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Environmental Impact Statement

Kariong Sand and Soil Supplies

Sand, Soil and Building Materials Recycling Facility - SSD8660

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This Environmental Impact Statement has been prepared by the following staff of Jackson Environment and Planning Pty Ltd, Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060; in association with Northstar Air Quality Pty Ltd, Waves Consulting, Sustainability Workshop, Narla Environmental, Bushfire Planning & Design, ACOR Consultants, Douglas Partners, RGH Consulting Engineers, Seca Solutions, Biosis, Moir Landscape Architecture, Clearsafe and Conzepts Landscape Architects.

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We declare that:
The statement has been prepared in accordance with clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation* 2000.

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 the information contained in the statement is neither false nor misleading.

Report version	Authors	Date	Reviewer	Approved for issue	Date
v1.0	Dr J.Lethlean, R. Loemker and Dr M. Jackson	02/07/18	Dr M.Jackson	Dr M.Jackson	02/07/18
V2.0	Dr J.Lethlean, R. Loemker and Dr M. Jackson	18/07/18	Dr M.Jackson	Dr M.Jackson	20/07/18
V3.0	Dr M.Jackson	26/09/18	Dr M.Jackson	Dr M.Jackson	26/09/18
V4.0	Dr J.Lethlean	27/09/18	Dr M.Jackson	Dr M.Jackson	27/09/18
V4.1 Revised (in response to DPE adequacy review on 12/10/18)	Dr J.Lethlean	14/01/19	Dr M.Jackson	Dr M.Jackson	15/01/19
V5.0 – Response to Submissions	Dr J.Lethlean, R. Loemker and Dr M. Jackson	05/02/20	Dr M.Jackson	Dr M.Jackson	05/02/20
V6.0 Revised in response to DPIE adequacy review Feb/Mar 2020	Dr J.Lethlean, R. Loemker and Dr M. Jackson	03/08/20	Dr M.Jackson	Dr M.Jackson	05/08/20

Executive Summary

About the development

This Environmental Impact Statement (EIS) has been prepared for the proposed development of a sand, soil and building materials recycling facility at 90 Gindurra Rd, Somersby (Lot 4 DP 227279). The facility located at the site is approved to receive sand and soil, which is blended into specific landscape products.

Kariong Sand and Soil Supplies (KSSS) is seeking development consent for the site to enable the company to receive up to 200,000 tonnes of waste for recycling each year. The proposed development will seek to expand the current facility into a best-practice recycling plant that can process a range of sand, soil and building materials, and produce a wide range of landscape supplies. The proposed facility is ideally located to receive waste materials from the Central Coast region. This will assist in achieving the NSW Government's target of an 80% recycling rate for construction and demolition waste by 2021.

Purpose of the Environmental Impact Statement

The EIS study evaluates the social, environmental and economic impacts and benefits of the project. The EIS defines the context of the proposed development, and examines those issues considered to be relevant. This EIS considers the potential environmental effects of the proposal during construction and operation, and proposes mitigation measures to prevent, reduce or offset significant adverse impacts on the environment. The aims of this EIS 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.

In delivering this EIS, Jackson Environment and Planning Pty Ltd has undertaken all statutory planning assessments, including the preliminary hazard analysis and environmental risk assessment, and stakeholder consultation. We consulted with neighbours, community groups, Central Coast Council, NSW Department of Planning, Industry and Environment, NSW Environment Protection Authority, Roads and Maritime Services, NSW Fire and Rescue, NSW Rural Fire Service, NSW Department of Primary Industries and AusGrid. We have also prepared the waste management, waste and chemical impact assessments.

NorthStar Air Quality Pty Ltd has undertaken the specialist air quality assessment, and Waves Consulting has undertaken the noise and vibration impact assessment. Seca Solutions has undertaken the transport and traffic impact assessment. Sustainability Workshop has undertaken the civil engineering design, soil and water management studies. A Baseline Groundwater Investigation has been performed by Douglas Partners. Hydraulic engineer design has been undertaken by RGH Consulting Engineers. Soil and contamination assessment has been undertaken by Clearsafe. The fauna and flora study has been undertaken by Narla Environmental. The fire and incident management study has been undertaken by Bushfire Planning & Design, and the fire safety study has been undertaken by ACOR Consultants. Aboriginal and historic heritage by Biosis. The visual impact assessment has been undertaken by Moir Landscape Architecture and the landscape concept design by Conzepts Landscape Architects.

The EIS has considered a range of social, environment and economic factors of the project, with a focus on Ecologically Sustainable Development principles. The study found that there were no significant environmental impacts that could not be mitigated by appropriate mitigation measures and management strategies.

The environmental assessment process has been used to inform the upgrade to the site and ensure operations will be sustainable and create minimal impacts on neighbours and the local community. Waste and soil receiving, processing and recycling operations will now be performed fully indoors. Operations have been designed to minimise traffic

impact on local roads, effective management of wastes, protection of soils, protection of surface and ground water quality, and minimise noise and dust emissions.

Planning and approvals pathway

The EIS addresses the NSW Department of Planning and Environment's Secretary's Environmental Assessment Requirements (SSD8660). Consent is now sought for the proposal under the *Environmental Planning and Assessment* Act 1979.

This EIS has been prepared in accordance with the requirements of the *Environmental Planning and Assessment Act* 1979, and Clause 6 and 7 of the *Environmental Planning and Assessment Regulation* 2000. This EIS has been prepared in accordance with the requirements of the *Environmental Planning and Assessment Act* 1979, and Clause 6 and 7 of the *Environmental Planning and Assessment Regulation* 2000. The EIS has also been delivered to meet the Secretary's Environmental Assessment Requirements (SEARs), which were issued on 23 August 2017 by Kelly McNicol, Acting Director, Industry Assessments, as a delegate of the Secretary.

Under Section 4.36 of the *Environmental Planning and Assessment Act* 1979 and Schedule 1 of the *State Environmental Planning Policy (State and Regional Development)* 2011, the proposed development is considered to be a State Significant Development, requiring an EIS to be submitted with the development application. The development is also considered to be an Integrated Development and will require an Environment Protection Licence from the NSW Environment Protection Authority under Schedule 1 of the *Protection of the Environment Operations Act* 1997.

An EIS was submitted to DPIE on 29th January 2019. During the public exhibition period, 1,329 submissions were received. Substantial feedback on the proposed development was provided by government agencies, neighbouring businesses and the general public. In addition, Kariong Sand and Soil Supplies conducted extensive community engagement and consultation in 2019.

The development proposal has been revised to incorporate and address the comments received from organisations and the public. This EIS documents the measures to be taken to mitigate any potential negative impacts on the surrounding environment and neighbouring properties. This EIS provides an assessment of the revised project, and forms part of the resubmission of the development application for consideration.

This EIS should be read together with the Response to Submissions Report, which provides a detailed overview of the submissions made by the community and agencies, and the site design and operational changes to address concerns and to ensure the environment and health of people is protected at all times. This EIS report and the technical investigations in the appendix has been fully updated and revised to consider the additional site design and operational changes since the first EIS was exhibited in early 2019.

Summary of site design and operational changes following the public exhibition period

In response to the comments received from government agencies, neighbouring properties and the general public, substantial design and operational improvements have been made to the development. These include:

- Extensive community consultation and engagement
- Conducting additional technical studies:
  - Fire safety study
  - Additional air quality modelling
  - Upgrade of noise modelling
  - Additional biodiversity impact assessment, including additional fieldwork
  - Revision of landscape design plan
  - Update of visual impact assessment
  - Revision of civil works plans

- Updated water impact assessment
- Re-design and upgrade to the stormwater catchment and treatment system
- Upgrade to hydraulic services plan
- Re-design of site entrance and additional traffic modelling
- Additional Aboriginal Cultural Heritage Assessment and consultation
- Baseline Groundwater Investigation

The comments from agencies and the public received during the exhibition period have been considered and addressed in detail. These are summarised in the Response to Submissions Report. The development design has been adjusted to address the comments received. Additional mitigation measures will be put in place to ensure the impacts of the facility are minimised. A summary of proposed changes that have been incorporated into the overall design and operations of the development, which have been evaluated in the updated EIS include:

- All waste materials to be received indoors, to minimise impacts on the outdoor environment (e.g. dust, litter, noise and water quality);
- Buildings to enclose the crushing and mulching operations to minimise dust and noise, including misting to maximise dust control;
- A three-sided building around the waste receival area with a misting system to ensure that water quality is protected and dust is minimised;
- Concrete kerbing on the exit to the site to prevent any trucks using Debenham Rd;
- A redesigned stormwater treatment system including four gross pollutant traps, two CDS gross pollutant traps to treat “medium-risk” stormwater, emergency spill pond, stormwater isolation valves, an enlarged detention pond with floating wetland and a membrane filtration plant to supply the site with high quality water for dust control via sprinklers above all storage bays;
- A second weighbridge and office to be built to ensure efficient traffic movements to and from the site, once waste receival increases above 100,000 tonnes per annum;
- Additional three hydrants and an additional four fire hose reels to manage any potential fire incidents;
- Establishment of emergency quarantine areas for extinguishing any waste materials on fire;
- Reduction of the noise wall height along the north east corner of the site, with the introduction of native vine plantings to improve visual aesthetics and soften the interface between the site and neighbouring rural residential properties;
- A commitment that recycling will increase in stages, only after independent testing is done to prove the facility is performing to the highest environmental standards. These stages proposed include:
  - Following development approval, waste receival to increase over time to a threshold of 100,000 tonnes per annum;
  - Consent to increase waste receival to 150,000 tonnes per annum;
  - Consent to increase waste receival to 200,000 tonnes per annum;
- Operational hours clarified as follows:
  - Opening hours (staffed): 7:00am to 6:00pm Monday to Saturday. Closed Sunday.
  - Waste deliveries: 7:00am to 6:00pm Monday to Saturday. Closed Sunday.
  - Waste processing (sorting, crushing, grinding, screening): 8:00am to 5:00pm Monday to Friday.
  - Product sales: 7:00am to 6:00pm Monday to Saturday. Closed Sunday.

- Continuous monitoring of air quality (dust) and noise at the site boundaries, including surface water and groundwater monitoring; and
- A commitment to establish a Community Consultative Committee with an independent chair post approval for providing a forum for the community to provide feedback on the performance of the development.

All the technical studies have been reviewed and updated to reflect the change in site design and parameters. All technical studies conclude that the final design will result in the facility having minimal impact on the environment and surrounding land users.

Overall, the project meets the environmental criteria in the relevant standards and guidelines and now meets the additional requirements listed in the agency comments. The environmental and social impact on the local area will be negligible. The project is consistent with the objectives of the land use zoning and with the Council development strategies for the area. The new facility will provide employment, economic benefits and best practice recycling services for the local area.

General overview of the existing and proposed development

The facility will provide for additional sand, soil and building material recycling in the Central Coast region and will service areas across the Sydney region. The current and proposed development features of the site are listed in Table E1. The proposed development can be implemented with minimal adverse environmental impacts as demonstrated throughout this assessment and is justified in terms of overall economic benefits to both local, state and national economies.

The sand, soil and building materials recycling facility and landscape supplies business will better meet demand and assist in meeting community expectations for efficient and effective recycling of these materials on the Central Coast. The facility is in the IN1 General Industrial zone of Somersby Industrial Park. The facility will provide an important employment role, not only at the facility itself, but also in related industries such as suppliers of equipment, waste collection and recycling services.

The proposed development involves the development of a largely undeveloped industrial site, to enable the facility to be used to receive, process and recycle construction and demolition waste, as well as supply building and landscape supplies for local projects.

The facility will require an Environment Protection Licence from the NSW Environment Protection Authority. The facility will also be required to meet the EPA's *Standards for Managing Construction Waste in NSW* and the *Fire Safety Guideline: Fire Safety in Waste Facilities*.

The facility will help achieve a significant reduction in solid waste to landfill and assist the NSW Government to reach its recycling target of 80% for construction and demolition waste by 2021. The proposal will have positive flow-on effects throughout the local economy through the creation of 20 new direct jobs. An economic analysis of the project also suggests that development will inject $407 million into the Central Coast economy over the next 25 years.

Table E1. Summary of the 'current', 'proposed' and 'net change' in development features of the Kariong Soil and Sand Supplies Facility under SSD application 8660. The impacts of the proposed development have been carefully considered in this Environmental Impact Statement.

Site feature / operating conditions	Current Consent Conditions	Proposed	Net change
Types of wastes that can be lawfully received at the facility for recycling	Sand and metal	Soil - Virgin Excavated Natural Material (VENM) Soil – Non-putrescible solid waste meeting the CT1 threshold Concrete, tiles, masonry Asphalt Timber and stumps and rootballs Mixed building waste (masonry, concrete, brick, tiles, wood, timber and metal)	Soil - Virgin Excavated Natural Material (VENM) Soil - Non-putrescible solid waste meeting the CT1 threshold Concrete, tiles, masonry Asphalt Timber and stumps and rootballs Mixed building waste (masonry, concrete, brick, tiles, wood, timber and metal)
Annual processing limit (tonnes per annum)	No limit	200,000 tonnes per annum	200,000 tonnes per annum
Scale up of operations	No limit	A commitment that recycling will increase in stages, only after independent testing is done to prove the facility is performing to the highest environmental standards. These stages proposed include: • Following development approval, waste receival to increase over time to a threshold of 100,000 tonnes per annum; • Consent to increase waste receival to 150,000 tonnes per annum; • Consent to increase waste receival to 200,000 tonnes per annum.	A commitment that recycling will increase in stages, only after independent testing is done to prove the facility is performing to the highest environmental standards. These stages proposed include: • Following development approval, waste receival to increase over time to a threshold of 100,000 tonnes per annum; • Consent to increase waste receival to 150,000 tonnes per annum; Consent to increase waste receival to 200,000 tonnes per annum.
Maximum amount of waste that can be stored on-site at any point in time	No limit	40,000 tonnes	40,000 tonnes
Processing equipment	Not stated	<u>Outdoor operations:</u> Screen, excavator, front-end loader (outdoors), storage of materials in dedicated concrete bays with dust suppression system in place. <u>Indoor operations:</u>	<u>Outdoor operations:</u> Screen, excavator, front-end loader (outdoors), storage of materials in dedicated concrete bays with dust suppression system in place. <u>Indoor operations:</u>

Site feature / operating conditions	Current Consent Conditions	Proposed	Net change
		Waste receival, crusher, shredder, front-end Loader, excavator, conveyor, stackers, trommel screen, station picking line with conveyor, overhead magnet, air blower, hopper and bagging machine. Extensive indoor dust suppression systems to be installed, including network of outdoor storage bay mounted sprinkler systems for continuous dust control.	Waste receival, crusher, shredder, front-end Loader, excavator, conveyor, stackers, trommel screen, station picking line with conveyor, overhead magnet, air blower, hopper and bagging machine. Extensive indoor dust suppression systems to be installed, including network of outdoor storage bay mounted sprinkler systems for continuous dust control.
Weighbridge	None	A new 26m above ground weighbridge will be installed adjacent to the front office. A second 26m weighbridge and a weighbridge office will be installed once the site receives the equivalent of 100,000 tpa of waste	A new 26m above ground weighbridge will be installed adjacent to the front office. A second 26m weighbridge and a weighbridge office will be installed once the site receives the equivalent of 100,000 tpa of waste
Fire suppression system	None	A total of six (6) fire hydrants will be installed. Three fire hydrants are to be installed under Stage 1 of the project (DA52541/2017). An additional three will be installed as part of Stage 2 of the project, which is the subject of this development application. A total of six (6) fire hose reels will be installed. Two fire hose reels are to be installed under Stage 1 of the project (DA52541/2017). An additional four will be installed as part of Stage 2 of the project, which is the subject of this development application. Two emergency quarantine areas to be established.	A total of six (6) fire hydrants will be installed. Three fire hydrants are to be installed under Stage 1 of the project (DA52541/2017). An additional three will be installed as part of Stage 2 of the project, which is the subject of this development application. A total of six (6) fire hose reels will be installed. Two fire hose reels are to be installed under Stage 1 of the project (DA52541/2017). An additional four will be installed as part of Stage 2 of the project, which is the subject of this development application. Two emergency quarantine areas to be established.
Containment of firewater	None	To be provided by on-site detention system and 70mm bunding within the Secondary Sorting Warehouse. Isolation valves to be installed in OSD basin.	To be provided by on-site detention system and 70mm bunding within the Secondary Sorting Warehouse. Isolation valves to be installed in OSD basin.
Treatment of stormwater runoff from site	Existing stormwater dam in place.	A new OSD and stormwater storage basin will be constructed to capture stormwater and sediment. The site will be contoured to ensure all	A new OSD and stormwater storage basin will be constructed to capture stormwater and sediment. The site will be contoured to ensure all

Site feature / operating conditions	Current Consent Conditions	Proposed	Net change
		stormwater run-off is collected. Stormwater will be treated through an extensive treatment train involving gross pollutant traps, bioswales, floating wetland in the OSD pond and a membrane filtration plant. An emergency spill pond is also proposed.	stormwater run-off is collected. Stormwater will be treated through an extensive treatment train involving gross pollutant traps, bioswales, floating wetland in the OSD pond and a membrane filtration plant. An emergency spill pond is also proposed.
Operating hours **(operational hours)**	6:30am to 5:30pm Monday to Saturday	Opening hours (staffed): 7:00am to 6:00pm Monday to Saturday. Closed Sunday. Waste deliveries: 7:00am to 6:00pm Monday to Saturday. Closed Sunday. Waste processing (sorting, crushing, grinding, screening): 8:00am to 5:00pm Monday to Friday. Product sales: 7:00am to 6:00pm Monday to Saturday. Closed Sunday.	Opening hours (staffed): 7:00am to 6:00pm Monday to Saturday. Closed Sunday. Waste deliveries: 7:00am to 6:00pm Monday to Saturday. Closed Sunday. Waste processing (sorting, crushing, grinding, screening): 8:00am to 5:00pm Monday to Friday. Product sales: 7:00am to 6:00pm Monday to Saturday. Closed Sunday.
Environmental monitoring	None defined	Continuous monitoring of air quality (dust) and noise at the site boundaries. Surface and groundwater monitoring to be performed.	Continuous monitoring of air quality (dust) and noise at the site boundaries. Surface and groundwater monitoring to be performed.

Staging of development

The proposed development will be staged, consisting of two defined project phases. Stage 1 will involve demolishing the existing sheds on the property and constructing an office building and warehouse. The two-stage development approach will enable the proponent in Stage 1 to occupy the site on a more permanent basis, by having an office building for staff to be based. It is noted that Stage 1 is currently underway and was approved by Central Coast Council as a local development under DA52541/2017 on 17/11/2017. The building design and location was modified and approved by Central Coast Council on 21/09/2018 under DA52541/2017.2. Stage 1 has already commenced.

Stage 2 will involve the following construction and operational activities (subject of this SSD development application):

- Clear selected vegetation from the front half of the site as determined by the Fauna and Flora and Vegetation Management Plan;
- Construct sediment control basin to capture run-off during construction;
- Grading of site. Construct retaining walls. Install water, power and recycled water services across the site. Install hardstand across the operational areas of the site;
- Install noise wall along eastern side of the site;
- Construct onsite roads, new entrance and modifications to Gindurra Rd (turning lane);

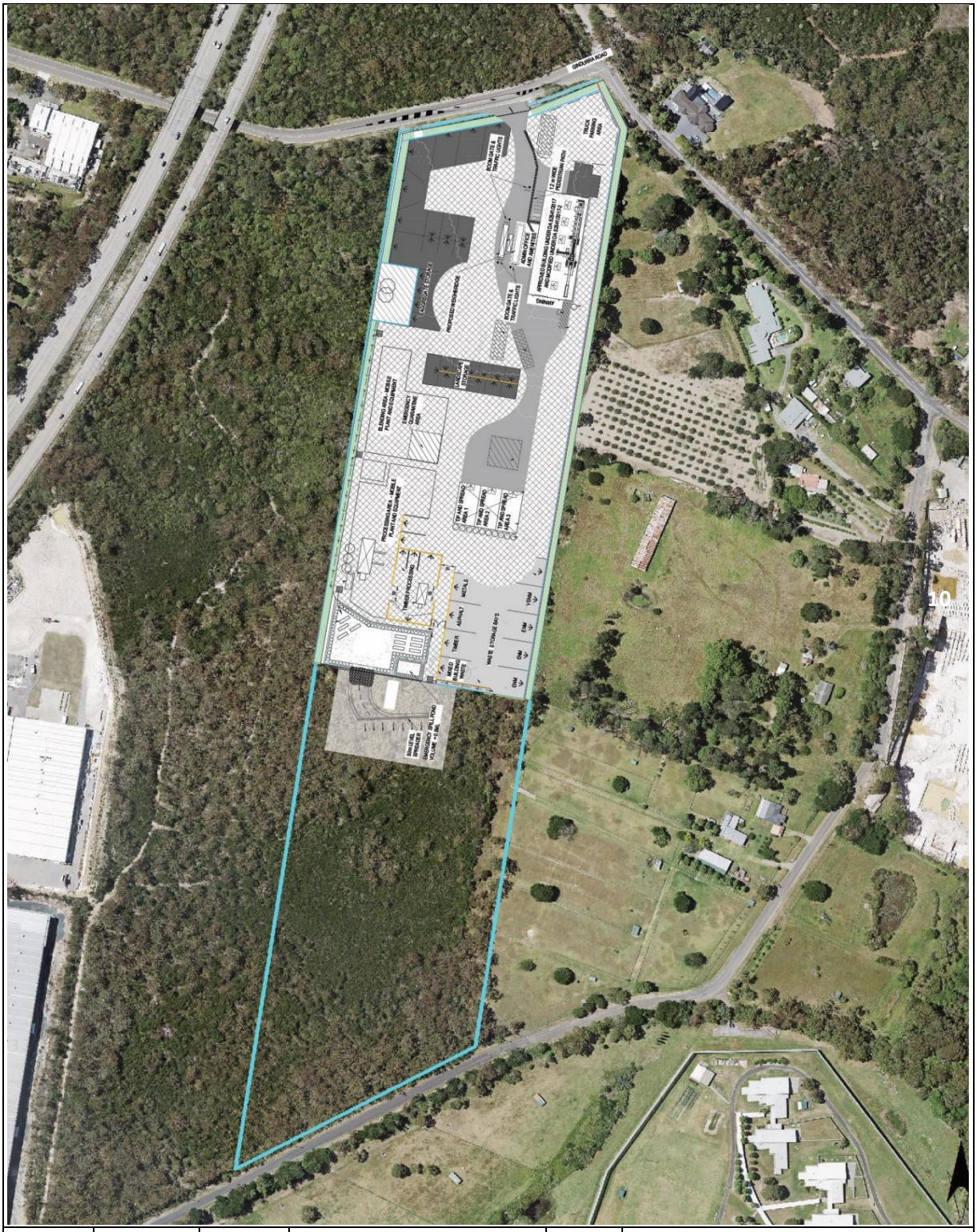
- Construct stormwater drainage system, including pond, floating wetland, level rock spreader, bioswales, gross pollutant traps and a packaged recycled water plant, connect to sewer;
- Construct crusher building;
- Construct mulcher building;
- Construct tip and spread waste receival building, rainwater harvesting tanks and misting system. Install truck wash bay, coalescing plate separator and awning (and connect to sewer);
- Install dust and fire suppression systems across the site, including the Secondary Sorting Warehouse;
- Construct waste storage bays, aggregate and landscape supply concrete bays, including bay mounted sprinkler system;
- Install processing equipment in crusher building, mulcher building and secondary sorting warehouse;
- Install weighbridges, traffic control lights and boom gates on site;
- Install environmental monitoring equipment (weather station, high volume air samplers, dust gauges, sound meters);
- Complete landscaping works;
- Commissioning and testing of site plant, equipment and environmental control systems, and issue of EPA licence for the site;
- Commence formal operations for receival and recycling of waste materials up to 100,000 tonnes per annum;
- Install second weighbridge and weighbridge office once waste receival exceeds 100,000 tonnes per annum;
- Waste receival to increase to 150,000 tonnes per annum subject to the site demonstrating compliance with consent and EPA licence conditions and satisfactory environmental performance; and
- Waste receival to increase to a maximum of 200,000 tonnes per annum subject to the site demonstrating compliance with consent and EPA licence conditions.

Operational description of the development

The site will be developed into a fully integrated, best practice facility for recycling of sand, soil and building materials. The site will comprise seven separate functional areas. A summary of operations and the functional areas of the site is provided in Figures E1 and E2 below.

Figure ES 1. 3-D visual of the proposed facility from Gindurra Rd.

Figure ES 2. Aerial view of proposed development site at 90 Gindurra Rd, Somersby.



Date	Revision	Drawn By	Site description	Client	Kariong Sand and Soil Supplies
31/01/20	Revision A	J Lethlean	90 Gindurra Rd, Somersby. Kariong Sand and Soil Supplies (Lot 4 / DP 227279)	Project	Upgrades to a Sand and Soil Supplies Facility
14/07/20	Revision B	J Lethlean		Title	Aerial view of development site
				Source	Central Coast Council & Sustainability Workshop

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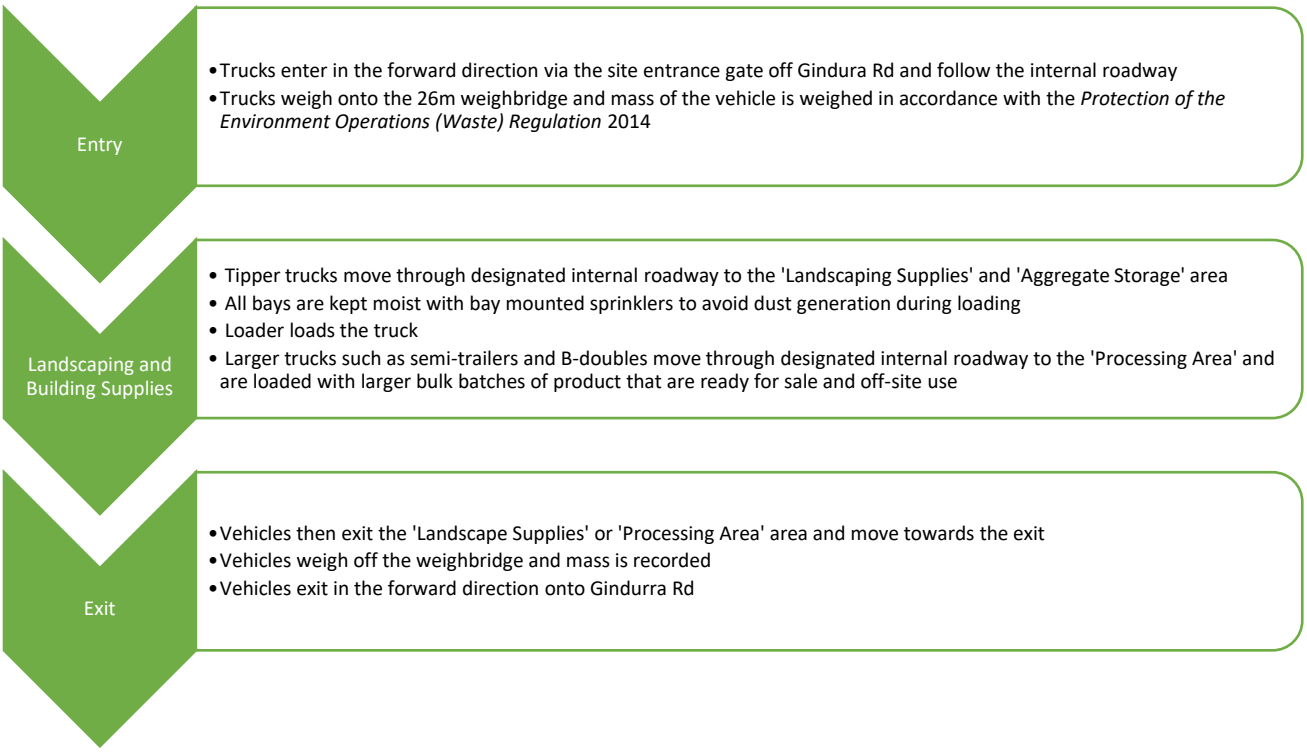
Figure ES 3. Process flow chart for recycling operations.

Figure ES 4. Process flow chart for landscaping and building supplies part of the operation.



Summary of Environmental Impact Assessment for the Updated Project

Waste Management

The waste generated during the demolition / construction phase of the project is estimated to be up to 18,090 m^3 of inert material (recycled concrete, rubble, soil), 5 m^3 of scrap metal, 100 m^3 of woody garden organics, 20m^3 mixed building waste and 3 m^3 of municipal solid waste (MSW). Existing concrete stockpiles on site need to be sampled and tested for compliance with the EPA's *Recovered Aggregate Resource Recovery Order* 2014 to confirm the material is acceptable for use in construction works on the site. The metal will be recycled at a scrap metal recycling facility, off-site. The woody garden organics will be shredded to produce mulch, and either used on-site or sold. The MSW will be removed from site and disposed in a licensed landfill.

During the operational phase, up to 200,000 tonnes per annum of waste materials will be received on site for recycling. The majority will be soil or source-separated inert material. Excavated Natural Material will be managed in accordance with *The Excavated Natural Material Order* 2014. Clean, non-treated timber will be mulched to be sold as a landscape product. Concrete and bricks will be crushed to produce aggregate, in accordance with the *Recovered Aggregate Resource Recovery Order* 2014. Mixed building waste will be sorted in an enclosed Secondary Sorting Warehouse, with the recovered paper, plastic, metal etc. sent off-site for recycling. Recovered timber and inert materials will be recycled on-site.

It is estimated that the re-use/recycling rate for the facility will be approximately 95%, with approximately 5,225 tonnes per annum of residual waste being removed for disposal to landfill. The recovered material will be sold as building and landscaping products from the premises.

A Waste Management Plan is provided at Appendix H.

Water Impacts

The main water issues associated with the site are the potential for stormwater contamination from on-site operations and water use for dust suppression. The on-site storm water and erosion control measures will ensure that all storm water is captured and treated on-site. The discharge point for the proposed development is located 400m away from a waterway. The largest potential impacts are the impacts on the health and stability of the bushland downstream of the proposed discharge point rather than off the site.

The site will comply with the requirements of the Blue Book during construction and this will ensure that construction phase sediment impacts are minimised.

During the operational phase, erosion on site will be limited by the use of concrete pavements, asphalt and hardstands, as well as vegetation in non-operational areas. Any sediment carried in the storm water will be captured in grassed swales and gross pollutant traps, then in sediment inlet ponds, followed by storage in an OSD basin. Sediment is to be removed regularly.

To minimise the risk of stormwater contamination, the site has been divided into four stormwater capture zones. The stormwater from each zone is treated to a level appropriate to the risk of the activities within the zone, prior to be discharged into the on-site detention basin. Stormwater from the high-risk area of waste receival can be isolated, if necessary, to allow testing and, if necessary, removal from site for treatment.

The on-site detention storage is proposed as part of the storage pond in the south-western corner of the site as shown on the Stormwater Management Plan included in Appendix E: Site, civil design and stormwater plans. The OSD basin will have a storage capacity of 5ML, with a headspace of up to 1.5m to allow for capture of firefighting water, if required. The pond is to be an open water body with steep sides and an access for maintenance. Inclusion of floating treatment wetlands in the pond will further attenuate pollutants in a biological process to see metals, suspended solids and nutrients removed. Overflow from the OSD basin is discharged from the site onto adjoining bushland located on the lower 4ha of the lot via a 50m wide level spreader, which will minimise erosion at the point of discharge. Volumes of runoff and runoff frequency are reduced back to near pre-European levels reducing potential impacts and protecting the bushland from any damages at the point of discharge.

Stormwater captured in the OSD basin will be treated in a membrane filtration plant and re-used for dust suppression on the stockpiles. Water captured in rainwater tanks will be used in dust misting systems, and for irrigating vegetation during extended dry periods. MUSIC water quality model results clearly show the site will exceed its best practice target and deliver water quality that is better than what is currently discharged from the site.

The high-risk part of the site is that part that contains the waste storage area and the timber processing area. This is the part of the site which affords the best opportunity to intervene to limit unusually high pollutant loads. If a potential water quality problem is going to occur on the site it is most likely to occur in this area as it stores unprocessed materials that may escape the rigorous tip and spread screening and rejection process. In the high-risk area continuous 24/7 real time water quality and flow monitoring will occur. In addition to the 5 ML water quality pond, an emergency spill pond of 500 m^3 volume will be provided. This will enable up to 60 mm of runoff to be contained in the spill pond from the high-risk catchment. Emergency spill prevention controls would include watertight penstocks which would prevent stormwater containing any spilled material from leaving the site.

A Baseline Groundwater Investigation found that the groundwater was generally fresh (low salinity levels and moderately to highly acidic), which is considered to be consistent with local background groundwater conditions, and that there were no signs of obvious contamination. Groundwater will be protected through the operational areas being either sealed hardstand or through the use of a waterproof membrane layer under areas covered in compacted crushed concrete. A groundwater monitoring and management plan will be implemented once the site is operational.

The site is connected to the town sewerage system. Wastewater from the water recycling treatment unit will be discharged to sewer as trade waste (subject to trade waste approval). A covered vehicle wash bay will use a coalescing plate separator to firstly treat dirty water (separating oils and grease) and then to discharge this water to trade waste.

The Stormwater Management Plan is provided in the set of Civil Plans at Appendix E. The Water Cycle Impact Assessment and Soil and Water Management Plan Report is provided at Appendix I. The Baseline Groundwater Investigation report is provided at Appendix K.

Soils and Contamination

A site investigation was conducted that included a review of site history, site inspection and soil sampling.

The information obtained from the review of available site history materials and site inspection identified three (3) potential Areas of Environmental Concern (AEC):

1. AEC 1 - Fill Materials of Unknown Origin - Fill materials and natural soils within the site were tested for a range of potential contaminants of concern. The samples tested reported results below the adopted criteria for the proposed development excluding 20-8613/TP3 - 0.5m, which reported a zinc concentration of 575 mg/kg which slightly exceeded the adopted ecological investigation levels. Results from three neighbouring test pits (<20m away) and all other test pits from across the site were analysed to be below the adopted criteria. The Zinc result for this sample appears to be an outlier and is considerably lower than Health Investigation Levels. Therefore, no significant risk of chemical contamination is expected across the site.
2. AEC 2 - Asbestos Containing Material - During the sampling, multiple fragments of non-friable asbestos cement (AC) were identified on ground surfaces within the north-eastern section of the site adjacent the buildings as well as in the central section of site.
3. AEC 3 - Hazardous Building Materials - Due to the age of the onsite buildings and structures, it is likely that hazardous building materials including but not limited to asbestos containing materials and lead paint may be present within these structures.

Based on the scope and limitations of the investigation, in consideration of the site observations and sample analytical results, it is considered that the site is unlikely to pose a significant contamination risk with regards to chemical contamination, however ACM was identified on ground surfaces within the north-eastern and central sections of site. A series of recommended mitigation measures will be implemented to reduce the risk at the site.

A full copy of the Contaminated Site Assessment is provided at Appendix L.

Air Quality

A risk-based assessment of the potential construction phase air quality impacts indicates that the implementation of a range of mitigation measures would be required to ensure that the risks (both health and amenity) to the surrounding community would be low or not significant.

The dispersion model predictions associated with the operational phase of the project indicate that the proposed operations can be performed without additional exceedances of the air quality criteria at any residential or non-residential receptor location surrounding the project site.

A range of emissions control measures would be implemented as part of the project operation, including; enclosing dust-generating operations, use of water misting systems on stockpiles and in buildings, and the use of a water cart around the paved areas and roads. The air quality mitigation measures are discussed in detail in the main body of the report and in the Air Quality Impact Assessment report. It is considered that the measures adopted represent best

practice dust control. The measures which are adopted have been demonstrated to ensure that the environmental objectives are achieved.

The updated air quality modelling also assessed the potential for release of silica dust. Worst case scenario modelling has been done. With the addition of a background concentration of 0.7 $\mu g \cdot m^{-3}$, the maximum respirable crystalline silica concentration is less than one third of the Victorian EPA and the California EPA Office for Environmental Health Hazard Assessment annual average criterion of 3 $\mu g \cdot m^{-3}$. Results clearly indicate that the project will not negatively impact on the health of the community, even at the closest residential receptor.

It is further recommended that a campaign of fence-line air quality monitoring is performed to provide the EPA with assurance that the site can be operated with the best practice measures outlined in the report and without giving rise to unacceptable air quality impacts.

A full copy of the Air Quality Impact Assessment is provided at Appendix M.

Transport and Traffic

The level of operation, by 2025, is estimated to generate up to 164 vehicle trips per day consisting of staff operational vehicles, 12 tonne tippers, 32 tonne truck and dog or semis, and 40 tonne B-Doubles. The peak hour movements were calculated based on the operation of a similar development, with a review of the typical movements across a day for this type of facility showing that peak truck movements for the site do not coincide with the road network peak periods. An allowance for 17 vehicles in the AM peak and 9 vehicles in the PM peak has been made based on the data provided. It is noted that the road network between Wisemans Ferry Road and 90 Gindurra Road is an approved B-Double route by the National Heavy Vehicle Regulator.

The site operator is anticipating that 25% of materials entering the site will come from Sydney while the remainder will be sourced locally on the Central Coast. It is expected that 100% of the products leaving the site will be used in the local area. These will be bulk loads transported in the various heavy vehicle classes listed above. There will be no sales direct to the public.

The existing road network and major intersections are currently operating at a good level of service with spare capacity and the traffic generated by the proposed development will be distributed to the road network over an 8 hour working day. The additional traffic is expected to have only a minor impact on the LoS of each of these roads and they will still be operating within their existing capacity.

From the route nominated, it is also clear that these additional trips will not have any significant impact on the operational performance of the intersections at Central Coast Highway / Kangoo Road. The intersections of the Central Coast Highway / Wisemans Ferry Road and Wisemans Ferry Road / Gindurra Road have been assessed and as each of these intersections is currently operating at acceptable levels of service with sufficient spare capacity to cater for the additional traffic generated by this proposed development the impact on the future development is acceptable.

The existing access has been reviewed and is to be relocated 14 metres west in accordance with Council's recommendation to satisfy sight distance. A concrete kerb is recommended on the exit to the site to ensure vehicles only exit to the left on Gindurra Road and do not proceed into the rural and residential areas to the east. A "no right turn" sign will also be installed at the exit to the site.

To facilitate the right turn movement into the site it is recommended that a right turn lane into the site be installed on Gindurra Road. The right turn lane shall provide sufficient storage for two B-Doubles (60 metres) with "No Stopping" signs installed. Management of vehicles internal to the site through the use of queuing/waiting areas, traffic lights and boom gates to control access to the weighbridge is described.

A full copy of the Traffic Impact Assessment is provided at Appendix N.

Noise and Vibration

A noise and vibration assessment, including noise modelling, was conducted for the proposed development. The assessment found that the predicted noise emissions from the site to the surrounding environment are low. The proposed development satisfies the Project Noise Trigger Levels (PNTLs) of the NSW Noise Policy for Industry (NPI) of the NSW Environment Protection Authority during all the time periods, providing the following noise mitigation measures are included:

- 5m high noise barriers along the eastern site boundary;
- 3m high noise barriers inside the site – one adjacent to the processing zone and another two adjacent to the landscaping storage zone and tip and spread waste inspection area;
- Processing building façade construction to provide a minimum airborne sound insulation performance of 35 dB Rw. This requirement should be reviewed and confirmed during detailed design;
- Processing building to have all doors and openings completely closed during processing activities; and
- Processing building mechanical equipment (AC units etc.) should have a maximum aggregate sound power level of 80 dB L_{WA}. This requirement should be reviewed and confirmed during detailed design.

Additional noise mitigation measures have been considered in the assessment in response to agency and community consultation. These include:

- Enclosure of the tipping and spreading bays to reduce noise during the unloading process;
- Enclosure of the crushing/grinding operation to reduce noise generation during processing; and
- Enclosure of the mulching operation to reduce noise generation during processing.

The sleep disturbance impacts from the operational noise events generated by the site were investigated in this assessment. There proposed development satisfies the sleep disturbance trigger levels at all nearby sensitive receivers.

The existing traffic noise levels on the nearby affected roads already likely exceed the RNP criteria. Therefore, all new traffic noise increases must satisfy the RNP 2 dB increase criteria. The noise assessment found that the proposed development generates negligible additional traffic noise. The Road Noise Policy (RNP) criteria are satisfied as a result.

The construction noise impacts have been assessed in accordance with the NSW interim Construction Noise Guidelines (ICNG). During standard construction hours, exceedances of the NMLs of up to 12 dB are predicted at the closest residential receivers on Acacia Road and Debenhams Road South. No receivers were found to be "highly noise affected" per the ICNG. Standard noise mitigation measures have been recommended for the construction phase. In addition, the operational noise walls along the eastern boundary should be constructed as early as practicable to reduce construction noise impacts for the remainder of the construction period.

The noise and vibration impact assessment also recommended that construction noise monitoring is undertaken for the duration of the construction period with bi-monthly reporting of construction noise levels. This monitoring should be undertaken at the worst-affected receiver during construction, with the assessment identified as 242 Debenham Rd South.

Construction traffic noise levels must satisfy the RNP 2 dB increase criteria. The assessment shows that the construction traffic generates negligible additional traffic noise. The NSW Road Noise Policy (RNP) criteria are satisfied as a result.

The offset distances (in all directions) between the vibrationally intensive equipment and any sensitive receivers is large (> 300 m). The potential for vibration impacts due to the construction or operation of the development are

effectively nil. All vibration criteria with respect to cosmetic damage to buildings and human comfort impacts will be satisfied as a result.

The study concluded that the proposed materials processing facility is a complying development with respect to noise and vibration impacts and is, therefore, suitable for construction and operation.

A full Noise and Vibration Impact Assessment is provided at Appendix O.

Biodiversity

Biodiversity consultants, Narla Environmental, conducted site assessments over multiple days in 2018 and 2019. The ecologists determined that a large portion of the development area had been historically cleared and modified and contained large old stockpiles of a range of materials including fill, large slabs of concrete, polystyrene, corrugated iron and conglomerate rocks. Large infestations of weeds and exotic pasture grasses had taken over much of the centre of the site, on and surrounding old stockpiles. Native vegetation was restricted mainly to the western and southern boundaries of the development area, in which vegetation was derived from three vegetation communities classified according to Plant Community Types (PCTs), including:

- PCT 1642: Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast
- PCT 1643: Red Bloodwood - Smooth-barked Apple - Scribbly Gum - Old Man Banksia heathy woodland on sandstone ranges of the Central Coast
- PCT 1579: Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast

Four (4) native vegetation zones were identified based on the PCT classification above and an assessment on condition consistent with the requirements of the FBA (OEH 2014b):

- Zone 1: PCT 1642 – Low Condition
- Zone 2: PCT 1642 – Moderate to Good Condition
- Zone 3: PCT 1579 – Moderate to Good Condition
- Zone 4: PCT 1643 – Moderate to Good Condition

A further two (2) zones that constituted non-native vegetation and were not assigned a PCT were classified as 'Cleared' and 'Weeds and Exotics'.

Eight (8) plots and transects were established within the development area to best sample the natural variation of the vegetation across the development area. Plots were randomly stratified to attain best coverage across the development area. The current and future site value scores for the vegetation zones were then assessed and calculated based on the data from the eight plots and transects collected on site and entered into the BCC. The current site value scores range between 25.17 / 100 to 83.51 / 100. For areas of complete clearing the future site value score is 0 / 100.

The BCC and Bionet identified a list of 17 species credit fauna species that were subject to targeted survey within the development area. Targeted survey was conducted using remote camera trapping, bat acoustic monitors, spotlighting, fauna call playback, and opportunistic sightings.

Eastern Pygmy Possum (*Cercartetus nanus*) was confirmed on the subject site through targeted surveys. The Eastern Pygmy Possum is a Species Credit species. No other Species Credit fauna species were identified within the Subject Site.

A total of 32 threatened 'species credit' flora species were modelled as having potential to occur, or historically recorded within 10km of the subject site. Such species were surveyed utilising the parallel field transverse method as

recommended by the NSW Guide to Surveying Threatened Plants. The survey periods aligned with the flowering period (when the species are most conspicuous) of most flora species, thereby having the greatest chance of displaying key diagnostic features.

During targeted surveys, the ecologists identified the presence of one threatened flora species within the subject site, *Melaleuca biconvexa*, which is listed as Vulnerable under the TSC Act and EPBC Act. This species is a Species Credit species. Fifteen (15) individual specimens were recorded on the subject site. The occurrence of *Melaleuca biconvexa* was restricted to the western boundary of the subject site, confined to a small patch of mature individuals with evidence of regeneration. This small patch of *Melaleuca biconvexa* will be excluded from the development, including a 10m vegetation buffer surrounding the population. No other threatened flora species were identified within the subject site during site inspection.

Specific ameliorative measures have been incorporated into the site design and operations to prevent any direct or indirect impacts to this population of *Melaleuca biconvexa*. This will involve treated water being used to irrigate land draining to this plant community aiming to supply the same average annual volume of water that would have flowed to this community under predevelopment conditions.

The proposed development is restricted to the northern sections of 90 Gindurra Road, Somersby NSW (Lot 4 / DP 227279). Total impacts to native vegetation is 3.11 ha, with the remainder of the development area consisting of already cleared land or dominated by exotic vegetation. This includes the clearing of:

- 1.4 ha within Zone 1: PCT 1642 – Low Condition
- 0.78 ha within Zone 2: PCT 1642 – Moderate to Good Condition
- 0.30 ha within Zone 3: PCT 1579 – Moderate to Good Condition
- 0.63 ha within Zone 4: PCT 1643 – Moderate to Good Condition

Impacts to Eastern Pygmy-possum are anticipated within Vegetation Zone 2 and Vegetation Zone 4. A total impact of 1.41 ha to Eastern Pygmy-possum has been calculated.

In total, 103 ecosystem credit and 28 Eastern Pygmy-Possum species credits must be retired in order to offset the impacts of the proposed development.

Although complete clearing of native vegetation has been used to calculate credits within the development area, several avoidance measures have been implemented during project design. Several mitigation measures will also be implemented during development to reduce impacts as much as possible.

The proponent will now explore the generation of credits from an on-site Biodiversity Stewardship site, before considering other options such as the purchase of credits from the market or payment to the Biodiversity Conservation Trust.

A full copy of the Biodiversity Assessment Report is provided at Appendix P.

Fire Safety

A Fire Safety Study was conducted by fire consultants, ACOR, for the proposed development. The fire safety study investigated proposed combustible materials to be stored at the site and the potential impacts of thermal radiation, the risk mitigation strategies and the recommendations for fire detection and protection.

At maximum capacity, the facility will store on-site approximately 3,907 tonnes of combustible materials at any one time comprising six discrete locations. The fire load associated with these materials is equivalent to approximately 60,525 gigajoules of energy.

The study identified that the open stockpiles of combustible materials stored in the yard (waste storage bays, processing area and landscape storage bays) are unlikely to cause an escalation of the fire event by direct thermal radiation. However, the risk from spread of burning embers could result in escalation. Consequently, methods to detect likely fire conditions and take preventative actions have been identified.

The Secondary Sorting Warehouse has several stockpiles of combustible (recovered) materials with proximity to each other. A fire in any of the SSW stockpiles is likely to spread to each of the other stockpiles, meaning that the worst-case heat release rate (49MW) in the Secondary Sorting Warehouse is much lower than for the open yard stockpiles (96 – 3,817MW).

Diesel fuel and lube oil, stored in a bunded compound in the southwest corner of the Secondary Sorting Warehouse, are unlikely to cause escalation to other combustible materials within the Secondary Sorting Warehouse, with fully developed burn time lasting 1.75 hours at 75kW/m^2 thermal radiation. This level of flux will cause damage to the zincalume cladding but should not result in combustion initiation in the actual Secondary Sorting Warehouse infrastructure.

LPG cylinders stored at the northern end of the SSW will be impacted by thermal radiation from a fire in the process area at a thermal radiation flux less than 4.7kW/m^2, however, this is unlikely to result in gas venting, assuming that firefighting water can applied within 20 minutes of a fire commencing.

An LPG cylinder jet fire is unlikely to result in injury at distances beyond 10m from source.

Flame heights in the SSW will extend beyond the three (3) metre high, concrete, tilt-up panels and cause thermal stress failure of the zincalume cladding. Thermal radiation will then be able spread into the yard space closest to the heat source.

Similarly, the yard stockpiles will extend to one metre below the top of the concrete block walls, allowing flame height to extend above the masonry heat barrier. The only thermal radiation that is likely to escape from the yard originates in the waste storage bay holding only timber. The distance of this bay from the eastern boundary of the KSSS property (44m) and the presence of the five (5) metre high noise barrier allows a thermal shadow to prevent radiation within a minimum of 54m from the source, to the east and 95 metres from the source to the west. The furthest extent of thermal radiation from source is 25 metres.

The consequences of a fire event may result in:

- Injurious thermal radiation (30 seconds exposure) originating in the Secondary Sorting Warehouse will be blocked (shadowed) to an average distance of 13m beyond the site boundary (at ground level) to the east, by the five (5) metre high noise barriers, effectively negating impacts adjacent to the Secondary Sorting Warehouse;
- Injurious thermal radiation (after 30 seconds exposure) originating in the processing area will not extend beyond the boundary of the KSSS premises;
- Injurious thermal radiation (after 30 seconds exposure) originating in the central landscape storages will not extend beyond the boundary of the KSSS premises;
- Injurious thermal radiation (after 30 seconds exposure) originating in the waste storage bays will not extend beyond the boundary of the KSSS premises; and
- An LPG vapour cloud explosion, involving the contents of two 18kg LPG cylinders should not cause injury beyond the western and northern boundaries of the site. On the eastern boundary, injurious overpressure with up to a 10 per cent probability of injury will extend approximately 15m into the adjoining property adjacent to the Secondary Sorting Warehouse.

An LPG vapour cloud explosion, involving the contents of two 18kg LPG cylinders (one LPG cylinder will cause the two other LPG cylinders to explode generating a maximum overpressure from two LPG cylinders) should not cause injury beyond the western and northern boundaries of the site. On the eastern boundary, injurious overpressure with up to a 10 per cent probability of injury will extend approximately 15m into the adjoining property.

The fire study indicates that three additional fire hydrants and four fire hose reels will need to be installed adjacent to the outside storage areas.

Firewater generated during a fire event will either be contained within the bunded compound of the Secondary Sorting Warehouse or will flow though dish and /or swale drains to the on-site detention (OSD) pond. Contaminated firewater captured in the OSD will be analysed prior to being discharged or removed from site by a licensed third party waste contractor.

The estimated firewater application for a four-hour duration fire in the Secondary Sorting Warehouse is approximately 288kL of which 50% is assumed to evaporate (144kL contaminated firewater, equivalent to a depth of 68mm over the Secondary Sorting Warehouse floor area. Consequently, a 70mm high bund wall will be installed internally, at each opening to the Secondary Sorting Warehouse.

The estimated firewater application for a four-hour fire in one of the processing area finished mulch bays is approximately 288kL of which 50% is assumed to evaporate (144kL contaminated firewater, equivalent to 2.9% of the OSD pond ullage capacity).

ACOR has modelled outcomes that are consistent with low consequence and low probability and considers that the development can be managed to provide a risk outcome that is acceptable to persons, property and the environment.

A copy of the full Fire Safety Study is provided at Appendix Q: Fire Safety Study.

Bushfire Hazard Assessment

The proposed development has been assessed against the potential threat of bushfire. It is noted that the proposed works relate to the construction of four unenclosed, non-combustible and non-habitable structures (mulcher operation building, crusher operation building, aggregate storage bay, landscape storage bay, waste receival bay and waste storage bay). The proposed development is considered to be “Other Development” in the context of PBP (2019).

The Class 7 development is not required to comply with AS3959 (2018) with regards to the construction of a building in a bushfire prone area. The general fire safety construction provisions of the NCC (2020) are taken as acceptable solutions, but the aims and objectives of PBP (2019) apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management. All proposed built structures are non-combustible and suitably located. In the event of a bushfire it is our view that the proposed development will not influence bushfire behaviour and will not increase bushfire risk for any adjoining properties.

There are no specific asset protection zones required for this type of development. The RFS have requested that the entire development area be managed as an Inner APZ. In addition to managing the development area as an Inner APZ, all storage bays are bounded by concrete retaining walls that will prevent potential fire spreading from the subject site onto adjoining bush land and vice versa.

Unobstructed vehicular access is provided to all key areas within the development site and unobstructed pedestrian access is provided to the rear of the site consistent with the RFS recommendations.

All proposed works are to be constructed from non-combustible materials. The nominated asset protection zones are deemed to be adequate. Site access, including access via the public road system is suitable for emergency response vehicles. The development can comply with *Planning for Bushfire Protection* (2019) with regards to the provision of water, subject to certification of services by a hydraulic engineer. The requirements for electricity and gas (if

applicable) can also be complied with. A bushfire emergency evacuation plan has been prepared such that employees and visitors are informed about suitable egress routes away from the site in the event of bushfire. Compliance with the NCC (2016) via compliance with AS3959, the *Australian Standard for the Construction of Buildings in Bushfire Prone Areas* can also be achieved.

A full copy of the Bushfire Hazard Assessment is provided at Appendix R.

Heritage

Historical heritage

The assessment has identified that the study area likely contains the archaeological remains of the 1920s cottage and associated buildings in the north eastern section. The significance assessment has identified that these archaeological remains do not contain any significant fabric or research potential and therefore does not require any management. The southern border of the study area is adjacent to a state listed conservation area, Mount Penang Parklands and as such required an assessment of possible impacts resulting from the proposed development. The works are confined to the northern section of the study area with no plans to use the southern section. The significance of the Mount Penang Parklands includes the visual relationship of the conservation area with its surrounds. Therefore, the southern portion of the study area should remain undeveloped to minimise any visual impacts. Built infrastructure within the study area should not exceed the height of extant buildings. It should also be mentioned that cumulative impacts of any future developments within the surrounds of Mount Penang Parklands will contribute the loss of the Parklands significance and should therefore be managed appropriately.

A copy of the Historical Heritage assessment is provided at Appendix S.

Aboriginal heritage

Biosis Pty Ltd were engaged to conduct an Aboriginal Cultural Heritage Assessment for the site.

As part of the Aboriginal archaeological assessment, background research was undertaken for the study area, including a search of the Aboriginal Heritage Information Management System (AHIMS) database and a review of regional and local archaeological survey reports. There are 36 Aboriginal cultural heritage sites registered with the Aboriginal AHIMS register in the vicinity of the study area, however there are no recorded sites located within the study area. Background research has identified that previous surveys have identified an engraving site, SIE 26, as either being located within the study area (J. C. Lough & Associates 1981) or 50m to the west of the study area (AMBS 2002). SIE 26 has not been recorded on the AHIMS register. Biosis has checked the coordinates for this site, and through mapping has been able to confirm that this site is not located within the study area and is located approximately 120 metres to the west of the study area. The location of this site was also checked during the field investigation and was unable to be identified.

An archaeological survey of the study area was undertaken on the 2 February 2018, with two representatives of the Darkinjung Local Aboriginal Land Council. The field investigation was conducted in accordance with requirements 5 to 10 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW 'the code' (DECCW 2010). The field investigation involved the recording of the disturbances within the study area and focused on the identification of areas that may possess potential for Aboriginal archaeological sites and objects. The exposure and ground surface visibility (GSV) within the study area was also noted. Areas of exposure were investigated in order to identify any Aboriginal objects/sites that might be present upon the surface. The study area was observed to be highly disturbed by human activity within the area. Poor levels of ground surface visibly and the lack of appropriate sandstone exposures and overhangs suitable for rock engravings, shelters and grinding grooves within the area also contributed to the low potential for identifying these dominant site types within the study area.

A supplementary field investigation of the study area was conducted on Wednesday 11 September 2019 by representatives from Biosis, Awabakal & Guringai Pty Ltd and a Guringai Elder. No previously unrecorded Aboriginal

cultural heritage sites were identified during the field investigation, and no areas of (archaeological) sensitivity were identified. Due to the high levels of disturbance identified in the northern section and the lack of sandstone exposures and overhangs suitable for rock, engravings, shelters and grinding grooves, there is allow potential for Aboriginal sites to be present within the study area.

The Aboriginal community was consulted regarding the heritage management of the project throughout its lifespan. Consultation has been undertaken as per the process outlined in the DECCW document, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (consultation requirements). The appropriate government bodies were notified and advertisements placed in the Central Coast Express newspaper (27 June 2019) which resulted in the following Aboriginal organisations registering their interest:

- Darkinjung Local Aboriginal Land Council;
- Widescope Indigenous Group;
- Corroborree Aboriginal Corporation;
- Awabakal & Guringai Pty Ltd;
- A1 Indigenous Services; and
- Private citizen.

A search conducted by the Office of the Registrar, *Aboriginal Land Rights Act* 1983 listed no Aboriginal Owners with land within the study area. A search conducted by the National Native Title Tribunal (NNTT) listed no Registered Native Title Claims, Unregistered Claimant Applications or Registered Indigenous Land Use Agreements within the study area, as the area is freehold and this extinguishes Native Title.

Upon registration, the Aboriginal parties were invited to provide their knowledge on the study area and to provide feedback on the provided Methodology document supplied to all Registered Aboriginal Parties (RAPs) on 25 July 2019. Comments received supported the proposed methodology. One group requested an additional site survey, which was undertaken. No responses were received commenting on the cultural significance of the study area therefore the outcome of the consultation process with the RAPs so far is that the study area currently has an unknown level of cultural significance. The results of the consultation process are included in the Aboriginal Cultural Heritage Assessment report.

The Archaeological Report and Aboriginal Cultural Heritage Assessment report are provided at Appendix T.

Visual impacts

The existing landscape character is a mix of industrial development, rural properties and bushland ridgelines and corridors. The scale of the built form in the proposal is small compared to existing industrial developments in the Somersby Industrial Area and is more in keeping with adjacent rural residential developments.

The implemented design principles of this report seek to avoid, reduce and where possible, remedy adverse effects on the environment arising from the proposed development. Implementation of the mitigation measures, which propose a combination of primary mitigation measures (site planning principles) and secondary measures (landscaping, street trees, colour and material selections) are proposed to reduce localised negative impacts.

The 5m noise barrier along the eastern boundary of the site will reduce to 2m in height in the north-eastern corner, to reduce the visual impact from Gindurra Rd. The wall will be screened by plantings, include native trees, shrubs and a native vine.

With the implementation of the recommended mitigation measures, the proposed development could be undertaken whilst maintaining the core landscape character of the area and have a negligible visual impact on the surrounding visual landscape.

The full Visual Impact Assessment is provided at Appendix U. A copy of the Landscape Plan is provided at Appendix F.

Chemicals and hazards

An assessment was conducted of the risk posed by the management and handling of chemicals during the construction and operational phases of the project. The assessment found that the risk of harm due to chemicals spills and leaks during the construction and operational phases of the project is deemed low. Containment measures and clean-up of the incident will address the negligible harm to environment, consistent with existing pollution incident response procedures in place at the site.

A range of mitigation measures are proposed to minimise impacts from chemicals during the different stages of the project. These measures will help mitigate against the impacts of a chemical spill or fire, thereby reducing the potential for harm to receiving waterways.

A Pollution Incident Response Management Plan is attached at Appendix V. An Emergency Plan is attached at Appendix W.

Contents

Appendices

1 Introduction

This Environmental Impact Statement (EIS) has been prepared for the proposed development of a sand, soil and building materials recycling facility at 90 Gindurra Rd, Somersby (Lot 4 DP 227279).

The facility located at the site is approved for receival of sand and soil, which is blended into specific landscape products.

Kariong Sand and Soil Supplies (KSSS) is seeking development consent for the site to enable the company to receive up to 200,000 tonnes of waste for recycling each year. The proposed development will seek to expand the current facility into a best-practice recycling facility that can process a range of sand, soil and building materials, and produce a wide range of landscape supplies. The proposed facility is ideally located to receive waste materials from the Central Coast region. This will assist in achieving the NSW Government's recycling target of an 80% rate for construction and demolition waste by 2021.

Under Section 4.36 of the *Environmental Planning and Assessment Act* 1979 and Schedule 1 of the *State Environmental Planning Policy (State and Regional Development)* 2011, the proposed development is considered to be a State Significant Development, requiring an EIS to be submitted with the development application.

Central Coast Council has also advised in a pre-lodgment meeting that under the *Protection of the Environment Operations Act* 1997, the proposed development will require concurrence and licensing from the NSW Environment Protection Authority.

The company is committed to complying with all laws that affect its operations and understands that development approval and appropriate licensing is required prior to the proposed development occurring. In this regard, pursuant to Part 2, Schedule 2 of the *Environmental Planning and Assessment Regulation* 2000, KSSS, as the Proponent, has prepared this Environmental Impact Statement to support its application for development consent.

1.1 Overview

1.1.1 Proposed development

The Kariong Sand and Soil Supplies development will involve the construction and operation of a best practice recycling and landscape supplies facility that will enable the receipt of up to 200,000 tonnes of sand, soil and building materials each year. The project will transform the site into a state-of-the-art facility turning sand, soil and building materials into 100% recycled building and landscaping supplies. The facility aims to produce a number of building and landscape products, providing them for re-use mainly in the Central Coast region.

The proposed development will seek to expand the current facility into a best-practice recycling plant that will assist the Central Coast in achieving the NSW Government's target of an 80% recycling rate for construction and demolition waste by 2021.

The project will involve the development of a largely undeveloped industrial site, to enable the facility to be used to receive, process and recycle construction and demolition waste, as well as supply building and landscape supplies for local projects. All waste materials will be received and processed indoors, to minimise impacts on the environment and neighbours.

The front part that will be visible from Gindurra Rd will be the landscaping supply operations, including landscaping along the road frontage and landscape storage bays behind the setback area. A fully enclosed warehouse where sorting and recycling operations will be conducted will be visible from the front of the site. Along the eastern boundary, a

noise barrier and a native landscape buffer will be planted to avoid noise impacts on nearly rural dwellings, and to provide an aesthetically pleasing interface between the edge of the Somersby Industrial Estate and nearby rural zoned lots and dwellings.

Waste processing and recycling operations for selected materials, including crushing and mulching will be done on the southern section of the site, where processing will also be done in dedicated buildings to avoid any impacts on nearby land uses. These operations are to be conducted at maximum distance from any sensitive receptors. The southern section of the site will be retained as bushland to provide a natural buffer between the development and other residential areas more than a kilometre away from the southern boundary of the site.

Advanced water capture, rainwater harvesting, water treatment and dust suppression systems will be integrated in all buildings and outdoor areas to prevent dust being formed. The site will also include an advanced membrane filtration plant to enable much of the water captured from the site to be fully reused across the site for operational uses. The site will also include a water pond treatment system for treating stormwater runoff, and an emergency spill pond for capture, testing and management of contaminated water for sewer discharge or off-site treatment. The site will also include its own weather monitoring station, high volume air samplers for continuous air quality and dust analysis, continuous noise loggers and continuous water quality analysis to confirm compliance with consent and licence conditions. The site will be fully serviced with fire suppression systems.

1.1.2 Purpose of the Environmental Impact Statement

The EIS has prepared by Jackson Environment and Planning Pty Ltd on behalf of Kariong Sand and Soil Supplies. It presents the findings of a comprehensive environmental evaluation, which has been undertaken to establish the potential impacts associated with the development of a 200,000 tpa sand, soil and building materials recycling facility at 90 Gindurra Rd, Somersby.

The EIS study evaluates the social, environmental and economic impacts and benefits of the project. The EIS defines the context of the proposed development, and examines those issues considered to be relevant. This EIS considers the potential environmental effects of the proposal during demolition, construction and operation, and proposes mitigation measures to prevent, reduce or offset significant adverse impacts on the environment. The aims of this EIS 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.

In delivering this EIS, Jackson Environment and Planning Pty Ltd has undertaken all statutory planning assessments, including the preliminary hazard analysis and environmental risk assessment, and stakeholder consultation. We consulted with neighbours, community groups, Central Coast Council, NSW Department of Planning, Industry and Environment, NSW Environment Protection Authority, Roads and Maritime Services, NSW Fire and Rescue, NSW Rural Fire Service, NSW Department of Primary Industries and AusGrid. We have also prepared the waste management, waste and chemical impact assessments.

NorthStar Air Quality Pty Ltd has undertaken the specialist air quality assessment, and Waves Consulting has undertaken the noise and vibration impact assessment. Seca Solutions has undertaken the transport and traffic impact assessment. Sustainability Workshop has undertaken the civil engineering design, soil and water management studies. Hydraulic engineer design has been undertaken by RGH Consulting Group. Soil and contamination assessment has been undertaken by Clearsafe. A Baseline Groundwater Investigation was undertaken by Douglas Partners. The flora and fauna study has been undertaken by Narla Environmental. The fire and incident management study has been undertaken by Bushfire Planning & Design, and the fire safety study has been undertaken by ACOR Consultants.

Aboriginal and historic heritage by Biosis. The visual impact assessment has been undertaken by Moir Landscape Architecture and the landscape concept design by Conzepts Landscape Architects.

The EIS addresses the NSW Department of Planning and Environment's Secretary's Environmental Assessment Requirements. Consent is now sought for the proposal under the *Environmental Planning and Assessment Act* 1979 from the Minister for Planning.

This EIS has been prepared in accordance with the requirements of the Environmental Planning and Assessment Act 1979, and Clause 6 and 7 of the *Environmental Planning and Assessment Regulation* 2000. The EIS has also been delivered to meet the Secretary's Environmental Assessment Requirements (SEARs), which were issued on 23 August 2017 by Kelly McNicol, Acting Director, Industry Assessments as a delegate of the Secretary (Appendix C).

1.1.3 The proponent

Kariong Sand and Soil Supplies, owned by The Davis Family, is the Proponent seeking a development consent to upgrade its existing Landscaping Supplies business to incorporate a sand, soil and building materials recycling facility. The site was purchased in January 2017. Prior to that, there had been only limited development and activity at the site, despite its IN1 zoning and location within the Somersby Industrial Estate.

The Davis Family also own a successful earthmoving business, Davis Earthmoving & Quarrying Pty Ltd (ABN: 89001288400). The Proponent has a sound understanding of the industry and has the resources to ensure the new facility is constructed to and operates at best practice.

1.1.4 Cost of the development

Based on the proposed development requirements, the total capital value of the project is estimated to be $14,866,000 excluding GST (see Appendix G for Capital Investment Valuation report). This is a significant capital investment by a family owned company, which will create an estimated 5 jobs in construction (over a 3-month period) and 20 permanent jobs, providing benefits to the environment and local economy of Somersby and the Central Coast.

1.1.5 Secretary's Environmental Assessment Requirements (SEARs)

The SEARs for the proposed development were issued by the NSW Department of Planning and Environment on 23 August 2017 to enable the EIS to commence.

The key project issues identified by the Secretary for consideration in the EIS are given in Table 1.1. Note that all these requirements have been addressed in the EIS, and the relevant sections are highlighted for easy cross-referencing.

Table 1.1. SEARs addressed in the EIS report.

Secretary's Environmental Assessment Requirements	EIS Section where this requirement is addressed
Detailed description of the development	Chapter 2 – Description of the Proposed Development
Demonstrate that the site is suitable for the proposed use in accordance with State Environmental Planning Policy No. 55 – Remediation of Land	Chapter 8 - Soils and Contamination Impact Assessment Appendix L: Contaminated Site Assessment
Consideration of all relevant planning instruments	Chapter 2 - Description of the Proposed Development, Strategic Context, Hazard and Risk Analysis
Consideration of issues discussed in Attachment 2 of the SEARs (public authority responses to key issues)	Chapters 6 to 17
Risk assessment of the potential environmental impacts of the development	Chapter 3 - Environmental risk assessment of the potential impacts of the development identifying key issues for assessment
Detailed assessment of the key issues:	

Secretary's Environmental Assessment Requirements	EIS Section where this requirement is addressed
Waste management	Chapter 6 - Waste Management Appendix H: Waste Management Plan
Traffic and transport	Chapter 10 - Traffic and Transport Appendix N: Traffic Impact Assessment
Air quality and odour	Chapter 9 - Air quality Appendix M: Air Quality Impact Assessment
Fire and incident management	Chapter 13 - Fire Safety Study Appendix Q: Fire Safety Study Chapter 14 - Bushfire Appendix R: Bushfire Hazard Assessment Appendix V: Pollution Incident Response Management Plan Appendix W: Emergency Plan
Noise and vibration	Chapter 11 - Noise and Vibration Impact Assessment Appendix O: Noise and Vibration Impact Assessment
Soil and water	Chapter 7 - Water Impact Assessment Appendix I: Water Cycle Impact Assessment and Soil and Water Management Plan
Flora and fauna	Chapter 12 - Biodiversity Appendix P: Biodiversity Assessment
Hazards	Chapter 17 - Chemicals and Hazards Impact Assessment Appendix V: Pollution Incident Response Management Plan Appendix W: Emergency Plan
Heritage	Chapter 15 - Heritage Appendix S: Historical Heritage Assessment Appendix T: Aboriginal Cultural Heritage Assessment
Visual impacts	Chapter 16 - Visual Impact Appendix U: Visual Impact Assessment
Consolidated summary of all the proposed environmental management and monitoring measures	Chapter 18 - Compilation of mitigation measures
Quantity surveyor report providing a detailed calculation of the capital investment value and a close estimate of the jobs that will be created during the construction and operational phases of the development.	Chapter 4 - Capital investment value
Engineering design	Appendix E: Site, civil design and stormwater plans
Landscape concept design	Appendix F: Landscape design plans
Consultation	Chapter 5 - Consultation Appendix X: Community Consultation Report

1.2 Project team

Jackson Environment and Planning Pty Ltd engaged a project team on behalf of Kariong Sand and Soil Supplies to undertake the design and specialist investigations for the EIS. The role of each team member is given below:

- Town planning – Jackson Environment and Planning Pty Ltd;
- Community consultation – Jackson Environment and Planning Pty Ltd;
- Waste management – Jackson Environment and Planning Pty Ltd;
- Air quality – NorthStar Air Quality Pty Ltd;
- Noise and Vibration – Waves Consulting;
- Water Cycle Impact Assessment and Soil and Water Management Plan – Sustainability Workshop;
- Baseline Groundwater Investigation – Douglas Partners;

- Soils and contamination – Clearsafe;
- Biodiversity – Narla Environmental;
- Hazards – Jackson Environment and Planning Pty Ltd;
- Bushfire Risk Assessment – Bushfire Planning & Design;
- Fire Safety Study – ACOR Consultants
- Transport and traffic – Seca Solutions;
- Heritage – Biosis;
- Visual impacts - Moir Landscape Architecture;
- Engineering design – Sustainability Workshop;
- Hydraulic services design: RGH Consulting Engineers;
- Landscape concept design – Conzepts Landscape Architects.

1.3 Consultation

As part of the EIS preparation process, a comprehensive council, agency and community consultation program has been undertaken in accordance with the Department's SEARs requirements. The consultation strategy and findings are documented in Chapter 5, and involvement engagement with:

- Central Coast Council;
- NSW Environment Protection Authority;
- NSW Department of Planning and Environment;
- NSW Office of Environment and Heritage;
- Roads and Maritime Services;
- NSW Fire and Rescue;
- NSW Department of Primary Industry;
- Ausgrid; and
- And a total of 45 businesses, nearby residents within the area and the Central Coast community.

To help in engaging the community, seek feedback on the additional site enhancements and assist in building community understanding of the project, a comprehensive community engagement strategy was prepared and delivered between August and November 2019. The tools used included print, online, media and in person meetings were chosen to maximise participation, increase understanding and maximise engagement during this phase of the project.

As a result of the community engagement program, the following reach and participation was achieved:

- 1,000 households and businesses in the Somersby Industrial Estate received a four-page fact sheet on the proposed development, and further site enhancements proposed;
- 5,000 households in Somersby, Kariong and the surrounding districts through news stories published in community group newsletters (Kariong Connections and Mangrove Mountains & Districts Community News);
- 32 people including neighbours, community members and members of three community groups were consulted and a presentation provided on the proposed development, and further site enhancements proposed – this was achieved through direct meetings, two public meetings and one field day;
- Approximately 60,000 people living on the Central Coast and Sydney community were exposed to a media story published on the proposed development on 9th November 2019 in the Central Coast Express Advocate (online edition); and
- 233 unique visitors to the Kariong Sand and Soil Supplies web site between August and November 2019.

1.4 Accompanying documentation

The body of the report provides details of the proposed development and a summary of the findings of each of the environmental studies. The details of the environmental assessments for each issue is provided in the individual reports attached to this report as appendices. These appendices should be read in conjunction with the chapter summaries provided in this EIS report.

The documentation attached to this report includes:

- Original development consent;
- Section 149 certificates;
- SEARs requirements;
- SEPP55 Contaminated site assessment;
- Civil works plan and proposed site layout;
- Hydraulic services plan;
- Landscape concept plan;
- Waste management plan;
- Water Cycle Impact Assessment and Soil and Water Management Plan
- Baseline Groundwater Investigation
- Contaminated site assessment
- Air quality impact assessment report;
- Noise and vibration impact assessment report;
- Traffic assessment report;
- Fire Safety Study
- Bushfire Hazard report;
- Biodiversity assessment report;
- Hazards assessment;
- Heritage assessment report;
- Aboriginal Cultural Heritage Assessment report
- Visual impact assessment report;
- Community Consultation report; and a
- Capital Investment Value Estimate report.

2 Description of the Proposed Development, Strategic Context, Hazard and Risk Analysis

2.1 Site history and approvals

The site was approved by Gosford City Council in 1992 as a Sand and Metal Recycling Facility (DA 15337). The Development Consent is provided as Appendix A. In 1992, the site was owned by another party. The site was purchased by its current owners in January 2017.

Over the past 25 years, the site has undergone minimal development. Most of the site is bushland, with two areas cleared and in use. The original consent permitted an operational area of approximately 10,000 m^2. An additional area of approximately 14,000 m^2 was subsequently cleared and is currently being used as a processing and sorting area. The Development Consent does not specify a limit on the amount of material that can be received at the site. However, as the site is not covered by an Environment Protection Licence, and there is limited space for processing, development consent is required to expand the operations at the site.

The current facility is approved to receive sand, soil and metal for landscaping supplies. The current development consent (DA15337/1992) has no limit on the quantity of materials that can be received and processed for sale.

On 17/11/17, the owner sought development approval for Stage 1 of the development works under DA52541/2017 from Central Coast Council (see Appendix A). This development consent provides permission for construction of a new shed with offices & amenities & driveway. The building design and location was modified and approved by Central Coast Council on 21/09/2018 under DA52541/2017.2. Under this modified DA, the building was moved 18 m west of the original proposed location under DA52541/2017, and the front awning has been enclosed. This consent is provided in Appendix A. It is noted that the proposed development under Stage 2, which is the focus of this SSD application, complements Stage 1 of the development.

We note that construction works under DA52541/2017.2 are underway on the site, with construction works to the warehouse and services to be completed shortly.

In the absence of a specified processing limit imposed through the planning process, the processing throughput at the site is limited by environmental legislation, which is discussed in further detail in Section 2.6.5.

2.2 Site description

The KSSS site is currently operated as a soil and sand recycling business, located at 90 Gindurra Rd, Somersby, NSW. Recycled sand and soil is sold for landscaping. The site's current development approval and infrastructure limits the amount of material that can be accepted and processed (screened and sorted) at the site.

The site currently has development consent as a 'Sand and Metal Recycling Facility', which was originally approved under DA 15337 on 28/02/1992 (See Appendix A). The current consent permits the receiving of soil and sand, screening, landscaping material storage in outdoor concrete block bays and machinery parking at the front of the site. There are some structures on the site.

The total site covers an area of approximately 10.8 hectares. Only approximately 2.4ha at the front of the site is in use. The remainder of the site is bushland. It is proposed that the back (Southern) half of the site remain bushland in the new development.

2.2.1 Local context

The site is located on the eastern edge of the Somersby Industrial Park, located on the Somersby Plateau section of the Hunter Range on the Central Coast of New South Wales. The Somersby Industrial Park (SIP) is approximately 300 hectares in size and is located four to five kilometers west of Gosford.

According to the Somersby Industrial Park Plan of Management (Connell Wagner Pty Ltd, 2005), the key values of the Somersby Industrial Park are:

- Economic values that provides substantial employment and industrial development opportunities;
- Ecological and environmental values relating to the remnant native vegetation which provides significant habitat and linkages for a range of threatened flora and fauna species as well as other species; and
- Aboriginal heritage values arising from previous indigenous occupation of the area and represented by unique rock art and culturally significant sites.

The Somersby Industrial Park is bisected by the Sydney-Newcastle F3 freeway, which was constructed in the 1980s, and there are direct connections to the F3 from the Somersby Industrial Park. The SIP is also served by a number of internal roads that provide access to all allotments in the park.

Early settlement in the Somersby area occurred in the later 1800s. The Somersby area was exploited for timber and for the resin of the grass trees. When land subdivision took place, a number of settlers moved into the area and established orchards and other agricultural activities.

Around 1910, there was relatively little land under cultivation. Post–WW1, the extent of land cleared increased significantly, although it still remained confined within the general bounds of the SIP.

The most significant alterations to the landscape occurred following the gazettal of the industrial park in 1981. By 1999 only a few isolated pockets of untouched bushland remained with the majority of the SIP having been built upon, cleared of trees and/or shrub understory cleared by heavy machinery.

The SIP was officially opened in June 1980. In July 1981, Local Environmental Plan (LEP) No. 22 at the time was gazetted, which zoned the majority of the SIP for General Industrial 4(a1) with a small area zoned for Business 3(a2). The area is now zoned IN1 General Industrial under the *Gosford Local Environmental Plan* 2014.

Figure 2.1 shows an aerial view of the site, with the current development at the site. Only a limited area has been cleared. Figure 2.2 shows the land use zoning for the site, which is IN1 General Industrial. The site is part of the Somersby Industrial Estate. Figure 2.3 and Figure 2.4 show the status of the site.

A new warehouse and office building under DA52541/2017.2 is currently under construction. That development is subject to a separate development approval as described in Section 2.1 and is not part of this project.

There is a small pond located at the centre of the site, and a dam on the western boundary of the site (overgrown with vegetation). No formal stormwater drainage system exists on the site.

Figure 2.1. Aerial view of the current site. Lot boundaries are shown in red. 1, entry; 2, new warehouse / office; 3, main processing area & current stockpiles. Source: Google Earth & Central Coast Council.

Date	Revision	Drawn By	Site description	Client	Kariong Sand and Soil Supplies
10/05/17	Revision A	J. Lethlean	90 Gindurra Rd, Somersby. Kariong Sand and Soil Supplies (Lot 4 / DP 227279)	Project	Upgrades to a Sand and Soil Supplies Facility
16/07/20	Revision B	J. Lethlean		Title	Aerial photograph with current operations marked
				Source	Google Earth & Central Coast Council

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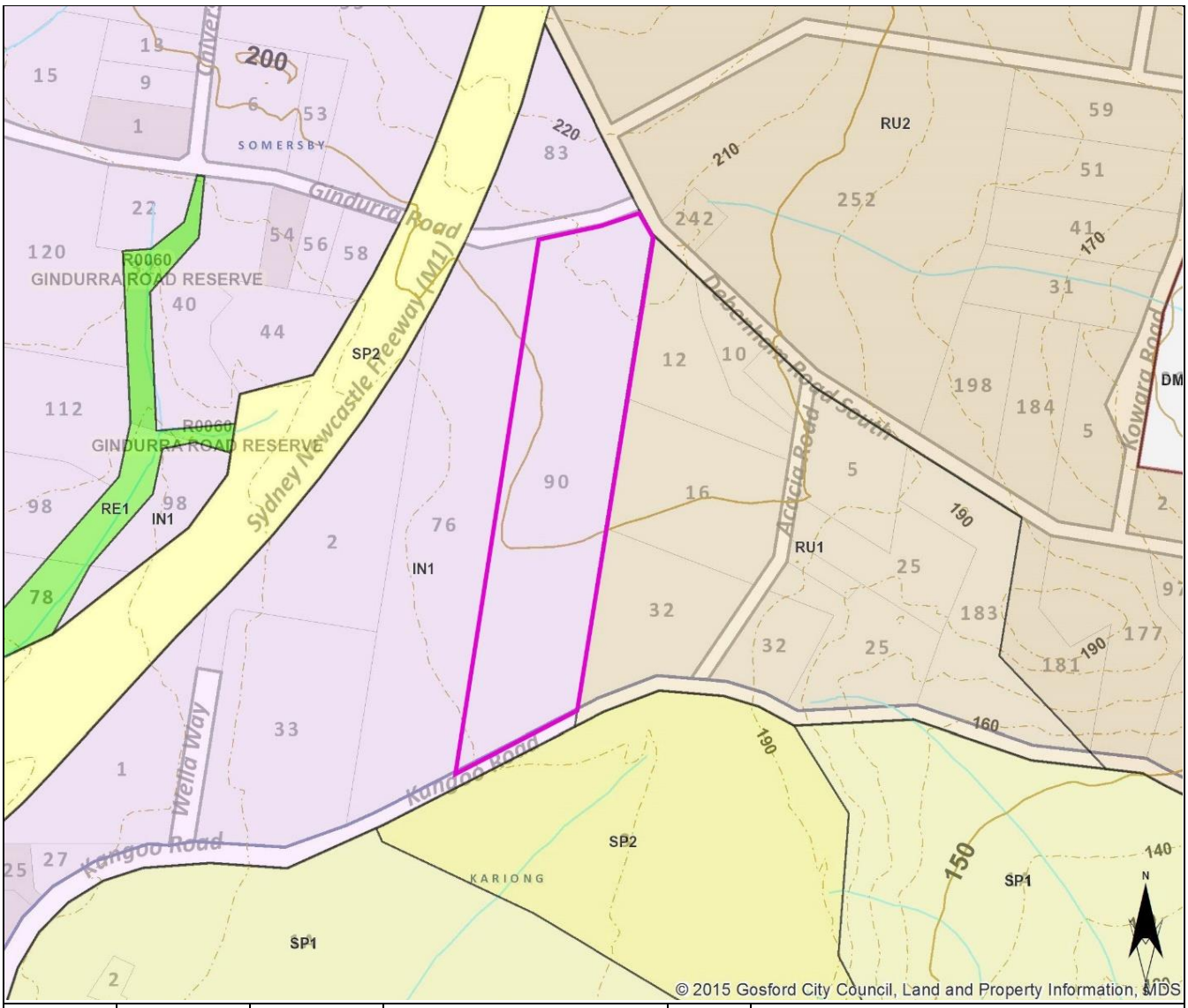
Figure 2.2. Land use zoning of the subject site, showing the area to be zoned IN1 General Industrial. Lot boundaries are shown in purple. Source: Central Coast Council.



Date	Revision	Drawn By	Site description	Client	Kariong Sand and Soil Supplies
10/05/17	Revision A	J. Lethlean	90 Gindurra Rd, Somersby. Kariong Sand and Soil Supplies (Lot 4 / DP 227279)	Project	Upgrades to a Sand and Soil Supplies Facility
				Title	Land use zoning
				Source	Central Coast Council

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Figure 2.3. View south from the entrance driveway of warehouse/office, as approved under DA52541/2017.2.

Figure 2.4. Photo of the centre of the site with legacy concrete stockpiles from the former owner. This area will be cleaned up as part of the construction process.

2.2.2 Regional and environmental context

The site is on the Eastern edge of the Somersby Industrial Estate. To the immediate West of the site is a vacant, undeveloped block, which is next to developed IN1 blocks and the M1 Sydney Newcastle Freeway. The bulk of the Somersby Industrial Estate lies to the West of the Freeway.

The land to the East and North-East of the site is zoned rural and consists of rural properties. These include several residences, as well as an orchard and Gosford Quarry.

The land to the South of the site is zoned SP2 Special Purposes. Most of the SP2 land hosts the Kariong Correctional Centre. However, the land immediately south of the development site is used as a riding school for the disabled.

The site immediately to the North is undeveloped land zoned IN1 General Industrial.

2.2.3 Neighbouring properties and sensitive receptors

The site is surrounded by a mix of commercial premises and rural properties, with the closest residential dwellings located approximately 22m from the front boundary of the property. The site is located approximately 200m from the Sydney Newcastle Motorway (M1) (Figure 2.5).

Sensitive receptors are considered in the Environmental Impact Statement along with other issues as raised by the Department of Planning, Industry and Environment and other regulatory authorities, to ensure the proposed development will provide an environmentally acceptable and valuable recycling facility to support the Central Coast community.

The adjoining and nearby premises/activities can be considered as sensitive receptors and impacts on these properties will be carefully considered and mitigated as part of the environmental planning investigations in preparing the Environmental Impact Statement for the development.

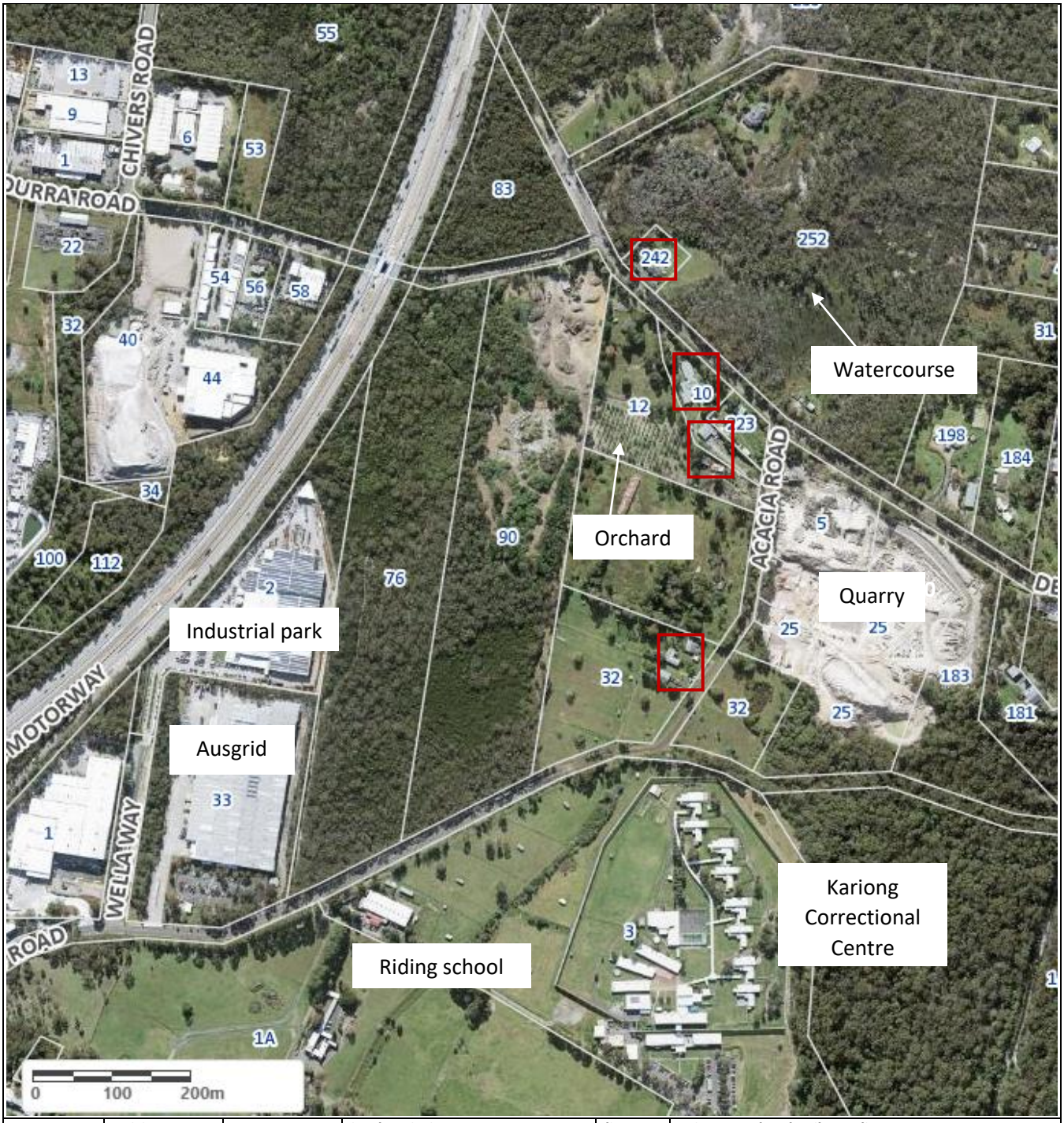
Although the nearest residential zone (R2) is located just over 1km from the site boundary (Figure 2.6), there are several residential dwellings on rural zoned land within 500m of the development site.

Table 2.1. Properties within 500m of the proposed development site.

No.	Address	Suburb	Zone	Zone Description
1	5 Acacia Rd	Somersby	RU1	Primary Production
2	10 Acacia Rd	Somersby	RU1	Primary Production
3	12 Acacia Rd	Somersby	RU1	Primary Production
4	16 Acacia Rd	Somersby	RU1	Primary Production
5	25 Acacia Rd	Somersby	RU1	Primary Production
6	32 Acacia Rd	Somersby	RU1	Primary Production
7	32 Acacia Rd	Somersby	RU1	Primary Production
8	3 Central Coast Hwy	Kariong	SP1	Special Activities
9	1A Central Coast Hwy	Kariong	SP2	Infrastructure
10	6 Chivers Rd	Somersby	IN1	General Industrial
11	97 Debenham Rd South	Somersby	RU2	Rural Landscape
12	183 Debenham Rd South	Somersby	RU2	Rural Landscape
13	184 Debenham Rd South	Somersby	RU2	Rural Landscape
14	198 Debenham Rd South	Somersby	RU2	Rural Landscape
15	223 Debenham Rd South	Somersby	RU1	Primary Production

No.	Address	Suburb	Zone	Zone Description
16	242 Debenham Rd South	Somersby	RU2	Rural Landscape
17	252 Debenham Rd South	Somersby	RU2	Rural Landscape
18	22 Gindurra Rd	Somersby	IN1	General Industrial
19	40 Gindurra Rd	Somersby	IN1	General Industrial
20	53 Gindurra Rd	Somersby	IN1	General Industrial
21	54 Gindurra Rd	Somersby	IN1	General Industrial
22	55 Gindurra Rd	Somersby	IN1	General Industrial
23	56 Gindurra Rd	Somersby	IN1	General Industrial
24	58 Gindurra Rd	Somersby	IN1	General Industrial
25	21 Kangoo Rd	Somersby	IN1	General Industrial
26	25 Kangoo Rd	Somersby	IN1	General Industrial
27	27 Kangoo Rd	Somersby	IN1	General Industrial
28	33 Kangoo Rd	Somersby	IN1	General Industrial
29	31 Kowara Rd	Somersby	IN1	General Industrial
30	2 Wella Way	Somersby	IN1	General Industrial
31	2 Wella Way	Somersby	IN1	General Industrial
32	2 Wella Way	Somersby	IN1	General Industrial

Figure 2.5. Aerial view showing residential dwellings (in red boxes) and other land uses surrounding the subject site at 90 Gindurra Rd, Somersby.



Date	Revision	Drawn By	Site description	Client	Kariong Sand and Soil Supplies
30/01/2020	Revision A	J Lethlean	90 Gindurra Rd, Somersby. Kariong Sand and Soil Supplies (Lot 4 / DP 227279)	Project	Upgrades to a Sand and Soil Supplies Facility
				Title	Adjoining premises
				Source	Central Coast Council

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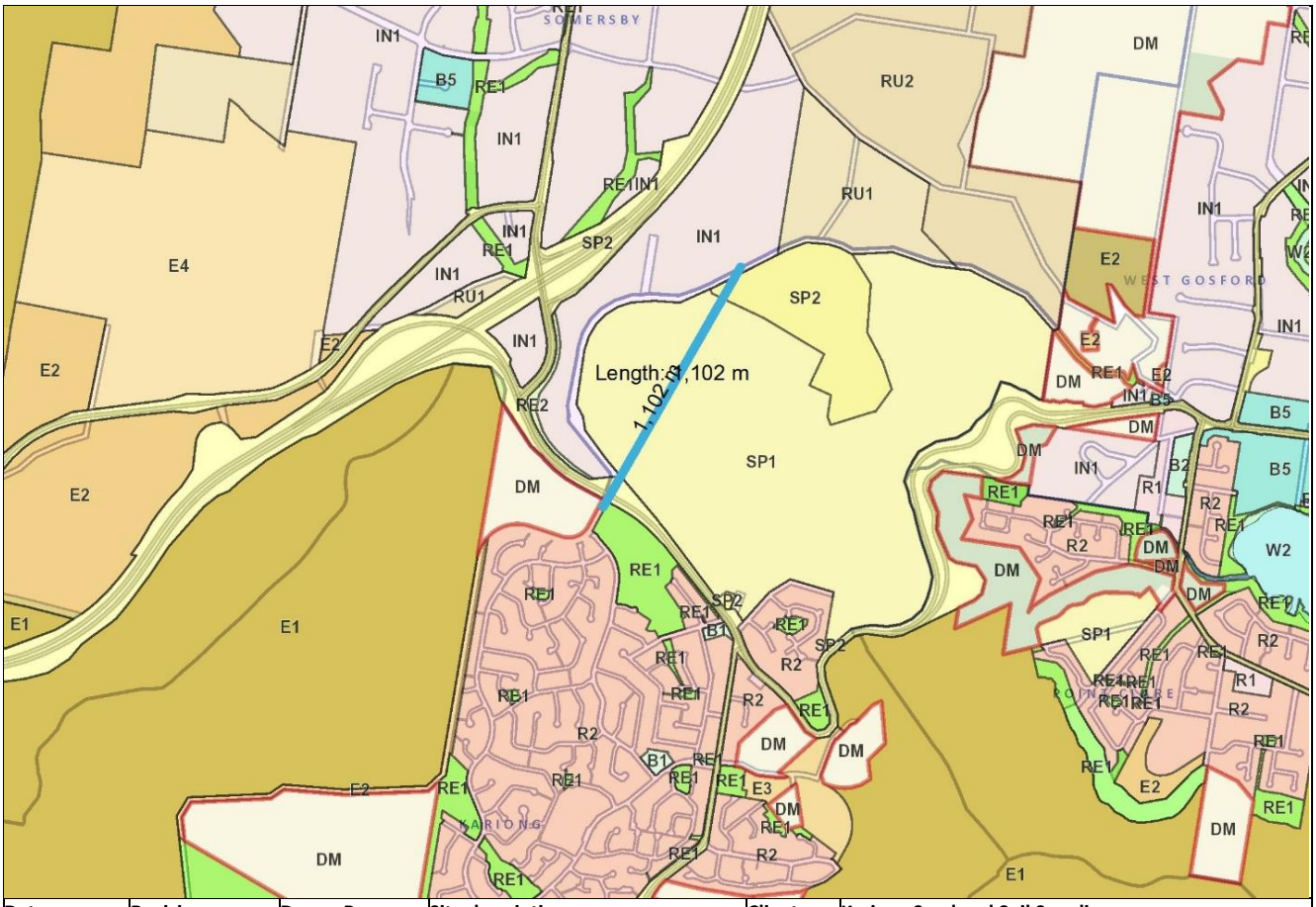
An issue that required assessment and the development of mitigation measures as part of this EIS is noise generated, by the crushing and shredding equipment to be located within the Crusher and Mulcher Buildings in the processing area of the site. Noise attenuation walls along the eastern boundary, with an effective height of 5 m, and two internal 3m noise walls within the centre of the site are proposed. Noise is further mitigated by ensuring that operations are all conducted in buildings. These design features have been assessed and are further explained within the Noise and Vibration Impact Assessment (Chapter 11).

Figure 2.6. Proximity of development site to the nearest residential zone (Kariong township to the south). This township is located more 1,100m from the southern undeveloped side of the subject property.



Date	Revision	Drawn By	Site description	Client	Kariong Sand and Soil Supplies
10/05/18	Revision A	J. Lethlean	90 Gindurra Rd, Somersby. Kariong Sand and Soil Supplies (Lot 4 / DP 227279)	Project	Upgrades to a Sand and Soil Supplies Facility
				Title	Distance to nearest residential zone
				Source	Central Coast Council

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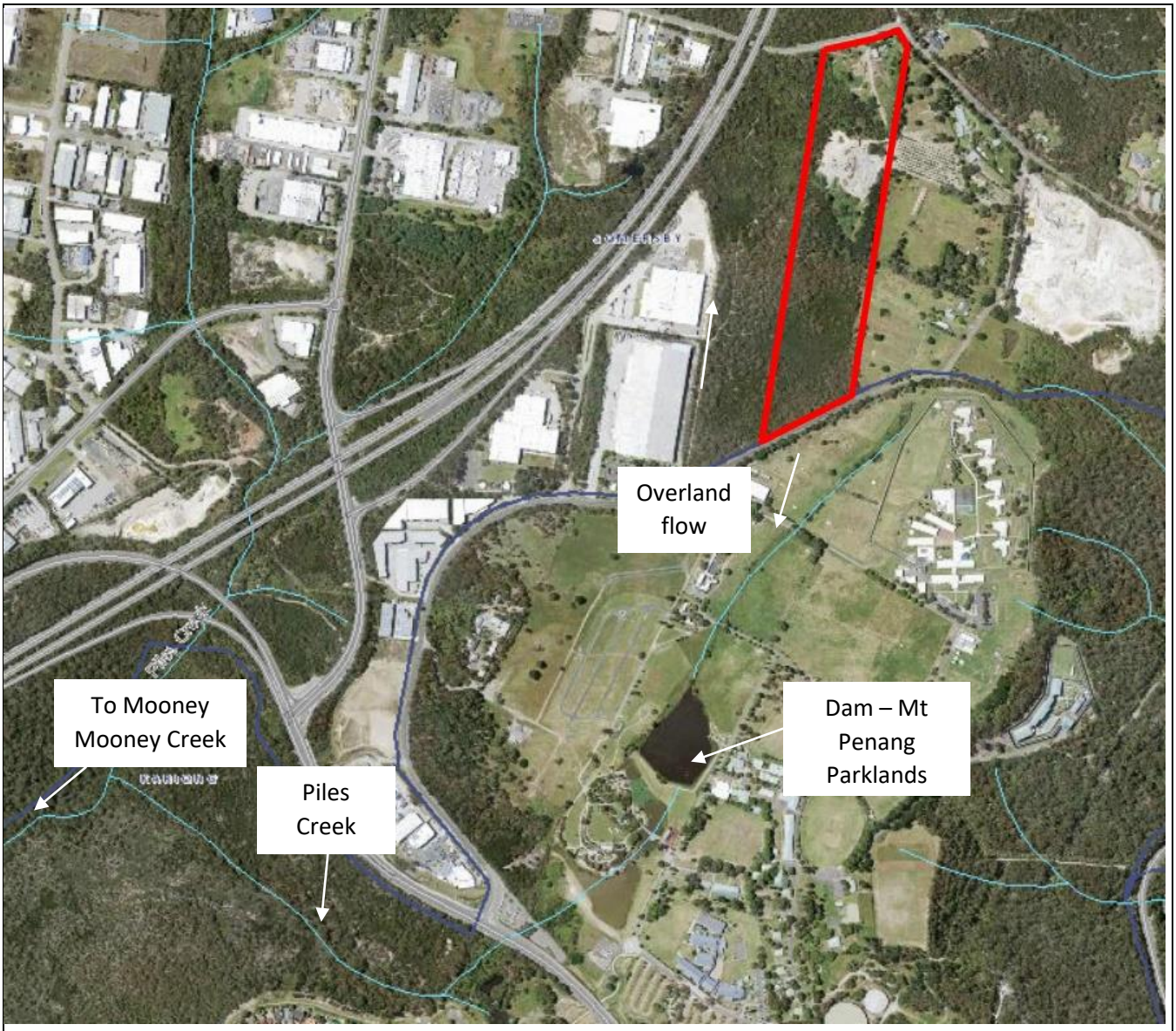
2.2.4 Riparian areas and waterways

The subject site is located at significant distance to riparian areas or a nearby waterway. No sensitive riparian areas or waterways exist on the site. The site drains via overland flow towards the south west of the site, following the gently sloping topography of the landscape. The landscape drains towards a drainage line to the south, commencing ~130 m from the site. This drainage line then terminates in a dam on the Mt Penang Parklands, located 480m to the south of the site (Figure 2.7). The outline from the dam discharges into a minor tributary of Piles Creek, which then discharges

into Mooney Mooney Creek, some 5.3km south west of the subject site. Mooney Mooney Creek then flows into the Hawkesbury River.

Figure 2.7. Riparian areas and waterways associated with the subject site. Boundary of subject site shown in red.



Date	Revision	Drawn By	Site description	Client	Kariong Sand and Soil Supplies
27/04/18	Revision A	M.Jackson	90 Gindurra Rd, Somersby. Kariong Sand and Soil Supplies (Lot 4 / DP 227279)	Project	Upgrades to a Sand and Soil Supplies Facility
				Title	Nearby riparian areas and watercourses
				Source	Central Coast Council

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2.3 Overview of proposed development

The Kariong Sand and Soil Supplies development will involve the construction and operation of a best practice recycling and landscape supplies facility that will enable the receipt of up to 200,000 tonnes of sand, soil and building materials each year. The project will transform the site into a state-of-the-art facility turning sand, soil and building materials into 100% recycled building and landscaping supplies. The facility aims to produce a number of building and landscape products, providing them for re-use mainly in the Central Coast region.

The proposed development will seek to expand the current facility into a best-practice recycling plant that will assist the Central Coast in achieving the NSW Government's target of an 80% recycling rate for construction and demolition waste by 2021.

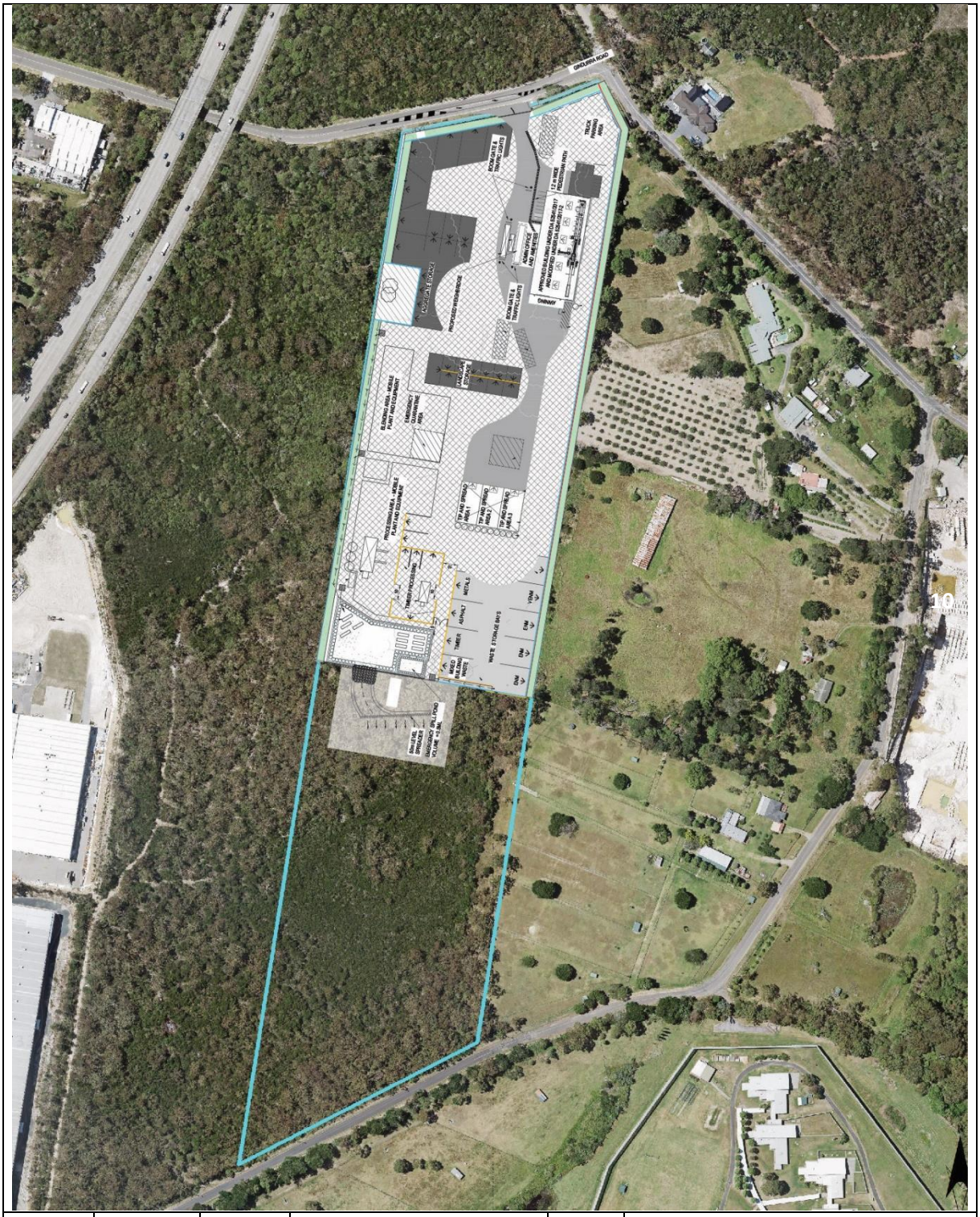
The project will involve the development of a largely undeveloped industrial site, to enable the facility to be used to receive, process and recycle construction and demolition waste, as well as supply building and landscape supplies for local projects. All waste materials will be received and processed indoors, to minimise impacts on the environment and neighbours.

The front part that will be visible from Gindurra Rd will be the landscaping supply operations, including landscaping along the road frontage and landscape storage bays behind the setback area. A fully enclosed warehouse where sorting and recycling operations will be conducted will be visible from the front of the site. Along the eastern boundary, a noise barrier and a native landscape buffer will be planted to avoid noise impacts on nearly rural dwellings, and to provide an aesthetically pleasing interface between the edge of the Somersby Industrial Estate and nearby rural zone lots and dwellings.

Waste processing and recycling operations for selected materials, including crushing and mulching will be done on the southern section of the site, where processing will also be done in dedicated buildings to avoid any impacts on nearby land uses. These operations are to be conducted at maximum distance from any sensitive receptors. The southern section of the site will be retained as bushland to provide a natural buffer between the development and other residential areas more than a kilometre away from the southern boundary of the site.

Advanced water capture, rainwater harvesting, water treatment and dust suppression systems will be integrated in all buildings and outdoor areas to prevent dust being formed. The site will also include an advanced membrane filtration plant to enable much of the water captured from the site to be fully reused across the site for operational uses. The site will also include a water pond treatment system for treating stormwater runoff, and an emergency spill pond for capture, testing and management of contaminated water for sewer discharge or off-site treatment. The site will also include its own weather monitoring station, high volume air samplers for continuous air quality and dust analysis, continuous noise loggers and continuous water quality analysis to confirm compliance with consent and licence conditions. The site will be fully serviced with fire suppression systems.

Figure 2.8. Aerial view of proposed development.



Date	Revision	Drawn By	Site description	Client	Kariong Sand and Soil Supplies
31/01/20	Revision A	J Lethlean	90 Gindurra Rd, Somersby. Kariong Sand and Soil Supplies (Lot 4 / DP 227279)	Project	Upgrades to a Sand and Soil Supplies Facility
				Title	Aerial view of development site
				Source	Central Coast Council & Sustainability Workshop

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2.3.1 Waste materials to be received and processed

An overview of the range of range of waste materials to be received at the site for processing, recycling and manufacturing into a range of quality landscaping and building supply materials is summarised in Table 2.2. It is noted that these materials are presented according to waste definitions in the NSW EPA's *Waste Classification Guidelines* (NSW EPA, 2014). All waste materials to be received and processed are characterised as non-putrescible and do not generate odour.

Table 2.2. Waste materials to be received by the facility, waste classification and approximate tonnages at maximum capacity.

NSW EPA Waste Classification	Material description	% of waste received	Tonnage to be received at maximum capacity (t/ yr)‡
General solid waste (non-putrescible)	Soils that meet the CT1 thresholds for general solid waste in Table 1 of the NSW EPA's Waste Classification Guidelines	40%	80,000
	Virgin Excavated Natural Material (VENM) (soil)	10%	20,000
	Concrete, tiles, masonry	23%	46,000
	Asphalt	10%	20,000
	Timber, stumps and rootballs (clean, non-treated and non-painted separated timber and woody tree material)	10%	20,000
	Mixed building and demolition waste	5%	10,000
	Metals (ferrous and non-ferrous)	2%	4,000
General solid waste (non-putrescible) or hazardous waste	Materials such as asbestos, tyres, batteries, gas bottles, fire extinguishers and food (unexpected finds to be separated for lawful off-site management)	Minimal	Minimal
Total (tonnes per annum)			200,000

‡ It is noted the facility will also purchase materials for storage and re-selling at the site. Up to 10,000 tonnes per annum of mulches, gravels, sand and specialist soils will be stored and sold from the 'Landscape and Building Supplies' storage area in bulk / commercial sales only.

2.3.2 Products manufactured

A focus of the facility is to manufacture a range of sustainable and quality landscaping and building materials that can support the residential and commercial development projects in the Central Coast region of NSW. Manufacturing products to meet the EPA's Resource Recovery Orders under the *Protection of the Environment Operations (Waste) Regulation* 2014 is critical to ensure all products can be used in a manner lawfully that protects human health and the environment. Other quality specifications, such as Australian Standards and industry specifications are given in Table 2.3. Further details on the range of specialist civil construction products to be manufactured are given in Table 2.4.

Table 2.3. Products to be manufactured and sold from the Kariong Sand and Soil Supplies facility, including relevant regulatory requirements and industry specifications / standards.

Product output	EPA Resource Recovery Order	Standard or Specification	% of product	Tonnage output per year (approx.)
Manufactured Soils	*Excavated Natural Material Order* 2014	Australian Standard AS4419 (2003): Soils for Landscaping and Garden Use	40	79,200
Aggregate and road base[1] Products to include: sand (0-6mm); Aggregate (0-10mm; 10-	*Recovered Aggregate Order* 2014	IPWEA (2010). Specification for Supply of Recycled Material for Pavements,	25	50,040

Product output	EPA Resource Recovery Order	Standard or Specification	% of product	Tonnage output per year (approx.)
14mm; 10-20mm; 20-30mm; 30-40mm; 40-60mm); Road base (0-20mm; 20-40mm); and Recycled terra cotta aggregate (0-6mm; 6-10mm; 10-20mm)		Earthworks and Drainage		
Virgin Excavated Natural Material (VENM) (soil)	EPA VENM validation certificate required	n/a	10	20,000
Asphalt	*Reclaimed Asphalt Pavement Order* 2014	IPWEA (2010). Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage	10	19,800
Timber mulch	*Mulch Order* 2016	N/a	11	21,300
Metal (ferrous and non-ferrous)	N/a	N/a	2	4,000
Paper / cardboard	N/a	N/a	0.3	500
Plastic	N/a	N/a	0.3	500
Residual waste sent to landfill	N/a	N/a	2	3,200
TOTAL			100	200,000

[1] Aggregate and road base products include the following product categories as per IPWEA (2010): Road base (Class R1 and R2); Select Fill (Class S); Bedding Material (Class B); and Drainage Medium. These products are further defined in Table 2.3.

Table 2.4. Overview of the specialist civil construction products to be manufactured in under the 'Aggregate and road base' product category.

Product category	Class	Description as per IPWEA (2010)[1]
Road base	R1 R2	Suitable for use on roads with a traffic loading of greater than $1x10^6$ ESA Suitable for use on roads with a traffic loading of less than $1x10^6$ ESA
Select fill	S	Material placed directly on the subgrade to improve subgrade performance. Can also be used as engineered fill to raise site levels
Bedding material	B	Material used as support for paving blocks in pedestrian areas, carparks, shopping malls, footpaths, cycleways or on lightly trafficked accessways
Drainage medium	D10, D20 or D75	Backfilling material for storm water pipes, sewer pipes or sub-surface drainage lines

2.3.3 Staging of the development

The proposed development will be staged, consisting of two defined project phases. Stage 1 will involve demolishing the existing sheds on the property and constructing an office building and warehouse. The two-stage development approach will enable the proponent in Stage 1 to occupy the site on a more permanent basis, by having an office building for staff to be based. It is noted that Stage 1 is currently underway and was approved by Central Coast Council as a local development under DA52541/2017 on 17/11/2017 and further modified under DA52541/2017.2 on 21/09/2018.

A summary of the construction activities under Stage 1 (approved) and Stage 2 is given in Table 2.5. It is noted that Stage 2 is the subject of this State Significant Development application (SSD8660), with environmental, social and economic impacts addressed in this EIS.

Table 2.5. Summary of construction activities under Stage 1 and 2 on the site.

Stage		Description	Consent status
1	i.	Demolish existing corrugated iron sheds	Approved under DA52541/2017 and modified under DA52541/2017.2
	ii.	Construct office building and warehouse	
	iii	Construct car park next to buildings and new entrance	
	iv.	Install fence at front of site	
2	a.	Clear selected vegetation from the front half of the site as determined by the Flora and Fauna and Vegetation Management Plan	Approval sought under State Significant Development application SSD8660
	b.	Construct sediment control basin to capture run-off during construction	
	c.	Grading of site. Construct retaining walls. Install water, power and recycled water services across the site. Install hardstand across the operational areas of the site	
	d.	Install noise wall along eastern side of the site	
	e.	Construct onsite roads, new entrance and modifications to Gindurra Rd (turning lane).	
	f.	Construct stormwater drainage system, including pond, floating wetland, level rock spreader, bioswales, gross pollutant traps and a packaged recycled water plant, connect to sewer	
	g.	Construct crusher building	
	h.	Construct mulcher building	
	i.	Construct tip and spread waste receival building, rainwater harvesting tanks and misting system. Install truck wash bay, coalescing plate separator and awning (and connect to sewer)	
	j.	Install dust and fire suppression systems across the site, including the Secondary Sorting Warehouse	
	k.	Construct waste storage bays, aggregate and landscape supply concrete bays, including bay mounted sprinkler system	
	l.	Install processing equipment in crusher building, mulcher building and secondary sorting warehouse	
	m.	Install weighbridges, traffic control lights and boom gates on site	
	n.	Install environmental monitoring equipment (weather station, high volume air samplers, dust gauges, sound meters)	
	o.	Complete landscaping works	
	p.	Commissioning and testing of site plant, equipment and environmental control systems, and issue of EPA licence for the site	
	q.	Commence formal operations for receival and recycling of waste materials up to 100,000 tonnes per annum	
	r.	Install second weighbridge and weighbridge office once waste receival exceeds 100,000 tonnes per annum	
	S.	Waste receival to increase to 150,000 tonnes per annum subject to the site demonstrating compliance with consent and EPA licence conditions and satisfactory environmental performance	
	t.	Waste receival to increase to a maximum of 200,000 tonnes per annum subject to the site demonstrating compliance with consent and EPA licence conditions	

It is noted that the site has been previously used as a sand and soil supplies facility, and has a number of stockpiles of concrete / masonry and soil will need to be processed on site, tested for compliance against a relevant EPA Resource Recovery Order as per Table 2.3 and reused in the civil construction process across the site in accordance with the Waste Management Plan in Chapter 6 and in Appendix H.

2.3.4 Site layout, construction and operations

The main operational area will be divided into three main areas; one for receiving and processing incoming material in buildings, a secondary sorting warehouse for further waste sorting, and another area for storage of final civil and landscape product and sale of material. It is anticipated that a total final area of the developed operational area on the site will be approximately 6.57ha.

In addition to the sand, soil and building materials recycling facility, a building and landscape supplies business will operate on the site. This will sell recycled products from the recycling operations to commercial customers. It is anticipated that the building and landscape supplies business will bring an additional 10,000 tonnes per annum of products onto the site for sale. These products are likely to be mulches, gravels, sands, specialist soils, etc. that have been manufactured to meet appropriate standards for their use.

The operational phase of the project consists of receiving, inspecting and processing waste materials in proposed buildings to avoid impacts on the environment or neighbouring properties. Concrete storage bays fitted with bay mounted dust suppression will be used for storage of processed products for despatch to customers off site (see Figure 2.14). Products will be stored and sold through the landscape and building supplies business on the site.

All material received and leaving the site will be weighed on the weighbridge. Therefore, the facility operators will know how much material is has been processed, is on-site and has been removed from site. Amounts of waste received, processed and removed from site will be reported via the NSW EPA's Waste and Resource Reporting Portal (WARRP). It is proposed that a second outbound weighbridge and weighbridge office will be installed once the facility reaches a processing capacity of 100,000 tonnes per year.

The development will consist of site improvement works to allow a greater range of materials to be processed on the site, and to enable up to 200,000 tonnes per annum to be received, processed and temporarily stored on the site in an an environmentally sensitive manner. A more detailed outline of the stages of construction and operations are outlined below. Note that the notations refer to the stages as shown in Table 2.5.

Stage 2 (a)-(c): Clearing, sediment control basin, site grading, retaining walls, drainage and services

Prior to any construction, areas of the development area will need to be cleared and graded to provide adequate drainage to a sediment control basin. Civil site works will ensure that there is appropriate drainage and stormwater capture at the site. The basin will be constructed in the south-west corner of the development area for stormwater capture (along the western boundary of the site) as per the detailed designs in Appendix E. Retaining walls will also be constructed along the western boundary of the site where noted in the civil design plans in Appendix E.

The existing dams located in the centre and on the western boundary of the site will be filled. The captured stormwater will be used for operational purposes at the site, such as dust suppression. This has been considered in the stormwater management system design and the Water Cycle Impact Asessment and Soil and Water Management Plan (Appendix I). The design is in accordance with best pratice guidelines in:

- Landcom (2004). *Managing Urban Stormwater – Soils and Construction.* Published by the NSW Government. Internet publicaton: http://www.environment.nsw.gov.au/resources/water/BlueBookV1Chapters.pdf
- Department of Environment and Conservation (2006). *Managing Urban Stormwater – Harvesting and Reuse*. Published by the NSW Department of Environment and Conservation, Internet: http://www.environment.nsw.gov.au/resources/stormwater/managestormwater060137.pdf

a) Roads and pavement design

The site general arrangement plan shows the main traffic flow paths for the site (see Appendix E).

The roads and pavement will be constructed of recycled crushed concrete, concrete or asphalt, in accordance with the NSW EPA's *Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage 2010*. The roads will need to be suitable for use by B-doubles and large equipment (crusher, screen, shredder, front end loaders).

It is noted that the following pavement designs have been specified to help reduce the risk to water quality. These are outlined in the civil plans given at Appendix E:

- Main entrance and areas adjacent to the processing building: reinforced concrete hardstand;
- Waste tip and spread building: bunded reinfored concrete hardstand;
- All waste storage and civil and landscape supply storage areas: recycled crushed concrete hardstand sealed with asphalt; and
- Outdoor processing areas, crusher building, mulcher building and internal roadways: recycled crushed concrete hardstand over a waterproof membrane.

It is noted that a turning areas to accommodate a 25m B-double is required, as decribed in Appendix N Traffic Impact Assessment. As per the site entrance design in Appendix B of the Traffic Impact Assessment Assessment and the Civil plans (Appendix E), this will involve establishment of new line markings on Gindurra Rd to permit the establishment of a turning lane (given sufficient width of Gindurra Rd).

Services including electricity, town water and recycled water service lines will be installed across the site in accordance with hydraulic and services plan in Appendix E.

Stage 2(d): Noise barriers

A noise barrier will be constructed along the eastern boundary of the site, commencing at a height of 2m in the north east corner of the site to avoid visual amenity impacts on the rural residential property located at 242 Debenham Rd. This wall will transition to 4m then to 5m along the eastern boundary, so as to maintan an effective wall height of 5m (which includes the depth of cut and the wall located above the natural ground surface). A plan showing the long section of the noise wall can be found in Appendix E.

Two internal 3m concrete block noise barriers within the site (forming part of the concrete storage bays) will be constructed to mitigate against noise impacts. The noisiest operations (mulching, crushing) will be performed inside buildings, which will substantially reduce the noise impacts off-site.

Stage 2(e): Construct onsite roads, new entrance and modifications to Gindurra Rd (turning lane)

Internal roads within the site will be constructed as part of Stage 2(c). Line markings will be performed across the site to enable the safe movement of vehicles. The entrance to the site will be constructed as per the civil plans in Appendix E, including a concrete median along the centreline of the entrance to prevent vehicles turning right into Debenham Rd. Appropriate linemarking of Debenham Rd will be performed following a s138 *Roads Act* approval from Central Coast Council.

Stage 2(f): Construct stormwater drainage system, including pond, floating wetland, level rock spreader, bioswales, gross pollutant traps and a packaged recycled water plant, connect to sewer

Construction of the full stormwater drainiage system will then occur. The site will be divided into 6 catchment, according to stormwater contamination risk. The stormwater system will include the construction of four Barramy Gross Pollutant Traps to intercept runoff water vis sheet flow across the hardstand areas of the site and remove silt and sediment. Water from the medium and high risk areas will flow through a CDS Gross Pollutant Trap. Slotted kerbing along will be installed along the end of the hardstand areas on western boundary of the site, to direct runoff

water into the bioswale zone for treatment and conveyance to the stormwater detention pond located in the south-west corner of the site. Grasses will be planted in the bioswale zone in accordance with the Landscape Concept Plan given in Appendix F.

The on-site detention pond will be construction, including rock walls, pond lining, outlets, isolation valves, level rock spreader and the floating wetland to enhance water treatment as outlined in the Water Cycle Impact Assessment (Appendix I). The emergcy spill pond will also be constructed. Once constructed, the packaged recycled water plant will be installed adjacent to the pond, with a connection to sewer (as approved under Stage 1) for discharge of organic material from treated water. Appropriate Trade Water Licensing will be sought from Central Coast Council.

Stage 2(g) – (i): Construct mulcher building, construct tip and spread waste receival building, rainwater harvesting tanks and misting system. Install truck wash bay, coalescing plate separator and awning (and connect to sewer)

This stage of the project will invovle the construction of the processing buildings on the site, as well as additional services to support operations. This will involve the construction of a mulcher building and concrete bay structures for the storage of timber, processing of timber and storage of processed timber mulch. A dedicated three-sided tip and spread waste receival building will be built, including 10 x 18 kL rainwater harvesting tanks with town water top-up for misting and dust suppression within the building.

A truck wash area will be constructed on the southern side of the Secondary Sorting Warehouse. This will involve the construction of a concreted, covered wash bay area, with washwater directed to a new coalescing plate separator to remove oil, grease and solids from the wash water. Oil, grease and solids will be managed by a contractor, and treated water will be directed to sewer, subject to a Trade Waste Licence from Central Coast Council.

Stage 2(j)-(k): Install dust and fire suppression systems across the site, including the Secondary Sorting Warehouse

Water from the packaged recycled water plant will supply water to sprinkler systems mounted above all waste storage and landscape material storage bays. Concrete waste storage and lanscape storage bays will be constructed across the site. Fire hydrants and fire hose reels will be installed in accordance with the hydraulic services plans (see Appendix E) in the Secondary Sorting Warehouse and across the operational areas of the site.

Stage 2(l)-(m): Install processing equipment in crusher building, mulcher building and secondary sorting warehouse, install weighbridges, traffic control lights and boom gates on site

This stage of the project will involved the placement and installation of processing plant and equipment in buildings, including installation of the crushing plant within the crusher building; the mulcher plant in the mulcher building; and the sorting plant in the Secondary Sorting Warehouse. In addition, the first weighbridge will be installed adjacent to the office within the Secondary Sorting Warehouse, including traffic control lights at both sides of the weighbridge and boom gates on either side of the weighbridge.

Stage 2(n): Install environmental monitoring equipment (weather station, high volume air samplers, dust gauges, sound meters)

All necessary environmental monitoring equipment required under the conditions of consent and the EPA licence for the premises will be installed and commissioned, including a weather station, high volume air samplers, dust gauges, sound meters. This equipment will enable the site to continuously monitor the environmental performance of the operations for regular reporting.

Stage 2(o): Complete landscaping works

All landscaping plants and related works will be completed along the frontage, the western boundary and the eastern boundary of the site, between the noise wall and the boundary fence line. Installation of a trellis and planting of native vines along the noise wall to the east side of the side will help soften the interface between the site and the neighbouring rural residential properties.

Stage 2(p): Commissioning and testing of site plant, equipment and environmental control systems, and issue of EPA licence for the site

All plant and equipment will be tested and commissioned prior to commencement of operations. The EPA licence will be secured for the premises to commence the receival of waste materials for processing and commissioning of plant and equipment. All environmental control systems will be in full operations at this point.

Stage 2(q): Commence formal operations for receival and recycling of waste materials up to 100,000 tonnes per annum

At this point, the site will be fully operational and will gradually accept waste materials for sorting, processing and recycling in accordance with consent and EPA licence conditions. It is expected that the facility will be receiving up to 100,000 tonnes per annum by the end of year 2 of operations (see the Waste Management Plan in Appendix H).

Stage 2(r): Install second weighbridge and weighbridge office once waste receival exceeds 100,000 tonnes per annum

To ensure that traffic congestion does not occur at the single weighbridge as the tonnages of waste materials received grows, it is proposed that the second weighbridge and a weighbridge office as showin in Appendix E will be installed once the site receives the equivalent of 100,000 tonnes of waste per annum. The second weighbridge will include traffic lights and boom gates to control the flow of traffic out of the site. The existing weighbridge will be used for inbound traffic only.

Stage 2(s): Waste receival to increase to 150,000 tonnes per annum subject to the site demonstrating compliance with consent and EPA licence conditions and satisfactory environmental performance

To provide the community with confidence that the site is being well operated in accordance with the consent and EPA licence conditions, recycling will not increase above 100,000 tonnes to 150,000 tonnes per annum until independent testing is done to prove the facility is performing to the highest environmental standards. It is proposed that this approval will be provided by the Department of Planning, Industry and Environment as a condition of consent.

Stage 2(t): Waste receival to increase to a maximum of 200,000 tonnes per annum subject to the site demonstrating compliance with consent and EPA licence conditions

To provide the community with ongoing confidence that the site is being well operated in accordance with the consent and EPA licence conditions, recycling will not increase to the equivalent of 200,000 tonnes per annum until independent testing is done to prove the facility is performing to the highest environmental standards. It is proposed that this approval will be provided by the Department of Planning, Industry and Environment as a condition of consent.

The operational layout of the development is shown in Figure 2.9 and Figure 2.10. The proposed layout and operations of the development have been informed by guidelines prepared by the NSW EPA (2018) *Standards for Managing Construction Waste in NSW* and NSW EPA (2014) *Draft Protocol for Managing Asbestos during Resource Recovery of Construction and Demolition Waste.* Detailed site plans are given in Appendix E.

A description of the operational areas, functions and processes across the site is provided in the following sections.

Figure 2.9. Site layout for the Kariong Sand and Soil Supplies development. Note that detailed site and civil design plans are given in Appendix E.

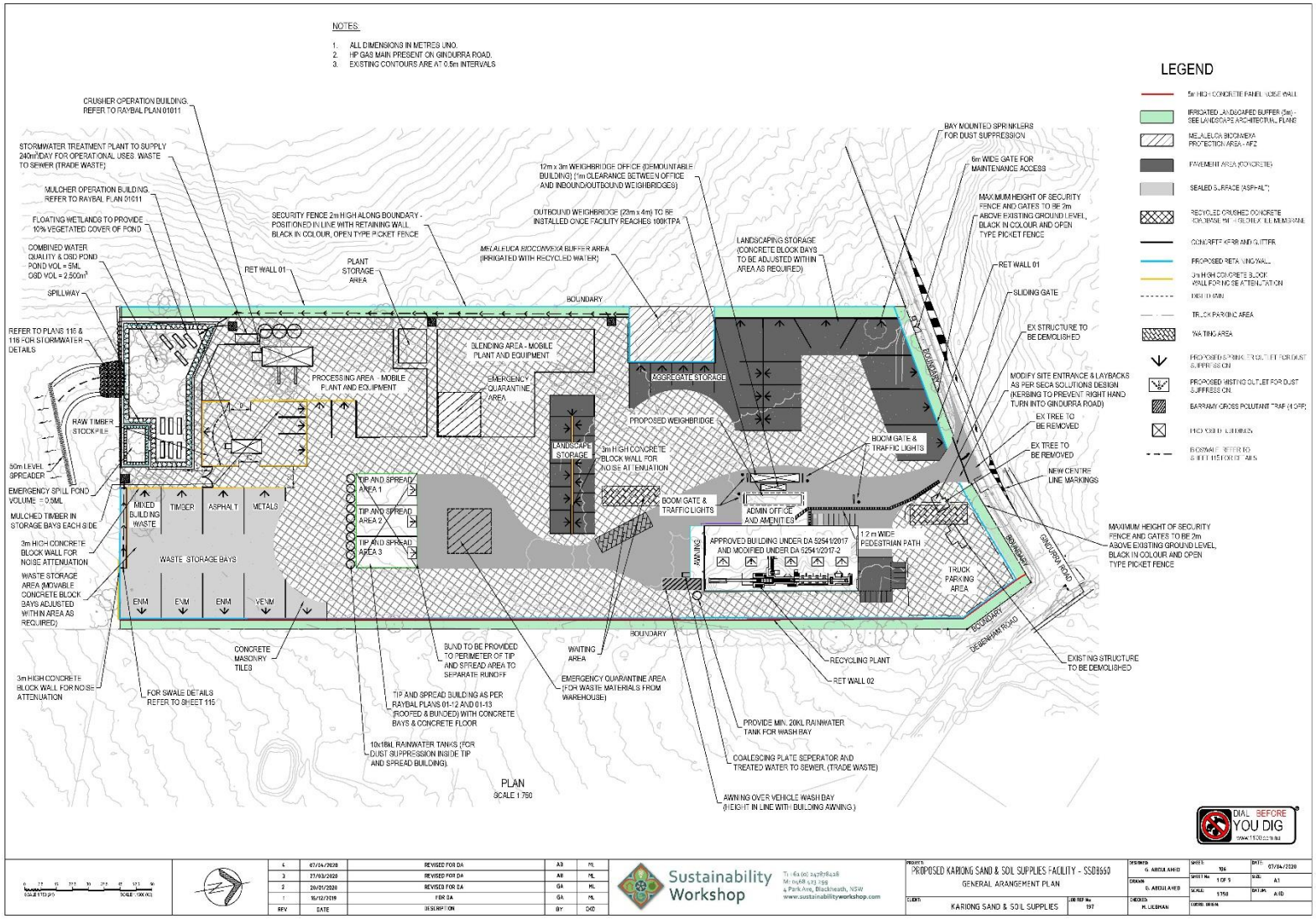
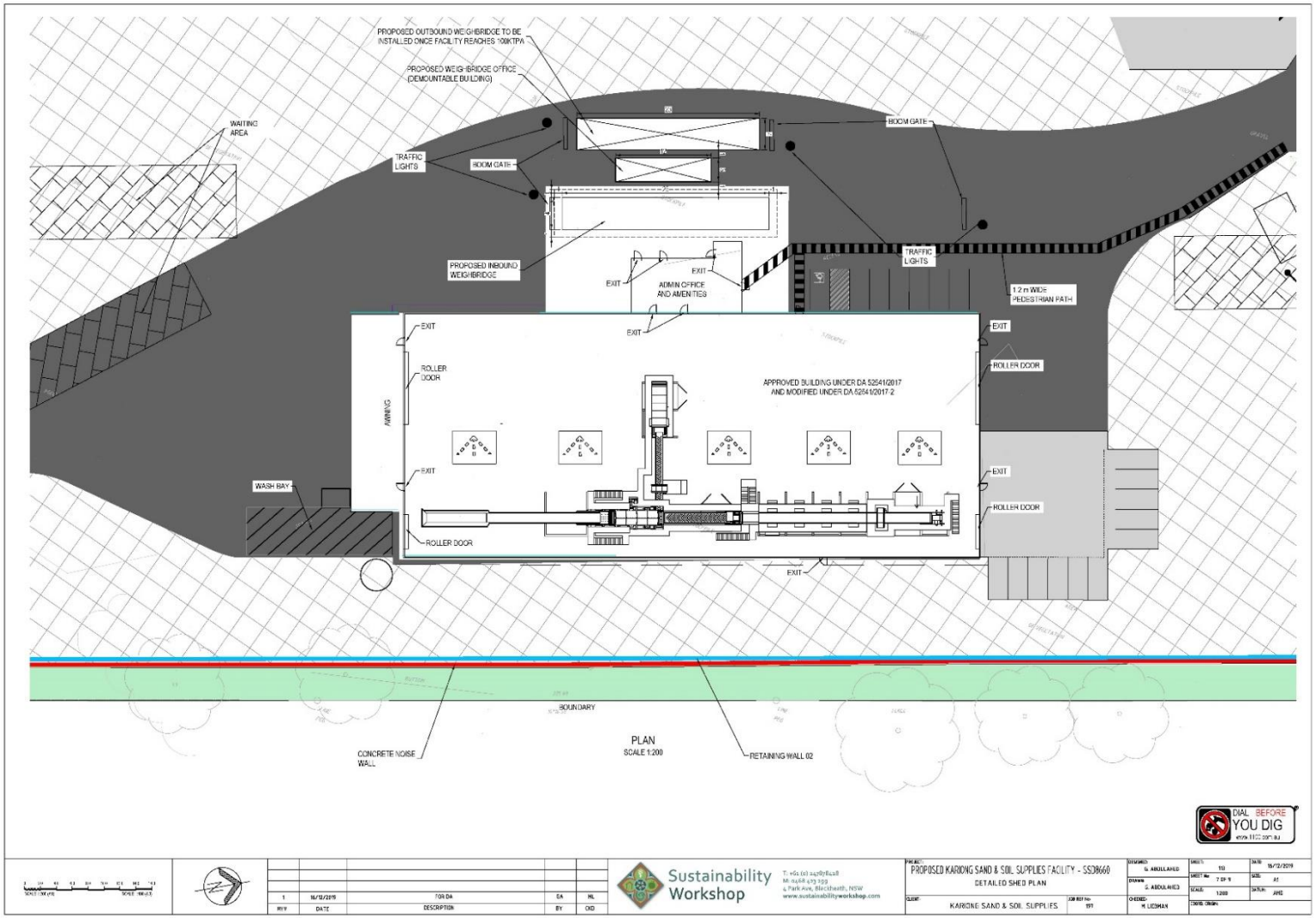


Figure 2.10. Layout within the Secondary Processing Warehouse (provided in Appendix E).



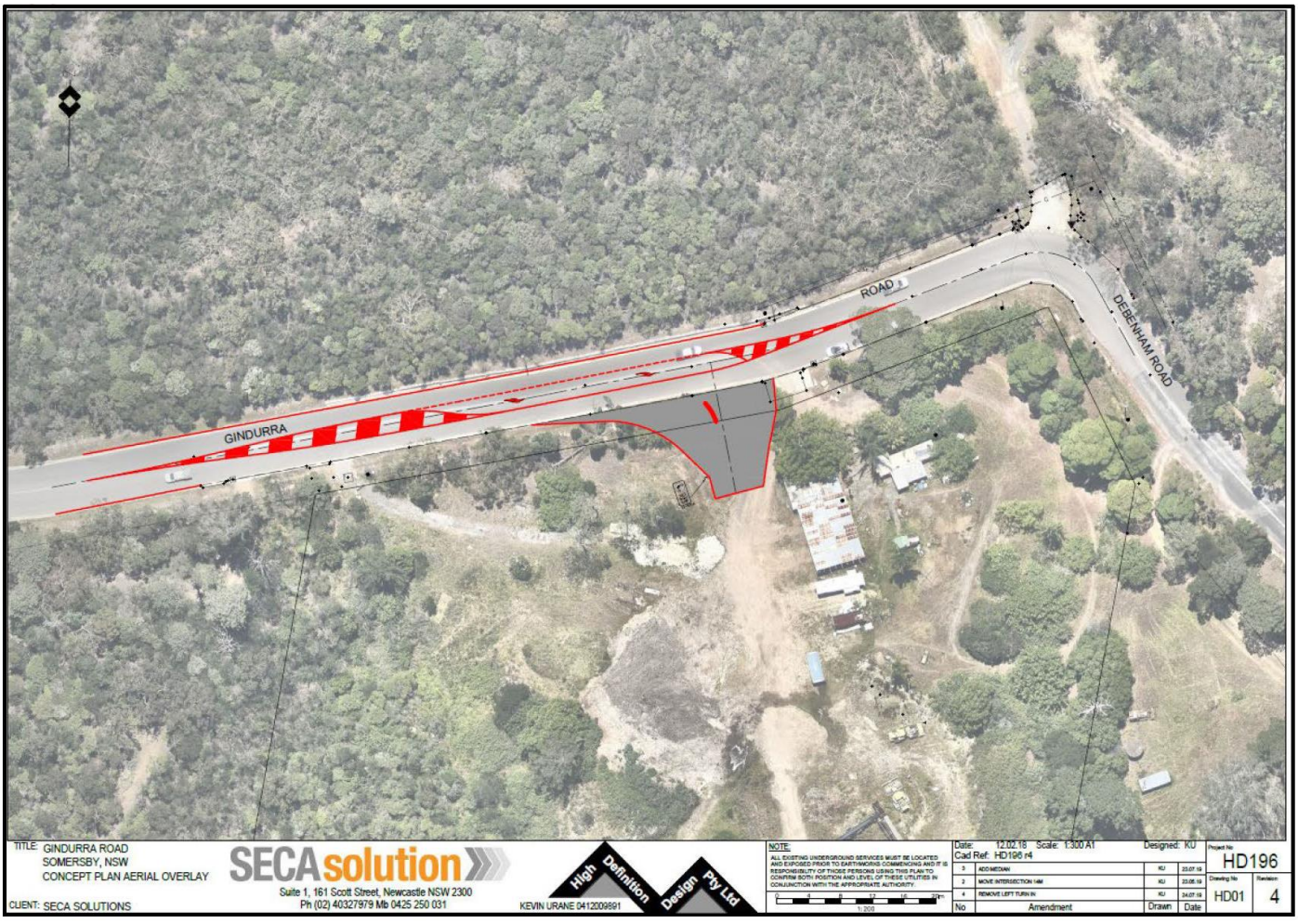
2.3.5 Vehicular and pedestrian access

All vehicles will access the site from a single dual lane access point from the front entrance to Gindurra Rd. As outlined in the site layout plans (Appendix E) and the plans for the proposed amendment to Gindurra Rd, a new 60m turning lane will be marked on Gindurra Rd to permit the carriage of a B-double truck turning right into the site without impeding traffic flow on Gindurra Rd (see Figure 2.11).

It is noted that a mix of staff passenger vehicles and load bearing vehicles (trucks), including 12 tonne tipper trucks, 32 tonne capacity semi-trailers and 40 tonne B-double trucks will access the site. The site entrance from Gindurra Rd has been designed in accordance with *Gosford Development Control Plan* 2013 and RMS requirements.

The site will be used and accessed by commercial vehicles only and will not be open to the general public. Pedestrian access and a pathway will be provided from the entrance to the site, to safely permit pedestrians (staff) accessing the site and accessing the staff office and warehouse at the front of the site. The pedestrian pathway is shown in Figure 2.9 and on the site layout plans provided at Appendix E.

Figure 2.11. Proposed update to Gindurra Rd markings near site entrance.



2.3.6 Traffic management

All load-bearing vehicles (trucks), will enter the site via Gindurra Rd in the forward direction, proceed to the weighbridge installed outside the site office for net weight recording in accordance with Clause 36 of the *Protection of the Environment Operations (Waste) Regulation* 2014.

Trucks then proceed to the unloading / loading area adjacent to the processing area. Upon completion of loading / unloading, trucks manoeuvre in the turning area towards the west of the site, progress along the same path by which they entered, weigh off at the weighbridge and proceed to the exit via Gindurra Rd in the forward direction.

The types and numbers of vehicle movements during the early and full operational phases of the development are summarised given in Table 2.6 below and are further discussed in Chapter 10. All vehicles are to comply strictly with speed limits on site of 5km/hr.

Table 2.6. Estimated types and numbers of vehicle movements during early and fully operational phases of the development.

Type of vehicle	Phase I	Full Capacity (Phase IV)
	Number of vehicles / day	Number of vehicles / day
Staff operational vehicles	3.69	9.23
12 t tipper	3.55	35.54
32 t T&D or semi	1.89	18.86
40 t B-double	0.63	6.30

A more detailed analysis of traffic issues is provided in Appendix N: Traffic Impact Assessment.

2.3.7 Weighbridge operations

The use of a weighbridge is a regulatory requirement under Clause 36 of the *Protection of the Environment Operations (Waste) Regulation* 2014.

The weighbridge is located on the Western side of the warehouse / office complex. The weighbridge to be initially constructed is a single weighbridge, designed to accommodate extra wide loads (4m wide x 26m long).

All vehicles entering and leaving the site will need to be weighed on the weighbridge, in accordance with Part 3 Division 2 Clause 36 of the *Protection of the Environment (Waste) Regulation* 2014. Vehicles enter from Gindurra Rd and drive towards the weighbridge. A boom gate will be located approximately 30m from the Northern edge of the weighbridge (on the entrance side), for traffic control. Another boom gate is to be installed at the Southern edge of weighbridge to prevent vehicles on the weighbridge from driving into oncoming vehicles. In addition, traffic lights will be installed to control movement of vehicles in both directions.

There is sufficient space for two vehicles to queue behind the entrance boom gate. In the event that additional queuing space is required, vehicles can temporarily park in the truck parking area in the North-East corner of the site. There is sufficient space within the waste receival area for at least two 25m B-double trucks to queue waiting to leave the site. Similarly, there is room for at least two 19m vehicles to queue in the landscape supplies business area, if necessary. This is further described in the Traffic Impact Assessment (Appendix N).

It is noted that a second 4m wide x 26m long outgoing weighbridge with boom gates and traffic lights will be installed once the site receives the equivalent of 100,000 tonnes per annum of waste materials to process. The existing weighbridge will be used as a dedicated inbound only weighbridge, and the new weighbridge will be a dedicated outbound weighbridge only. A weighbridge office will be installed between the inbound and outbound weighbridge to improve traffic control, traffic monitoring and efficiency.

2.3.8 Waste inspection, acceptance and non-conforming waste

The incoming waste inspection and management of non-conforming loads will conform to the standards in the NSW EPA's *Standards for managing construction waste in NSW* (NSW EPA, 2019).

Standard 1 Inspection requirements

At the verified weighbridge on entry into the facility, trained personnel must:

1. Inspect the entire top of each load from an elevated inspection point or by using a video camera connected to a monitor and determine whether or not the load contains any asbestos waste and any other unpermitted waste;

2. Where the load is identified as containing, or is reasonably suspected to contain, any asbestos waste, reject the entire load of waste by directing the driver to immediately leave the facility and record the information required by Standard 1.4 into the C&D waste facility's rejected loads register; and

3. Where the load is not rejected, record the details as required by clause 27 of the Waste Regulation and direct the driver and the load of waste to proceed directly to inspection point 2.

At inspection point 2 – tip and spread inspection area, trained personnel must:

1. Direct the driver of the vehicle to tip the entire load on the tip and spread inspection area;

2. Spread the entire load and inspect the visible surface area for any asbestos waste and any other unpermitted waste;

3. Manually turn, or direct a plant operator to turn, the entire load and inspect the entire load for any asbestos waste and any other unpermitted waste on or beneath the visible surface;

4. Where any asbestos waste is identified, reject the entire load of waste.

5. Where any other unpermitted waste is identified under this Standard 1.2, remove that waste from the load or reject the entire load of waste.

6. Where a load is rejected under this Standard 1.2, ensure that the entire load is immediately reloaded onto the vehicle in which it arrived or onto another vehicle and ensure that the vehicle with the rejected load leaves the C&D waste facility on the same business day and then immediately record the information required by Standard 1.4 into the C&D facility's rejected loads register; and

7. Ensure that all waste that may lawfully be received at the C&D waste facility proceeds to be sorted and stored in accordance with Standards 2, 3 and 4.

A load of construction waste received at the C&D waste facility that, upon receipt, only contains waste that meets the requirements of a resource recovery order, as evidenced by a statement of compliance for that waste which has been provided and kept in accordance with the applicable resource recovery order and is current at the time of receipt. The statement of compliance must be made available for inspection to an authorised officer of the EPA if requested. This load of waste must be immediately transferred to the appropriate waste storage area referred to in Standard 4.

It is noted that all waste materials will be received within the dedicated Tip and Spread Building, which will enable the spreading, assessment and identification of any non-conforming waste materials. This area will be supplied with a full water based misting system to suppress any dust during tipping / unloading and spreading of waste materials within the building.

2.3.9 Wastes processed and recycling operations

Figure 2.12 shows the anticipated composition of the material that will be delivered to the site for processing. Figure 2.13 shows the extrapolated tonnes received over the first 6-7 years of operation, assuming the facility reaches full capacity. As these charts show, most of the waste will be source-separated, inert material, such as soil or

concrete/brick/tiles. The aim will be to recover as much material as possible to recycle into products for sale through the landscape and building supplies business to be located at the site.

A process flow chart describing each stage of the waste receival and recycling operation is provided in Figure 2.14.

Figure 2.12. Composition of incoming waste stream.

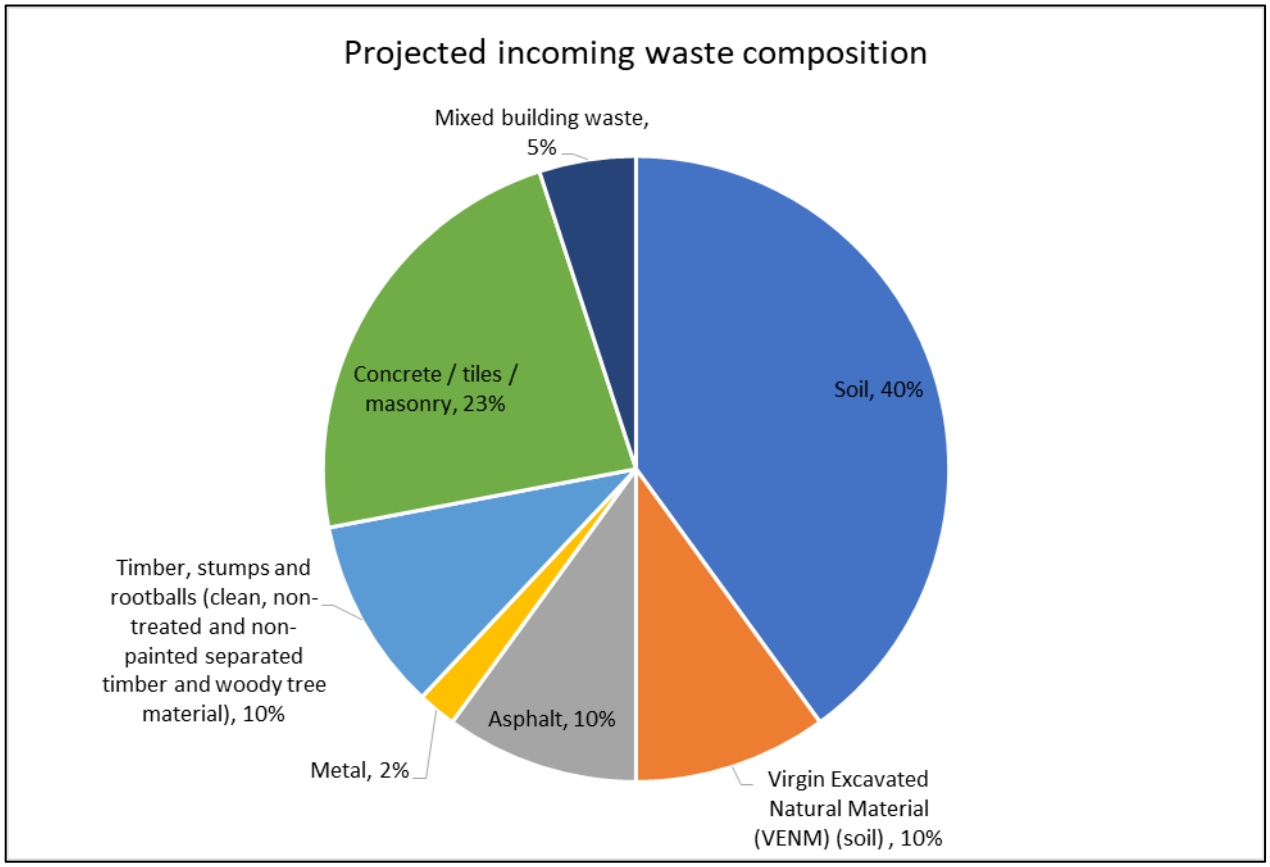
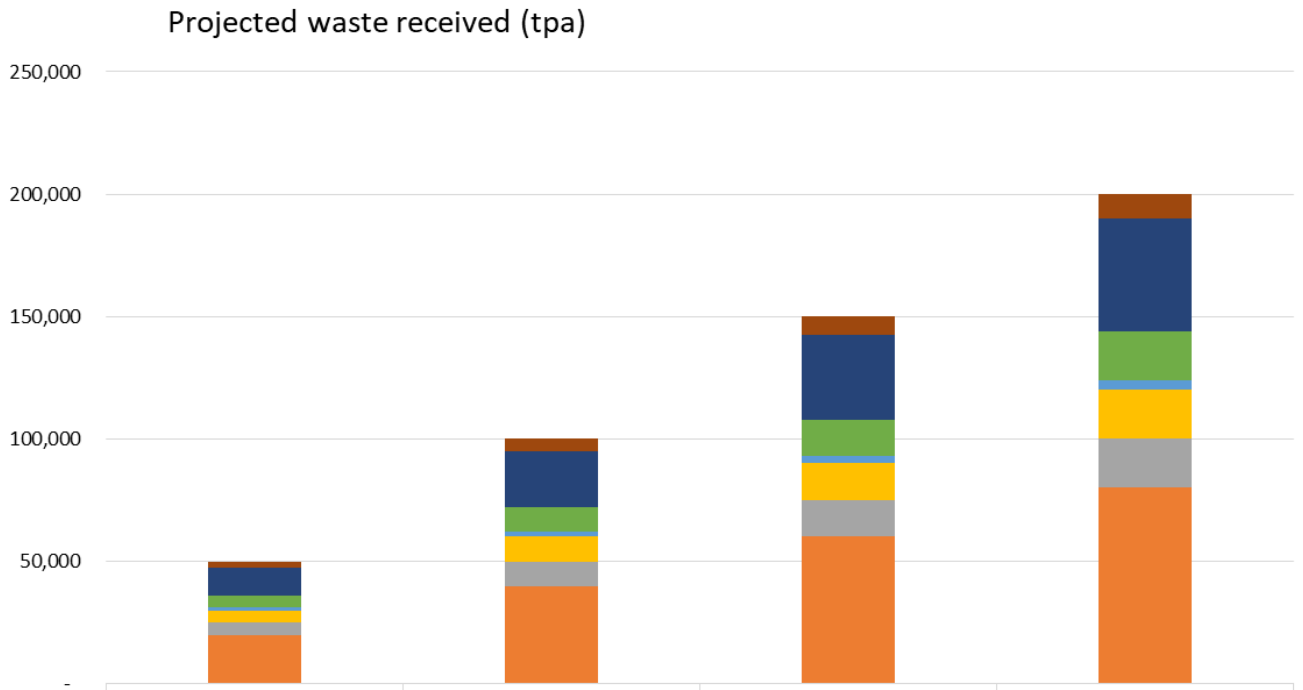


Figure 2.13. Estimates of amounts of incoming waste during operational phase.



	Year 1	Year 2	Year 4	Year 6
Mixed building waste	2,500	5,000	7,500	10,000
Concrete / tiles / masonry	11,500	23,000	34,500	46,000
Timber, stumps and rootballs (clean, non-treated and non-painted separated timber and woody tree material)	5,000	10,000	15,000	20,000
Metal	1,000	2,000	3,000	4,000
Asphalt	5,000	10,000	15,000	20,000
Virgin Excavated Natural Material (VENM) (soil)	5,000	10,000	15,000	20,000
Soil	20,000	40,000	60,000	80,000

Figure 2.14. Process flow chart for recycling operations.

2.3.9.1 Building and landscape supplies business

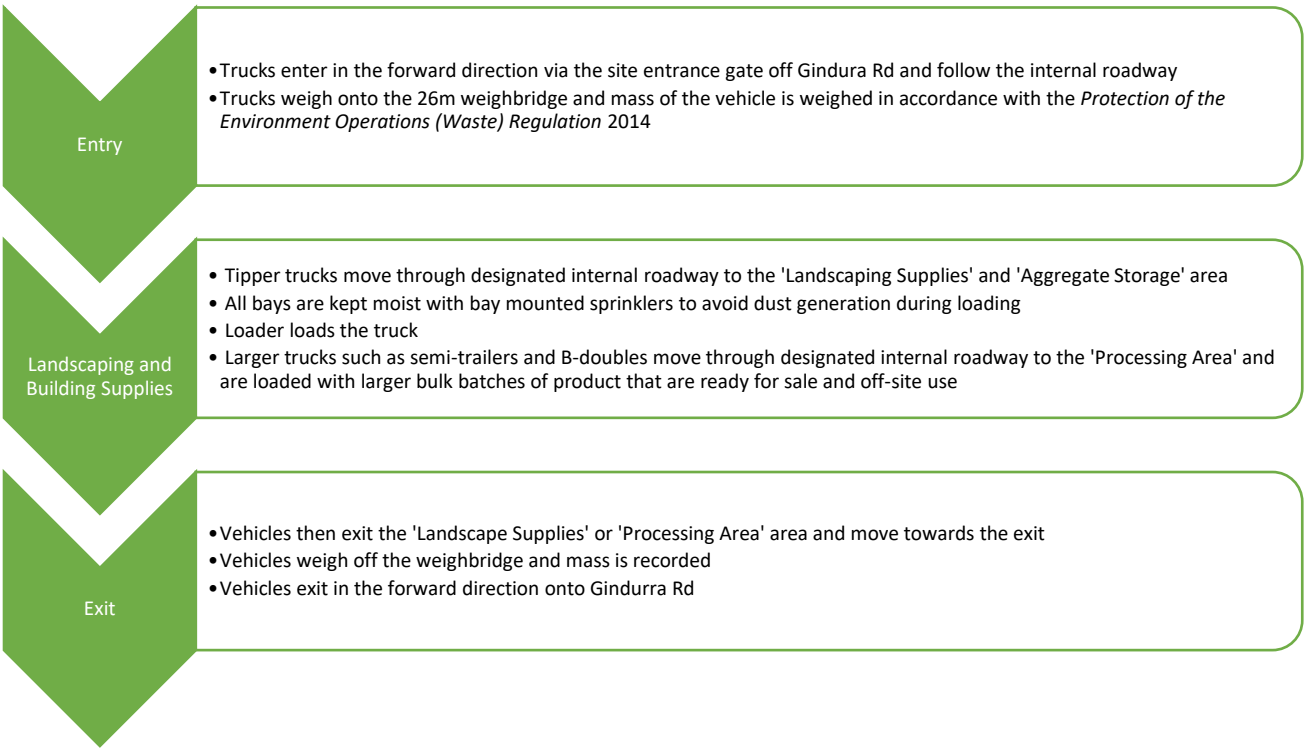
The building and landscape supplies business will consist of the storage and sale of products such as aggregate, soil, crushed asphalt, mulch, timber and metal.

Finished products from the processing area will be transferred via front-end loader to the landscape and building supplies area and unloaded into concrete bunkers. Products will be regularly tested to ensure they meet the appropriate standards. All bays will be fitted with dust suppression sprinklers.

In addition, a limited amount (up to 10,000 tpa) of clean sand and soil will be brought onto the site for sale in the landscape and building supplies business. This material will be transported from other suppliers. This material will be unloaded in the landscape and building supplies area, then pushed into bunkers for storage. Suppliers will be responsible for providing products that meet the specifications provided by Kariong SSS. Incoming products will be inspected, and suppliers will be required to provide proof (test reports or compliance certificates) that the products meet the specifications.

Products sold from the landscape and building supplies business will be removed from the storage bunkers and loaded into waiting haulage vehicles using a front-end loader. Only commercial customers will be permitted onto site, with most vehicles being large vehicles for bulk haulage.

Figure 2.15. Process flow chart for landscaping and building supplies part of the operation.



2.3.9.2 List of plant and equipment to be used during operations

Mobile plant and equipment will be used across the recycling operations, and for servicing the landscaping supplies area of the operations. A list of plant and equipment used outdoors across the site, and indoors in the Secondary Processing Warehouse is given in Table 2.7.

Table 2.7. Mobile plant and equipment to be used in the operation.

Operational Area	Make	Model	Function
Tip and Spread Building	Volvo Front End Loader	L150	Spreading waste materials for inspection and movement of wastes to Waste Storage Area
Waste Storage Area	Volvo Front End Loader	L150	Loading and movement of waste materials
Processing Area (including Crusher Building, Mulching Building and Blending Area)	Volvo Front End Loader	L150	Loading and movement of waste materials
	CAT Excavator	330	Sorting of large recyclable items during primary sorting
	Metso Crusher	1213S	Crusher for size reducing timber, concrete, masonry and tiles
	Peterson shredder	2710D	Shredding timber and rootballs to produce mulch.
	Metso screening plant	ST3.5	Screening aggregates and soils into specific particle size gradings
Secondary Sorting Warehouse	Volvo Front End Loader	L150	Loading and movement of waste materials
	Leibherr Telehandler	LH24	Loading of waste materials from concrete bay into hopper
	Kiverco conveyor / stackers / trommel screen		For transferring waste from hopper to screen or picking line
	Kiverco 6-station picking line with conveyor		Staff will pick different recyclable materials from the mixed waste as it passes by on the conveyor belt.
	Kiverco Overhead magnet		Removes steel and iron from the residual waste stream
	Kiverco Air blower		Removes trace elements of light contaminant materials, such as plastic and paper from the final waste stream.
	Hopper and bagging machine (Rotto Chopper)		For loading of products into 2-tonne bulka bags
Landscape Supplies Area	Volvo Front End Loader	L35	Loading of landscape supplies and aggregates onto trucks
Other	Water Cart Truck		For dust suppression on internal roads as required

Equipment will usually remain in its operational area. The crusher and shredder will be installed within dedicated buildings, and the screening plant will be positioned in the blending area. The secondary processing equipment will be permanently fixed in the secondary processing warehouse. To avoid conflicts and to ensure each area is properly serviced, each operational area will have its own dedicated front-end loader/s and excavators. An area near the processing area has been allocated for parking the mobile plant overnight. An emergency quarantine area is also provided near the processing area in the unlikely event of a fire incident where waste materials will need to be transferred, spread and water applied to extinguish any fires.

The water cart will usually be parked near the office building at the end of each day, for the convenience of the truck driver.

2.3.9.3 Authorised amount (maximum stock held on site)

Under Clause 10B of the *Protection of the Environment Operations (Waste) Regulation* 2014, operators of licensed resource recovery facilities are required to not exceed the storage of a certain amount of waste and processed products (from waste) on site at any one point in time. This is referred to the 'Authorised Amount'. Exceedance of the Authorised Amount triggers the requirement for payment of the Waste and Environment Levy for tonnages of waste and product held on site (above the Authorised Amount). This regulatory measure encourages operators of resource

recovery facilities to manage the inventory of waste and products held on site to avoid potential risks and hazards to the environment, public safety and human health.

An assessment of the storage capacity of the site based on designated areas for waste storage, processing, blending and product storage is provided in Table 2.8.

Table 2.8. Analysis of the storage capacity of the site for waste materials and processed products, based on the site layout and concrete block and outdoor storage areas.

Waste or product storage area	Waste material or product storage	Bay or pile dimensions (m)	Volume stored (maximum) (m^3)	Bulk density‡ (t/m^3)	Maximum storage capacity (tonnes)
Waste storage bays	Soil (Bay 1)	21 m (wide) x 18m (deep) x 3 m (high)	1,130	1.1	1,243
	Soil (Bay 2)	21 m (wide) x 18m (deep) x 3 m (high)	1,130	1.1	1,243
	Soil (Bay 3)	21 m (wide) x 18m (deep) x 3 m (high)	1,130	1.1	1,243
	Virgin Excavated Natural Material	21 m (wide) x 18m (deep) x 3 m (high)	560	1.1	616
	Metals	21 m (wide) x 18m (deep) x 3 m (high)	1,130	0.8	904
	Timber	21 m (wide) x 18m (deep) x 3 m (high)	1,130	0.8	904
	Asphalt	21 m (wide) x 18m (deep) x 3 m (high)	1,130	1.1	1,243
	Mixed building waste	21 m (wide) x 18m (deep) x 3 m (high)	1,130	0.7	791
	Concrete / masonry / tiles	21 m (wide) x 18m (deep) x 3 m (high)	560	1.2	672
Tip and spread area	Tip and spread area 1	Assume no storage	-	-	-
	Tip and spread area 2	Assume no storage	-	-	-
	Tip and spread area 3	Assume no storage			
	Tip and spread area residual waste	1 x $20m^3$ skip bin	20	1.1	22
Crusher Building area	Inert waste for crushing	Area ≈10m x 20m Height ≈3m	200	1.1	660
	Processed inert product in piles	Area ≈2 bays x 10m x 20m Height ≈3m	400	1.1	1,320

Waste or product storage area	Waste material or product storage	Bay or pile dimensions (m)	Volume stored (maximum) (m^3)	Bulk density‡ (t/m^3)	Maximum storage capacity (tonnes)
Mulcher Building area	Residual waste	1 x 20m^3 skip bin	20	1.1	22
	Timber feed awaiting processing	Area ≈19m x 4.5m Height 3m	258	0.8	206
	Mulched processed product	Area 4 bays x 10m x 11m Height ≈3m	1,320	0.8	884
Blending area	Processed products awaiting blending of blended awaiting for storage in landscaping supplies bays	Assume ≈50% area can be used for temporary storage. Total area ≈3,130 m^2	4,700	1.3	6,110
Secondary Sorting Warehouse	Timber	3 m3 skip bin	3	0.8	2.5
	Wood mulch	3 m3 skip bin	3	0.8	2.5
	Paper/cardboard	3 m3 skip bin	3	0.77	2.3
	Plastics	3 m3 skip bin	3	0.6	1.8
Landscape storage (centre of site 12 bays total)	Landscaping supplies	Total storage area in bays ≈67m x 18m x 3m high	3,600	1.5	5,400
Aggregate storage area (4 bays)	Recovered aggregates	Total storage area in bays ≈40m x 11m x 3m high	1,320	1.3	1,716
Landscape storage bays at front of site (13 bays)	Various landscape supply materials	Total storage area in bays ≈3,365 m^2 x 3m high	10,095	1.1	11,105
Total estimated site storage capacity			**30,975**		**36,313**

‡ Density factors sourced from NSW EPA (2015). *Waste Levy Guidelines* (Table 4.1).

It is noted that as part of the development, the site will store up to 10,000 tonnes of pebbles, bricklayers sand, plasterers sand, washed paving sand, soil mixes, pine mulches, timber mulches and other landscaping products which will be purchased and sold commercially from the site.

The analysis in Table 2.8 suggests that operationally, the site can store up to 30,975m^3 of wastes and processed products, equivalent to an estimated 36,313 tonnes of materials. These estimates include the storage of the purchased landscaped supply materials, which will be sold commercially from the site.

As a consequence, the total amount of waste and products derived from waste that can be safely stored on the site is estimated to be 40,000 tonnes at any one point in time. Given this, the proponent will seek to apply for an Authorised Amount of 40,000 tonnes at any one point in time under Clause 10B of the *Protection of the Environment Operations (Waste) Regulation* 2014.

2.3.9.4 Operational hours

The following operational hours are proposed as part of the development application:

- Opening hours (staffed): 7:00am to 6:00pm Monday to Saturday. Closed Sunday.
- Waste deliveries: 7:00am to 6:00pm Monday to Saturday. Closed Sunday.
- Waste processing (sorting, crushing, grinding, screening): 8:00am to 5:00pm Monday to Friday.
- Product sales: 7:00am to 6:00pm Monday to Saturday. Closed Sunday.

2.3.9.5 Stockpile heights

Stockpile heights have been based on best practice guidelines outlined in the South Australian Environmental Protection Agency (SA EPA, 2017) in order manage fire, dust and odour:

- Stockpiles of waste materials in the designated waste storage area will be limited to 3m. Height guidance will be provided by the 3m height of the concrete block bays;
- Stockpiles will be limited to a maximum height of 3m in the processing area near the Crusher Building;
- Stockpiles of inert material such as concrete, brick, soil etc. will be limited to a maximum of 3m in height in the blending area. Height poles to the exact length (3m) will provide on-site guidance for stockpile management;
- Stockpiles of organic material such as timber and mulch will be limited to a maximum of 3m in height in the processing and blending areas. Height poles to the exact length (3m) will provide on-site guidance for stockpile management; and
- Stockpiles of all processed products, aggregates and landscaping supplies will be limited to 3m. Height guidance will be provided by the 3m height of the concrete block bays.

2.3.10 Environmental benefits

The proposed development will consider environmental best practice and sustainability to reduce the impact of the development on the environment. The following features will be built into the design of the proposed upgrade of the site:

- Waste will be received in a dedicated building with dust suppression systems and closely inspected upon arrival, as per the NSW EPA (2018) *Standards for Managing Construction Waste in NSW* and the NSW EPA (2014) *Draft Protocol for Managing Asbestos during Resource Recovery of Construction and Demolition Waste* to minimise the risk of contamination in the final products;
- Noise will be controlled using strategically-placed noise barriers and by enclosing noisy operations in buildings;
- Dust will be controlled by enclosing crushing and mulching operations inside buildings, and by extensive use of water sprays/misting systems;
- Advanced crushing, grinding, shredding and sorting technology will be used in the facility to maximise the diversion of waste from landfill, with a target of 95% recovery – with all waste processing done indoors with dust control systems operating at all times;
- More refined sorting of materials will occur within an enclosed warehouse building environment;
- Minimise the disposal of waste to landfill, and maximise the diversion of quality recycled materials into local markets;

- Concrete and asphalt hard stand to be used extensively across the site, including roads and waste storage and product storage bays to protect groundwater;
- Operational areas will comprise a compacted concrete aggregate hardstand and lined with waterproof membrane to avoid soil disturbance and to improve the quality of runoff water and to protect groundwater;
- Upgrading the stormwater management system on-site to protect surface water quality, firewater containment in the event of a fire incident and avoid impacts on receiving waterways;
- An advanced stormwater pond with floating wetland and a membrane filtration plant to supply the site with high quality water for dust control via sprinklers above all storage bays; and
- Continuous monitoring of air quality (dust) and noise at the site boundaries.
- Regular monitoring of ground water and stormwater.

2.3.11 Economic benefits

The facility upgrade will represent a new development that will assist in creating jobs within the Central Coast region. The proposed development will provide a broader range of recycling options and make progress towards the NSW Government's recycling targets. The project will create 5 jobs in construction over a 3-month period and 20 new permanent jobs, injecting more than $407 million into the local economy over a 25-year period.

2.3.12 Social benefits

The facility will create 5 jobs in construction over a 3-month period and 20 new permanent jobs. This will contribute towards employment in the area.

The facility will provide a local destination for building waste, as well as a local outlet for high quality recycled building and landscape products. This will reduce the need for transport of waste outside the area and the need to import products from Sydney, thus reducing transport costs and traffic.

2.4 Project Justification

2.4.1 Strategic Drivers

2.4.1.1 NSW EPA's Strategic Plan and the WARR Strategy 2014-21

In NSW, the State Government has committed to ambitious targets for recycling across the State. These targets are published in the NSW Waste Avoidance and Resource Recovery Strategy. By 2021/22, the NSW Government intends to increase recycling rates for:

- Municipal solid waste from 52% (in 2010–11) to 70%;
- Commercial and industrial waste from 57% (in 2010–11) to 70%;
- Construction and demolition waste from 75% (in 2010–11) to 80%; and
- Waste diverted from landfill from 63% (in 2010–11) to 75%.

A critical pathway to achieving these recycling targets is investment in new infrastructure. To encourage investment in new recycling facilities, the NSW Government is investing $337 million between 2017 and 2021 to build new recycling facilities. This investment is required to capture an additional 3.3 million tonnes of waste per year and have this material sustainably diverted from landfill. (NSW EPA, 2014)

2.4.1.2 NSW *Waste Less, Recycle More* Initiative

The NSW Government's $337 million Waste Less, Recycle More program includes $22.5 million allocated to business recycling, and a further $48 million to support the development of new infrastructure for both municipal, commercial and construction and demolition waste materials.

Waste Less, Recycle More programs have awarded $292.3 million to 822 projects, aiming to process 2,230,167 tonnes more waste and create 845 jobs.

2.4.1.3 NSW EPA draft Waste and Resource Recovery Infrastructure Strategy 2017-2021

The population of NSW is expected to grow to over 8.2 million by 2021 and this will increase the amount of waste generated across the state. By 2021, it is expected NSW will need to process nearly 20 million tonnes of waste.

The NSW Environment Protection Authority's (EPA) Waste Avoidance and Resource Recovery (WARR) Strategy 2014–21 sets targets for the diversion of waste from landfill, increasing from 63% in 2014/15 to 75% by 2021. To achieve the target, significant investment is needed to develop infrastructure that will process this forecast increase in waste volume. The draft Waste and Resource Recovery Infrastructure Strategy (NSW EPA, 2017)was developed to assist councils and waste industry participants to understand the expected increase in waste streams and to plan sufficient infrastructure capacity to process projected volumes.

The NSW Government is investing a further $168 million between 2017 and 2021 to stimulate investment in new waste processing technologies and capacity across NSW. This is part of the nine-year $802.7 million Waste Less, Recycle More initiative. Increased investment in resource recovery infrastructure is good for public health, the environment and the economy. It creates jobs and stimulates innovative technology. Successfully meeting NSW's diversion target would result in an estimated additional 1,590 jobs in NSW; energy savings equivalent to the energy usage of 1.49 million households each year; water savings equivalent to 5,392 Olympic-sized swimming pools each year and greenhouse gas benefits equivalent to removing 530,971 cars from the road.

The EPA recently finalised an infrastructure needs analysis to inform the development of the draft strategy. It is anticipated that the infrastructure strategy will aid ongoing development of regional waste and resource recovery implementation plans. Local governments and waste industry participants lead planning and investment in NSW's waste and resource recovery systems. The draft strategy has been developed to guide decision making to ensure NSW gets the correct mix of infrastructure to meet future needs.

The draft infrastructure plan identifies a significant shortfall in construction and demolition waste processing capacity in the Hunter and Central Coast Region. The draft strategy estimates that an additional capacity of approximately 461,000 tpa will be needed by 2021 to meet the NSW waste diversion target for C&D waste.

The proposed development will provide an additional 200,000 tpa capacity to the region, helping to ensure the Central Coast, and Hunter Region, have adequate processing capacity to meet the projected need.

2.4.2 Site suitability

The selected site is suitable as a sand, soil and building materials recycling facility:

- It is located within an industrial estate away from built-up urban areas;
- It is easy for heavy vehicles to access using major roads for the majority of their journey;
- The site is within easy reach for its customers, both projects generating sand, soil and building waste materials and potential customers requiring the processed product;
- The site is relatively flat, making it suitable for processing equipment and heavy vehicle maneuvering;

- The site is elevated, and not prone to flooding;
- There is sufficient area on the site allowing for a suitable processing area to be cleared and maintain visual and landscaped screens; and
- As discussed in detail in this EIS, the potential emissions can be mitigated to ensure there is no impact on surrounding properties.

The site is strategically positioned within the Somersby Industrial Park and is close to the M1 motorway. Furthermore, the proponent has a signification number of customers within the Central Coast region, who can potentially supply waste materials for recycling, and purchase recycled landscaping and building supply products.

An overview of these customers is provided in Table 2.9 below.

Table 2.9. List of commitments from local businesses to use the proposed facility once approved and operational. Letters of support are provided in Appendix Y.

Indicated interest in supplying waste	Expected tonnage per annum
Greenwood Landfill & Waste Recovery Facility	30,000
AE Biggs	25,000
About the House	20,000
John E Hogan Pty Ltd	5,000
Adam Lowe Earthmoving Pty Ltd	20,000
Central Waste Station	20,000
Central Coast Council	80,000
Robson Civil Projects	1,500
TOTAL	***201,500***
Indicated interest in purchasing products from the site	**Expected tonnage per annum**
Port Stephens Gardenland	12,000
AE Biggs	12,000
Adam Lowe Earthmoving Pty Ltd	20,000
McMahons Transport	20,000
Sell and Parker	600
John E Hogan Pty Ltd	15,000
Roy Lamb The Sandman	15,000
Central Coast Council	30,000
Robson Civil Projects	3,000
TOTAL	***127,600***

2.4.3 Strategic context

The Gosford Community Strategic Plan (Gosford City Councl, 2013) identifies the need to increase job opportunities and economic growth in the region by diversifying the types of industry in the area and by encouraging new businesses. The proposed development meets both of these objectives by using under-utilised industrial land to establish a business that will create 20 ongoing jobs. The facility will also service the local construction industry, supplying it with high quality recycled products.

It is further noted that the Department of Planning, Industry and Environment's *Central Coast Regional Plan 2036* (NSW DPIE, 2016), the region is expected to have 36,350 more households, requiring 41,500 new homes by 2036 (Goal 4). As a result, there will be growing demand for recycling services to support the local building industry over time.

Under Goal 1 of the *Central Coast Regional Plan 2036,* there is a NSW Government focus to create a prosperous Central Coast with more jobs close to home. The region has an estimated 116,730 local jobs and this number is projected to increase by 24,674 jobs to 141,404 by 2036. Employment is concentrated in areas with infrastructure that has the capacity to support future growth, potentially above current projections. The proposed development is strongly aligned with this goal in that it makes commercial use of industrial lands on the Central Coast that generates jobs and contributes significantly to the regional economy.

2.4.4 Ecologically Sustainable Development

The NSW Government is committed to encouraging Ecologically Sustainable Development, and this is a key objective of the State's environmental laws. The *Protection of the Environment Administration Act* 1991 defines ecologically sustainable development under Section 6(2) as: 'ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes.'

The National Strategy for Ecologically Sustainable Development (NSESD) (1992) states that there are two main features which distinguish an ecologically sustainable approach to development. These features are:

- The need to consider in an integrated way, the wider economic, social and environmental implications of our decisions and actions for Australia, the international community and the biosphere; and
- The need to take a long-term rather than a short-term view when taking those decisions and actions.

The *Protection of the Environment Administration Act* 1991 highlights four key principles of ecologically sustainable development under Section 6(2) (a)-(d). These principles are:

- **Precautionary principle** – namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
    - (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
    - (ii) an assessment of the risk-weighted consequences of various options.
- **Intergenerational equity** – namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.
- **Protecting Biodiversity** – conservation of biological diversity and ecological integrity-namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.
- **Improved valuation** – improved valuation, pricing and incentive mechanisms should be promoted to ensure the full costs, including the cost to environmental and social systems, are included in the final valuation of the product or service. Environmental factors should be included in the valuation of assets and services, such as:
    - (i) polluter pays-that is those who generate pollution and waste should bear the cost of containment, avoidance or abatement;
    - (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and

- (iii) environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The principles of ESD have been considered throughout the preparation of this EIS. The Chapter summarises what steps have been taken to achieve the principles of ESD.

The proposed Facility has been designed to minimise impacts and where possible, improve the natural, social and economic environment of the region. This includes ensuring the protection and management of air quality, soil and surface waters as well as the appropriate storage, management and disposal of wastes and hazardous substances. Impacts on social systems, such as noise, vibration, traffic and transport, fire and heritage have been managed and improved through the proposed mitigation measures.

The main processing operations will be enclosed, which will minimise dust and noise impacts on neighbouring properties. Waste is received onto a concrete and bunded hardstand in a three-sided building. Processing and recycling of the mixed building waste stream will be done within the secondary sorting warehouse. Processing of this waste stream in an enclosed environment will ensure that the waste material will not come into contact with rainwater, thereby avoid the potential for contaminated runoff requiring treatment in the OSD pond and stormwater treatment system.

The design of the outdoor waste storage, blending and product storage areas has considered environmental best practice in pavement design, to protect groundwater. The main access driveway and the waste tip and spread building will comprise a fully engineered and bunded hardstand, to avoid movement of any pollutants into groundwater. A flexible asphalt pavement will be provided beneath the waste storage bays, the landscaping storage bays and the aggregate storage bays to further protect groundwater. The other operational areas of the site will be paved in recycled crushed concrete, with a waterproof layer (impermeable barrier) to prevent any infiltration moving into groundwater.

Other water sensitive urban design and treatment measures are proposed to protect surface and groundwater quality. The measures will include four gross pollutant traps as the first part of the treatment train, to remove sediment and gross pollutants. This will be followed by treatment through a grassed swale for all runoff from working areas of the site. This is a critical component in the capture of sediment from the working areas of the site. Furthermore, an OSD basin in the south-west corner of the site will capture on-site stormwater and erosion sediment. An emergency spill pond is proposed to capture, test and manage water from higher risk runoff areas from the site. Other captured water will treated by the floating wetland, and water will be further treated through a membrane filtration plant before it is used for dust suppression across the site. The OSD basin and hydrological cycle of the operation has been designed to mimic natural runoff events across the property consistent with pre-development or naturally forested conditions. This will ensure that no impact occurs on vegetation being conserved on the property.

Water tanks will be used to capture rainwater from the Tip and Spread Building and the Secondary Sorting Warehouse for re-use.

The site is designed to have a comprehensive dust suppression system, with; water sprays on each storage bay, misting sprays in the Tip and Spread Building and Secondary Sorting Warehouse, paved areas under all vehicle access and operational areas, and a water truck patrolling the site.

The overall pavement design strategy and system of water management, therefore, is in line with best practice and will ensure the operations of the facility can be performed sustainably and in a manner that protects the environment and the amenity of neighbours.

The processing capacity of the facility will result in considerable social and economic benefits at both the local and regional level. The facility will be able to receive 200,000 tonnes of sand, soil and building materials per annum for recycling in the Central Coast region of NSW.

The development is consistent with current approved use and will enable additional material to be received, sorted and recycled by the facility to improve recycling outcomes for the Central Coast region, which has a critical shortfall of 461,000 tonnes per annum of recycling capacity to help the region reach a recycling target of 80% for construction and demolition waste materials 2021, per the NSW Government's *Waste Avoidance and Resource Recovery Strategy 2014 - 2021* (NSW EPA, 2014).

The proposed development will provide an additional 200,000 tpa capacity to the region, helping to ensure the Central Coast, and Hunter Region, have adequate processing capacity to meet the projected need.

The proposed upgrade the facility will enable the efficient entry, drop off of materials and loading of vehicles at the site, improving operational efficiency without impacting on neighbouring land uses.

2.4.5 Precautionary Approach

A precautionary approach to the identification and management of environmental issues has been taken throughout the preparation of this EIS. In some instances, where information was not fully obtainable for reasons outside the control of Jackson Environment and Planning Pty Ltd, a precautionary approach has been taken to ensure all appropriate measures were employed to prevent any associated environmental degradation.

2.5 Benefits to Current and Future Generations

The benefits to future generations include the protection and improved environmental management, increased employment opportunity, improved recycling infrastructure to respond to increasing demand (and community expectations) for efficient and effective sand, soil and building material recycling. Benefits also include the subsequent economic and social benefits which will be vital for the sustainable expansion and growth of the Somersby industrial area.

2.5.1 Protection of Biodiversity

A total of 2.5 ha of native vegetation is proposed to be impacted by the project, with a further 4.12 ha of cleared land and exotic vegetation also to be impacted within the Subject Site. Although complete clearing has been used to calculate credits within the Subject Site, several avoidance measures have been implemented during project design. Several mitigation measures will also be implemented during development to reduce impacts as much as possible, as recommended by Narla Environmental in their Biodiversity Assessment.

Avoidance and mitigation measures include:

- A 10 m buffer surrounding *Melaleuca biconvexa* individuals to ensure the species is not impacted by the development;
- Preparation of a Vegetation Management Plan (VMP) to guide the on-going protection and management of the *Melaleuca biconvexa*;
- Avoidance of the southern portion of the Subject Property, which totals 4.1 ha and contains habitat for *Prostanthera junonis* and *Hibbertia procumbens*. The area partially falls under Management Zone 1b and 1d of the Somersby Industrial Park Draft Plan of Management (Connell Wagner 2005) and the feasibility of entering into a Biodiversity Stewardship Agreement will be investigated;

- Assigning an Ecologist to undertake a pre-clearing survey of the vegetation prior to clearing and development. If any significant ecological values such as nests are found, clearing is to be delayed until the nest is vacated;
- Assigning an Ecologist to be present on site during the clearing events. The Ecologist will be able to guide works crews away from sensitive ecological features and will be on hand to capture and relocate displaced fauna. Where possible the clearing of mature trees will be avoided if they can be accommodated into the development footprint;
- Preventing the inadvertent introduction of exotic flora propagules by following the DEP (2015) 'Arrive Clean, Leave Clean' Guidelines; and
- Ensuring appropriate erosion and sedimentation controls are maintained throughout the construction phase and the period immediately following as outlined in the 'Blue Book' (Landcom 2004).

The unavoidable impact of clearing vegetation will be completely offset.

Details about the impacts on the biodiversity and the site are discussed in Chapter 12 and in the Biodiversity Assessment provided at Appendix P.

2.5.2 Valuation of Resources

The assessment of environmental, social and economic issues undertaken in this study has allowed for the improved valuation of these resources when considering the merits of the proposed development. The environmental and social costs with the proposed development have been minimised through the proposed mitigation measures, while it is expected that the proposed development will inject $407 million into the local economy over the 25 year life of the project and create 20 new and ongoing local employment positions within the community.

2.6 Planning and legislative requirements

This section summarises the planning and legislative requirements for the development approval, and how the proposed development meets those requirements.

2.6.1 Project approval

The proposed development will involve modification of the current Development Consent conditions. The maximum waste processing capacity will be increased to 200,000 tonnes per annum. The facility will include features outlined in Section 1.1.1.

Under Section 4.36 of the *Environmental Planning and Assessment Act* 1979 the proposed development is considered to be a State Significant Development, requiring an EIS to be submitted with the development application.

Central Coast Council has advised that the proposed development will require concurrence and licensing by the NSW Environment Protection Authority under the *Protection of the Environment Operations Act* 1997.

The company is committed to complying with all laws that affect its operations and understands that development approval and appropriate licensing is required prior to the proposed development occurring. In this regard, pursuant to Part 2, Schedule 2 of the *Environmental Planning and Assessment Regulation* 2000, Kariong Sand and Soil Supplies, as the Proponent, sought the Secretary's environmental assessment requirements with respect to the proposed Environmental Impact Statement. The SEAR's (8660) for the project was issued on 23 August 2017 by the NSW Department of Planning and Environment.

The EIS was submitted for the development in January 2019. This EIS and attachments comprise the updated submission which addresses all agency and community comments receiving during the public exhibition phase. The

reader is referred to the Response to Submissions Report for a full overview of how the EIS has been updated to address submissions received.

2.6.2 NSW statutory legislation

This section addresses how the proposed development complies with the relevant NSW planning legislation. The relevant NSW legislation includes:

- *Environmental Planning and Assessment Act* 1979;
- *Environmental Planning and Assessment Regulation* 2000;
- *Protection of the Environment Operations Act* 1997;
- *Waste Avoidance and Resource Recovery Act* 2001;
- *Water Management Act* 2000;
- *Biodiversity Conservation Act* 2016;
- *State Environmental Planning Policy (State and Regional Development)* 2011;
- *State Environmental Planning Policy (Infrastructure)* 2007*;*
- *State Environmental Planning Policy No. 55 - Remediation of Land;* and
- *State Environmental Planning Policy No.33 - Hazardous and Offensive Development.*

2.6.3 *Environmental Planning and Assessment Act* 1979

The proposed development is consistent with the overall objectives of the *Environmental Planning and Assessment Act* 1979. Section 5 of the E*nvironmental Planning and Assessment Act* 1979 and the 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 1.3 are:

a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources;
b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment;
c) to promote the orderly and economic use and development of land;
d) to promote the delivery and maintenance of affordable housing;
e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats;
f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage);
g) to promote good design and amenity of the built environment,
h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants;
i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State; and
j) to provide increased opportunity for community participation in environmental planning and assessment.

Under Section 4.36 of the *Environmental Planning and Assessment Act* 1979, the proposed development is considered to be a State Significant Development, requiring an EIS to be submitted with the development application. Under Clause 5.5 of the Act, an Environmental Impact Statement in the form prescribed by the Regulations must accompany the development application.

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 EIS 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, employment and economic benefits for the Central Coast region of NSW.

2.6.4 *Environmental Planning and Assessment Regulation* 2000

The facility triggers Clause 32(1)(b)(iii) and Clause 32(1)(d)(iv) of Schedule 3 of the Regulation (see clauses below).

> Clause 32: Waste management facilities or works:
>
> > 1) Waste management facilities or works that store, treat, purify or dispose of waste or sort, process, recycle, recover, use or reuse material from waste and:
> >
> > (b) (iii) that have an intended handling capacity of more than 30,000 tonnes per year of waste such as glass, plastic, paper, wood, metal, rubber or building demolition material.
>
> Or for developments that are located:
>
> > (d)(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 water table, 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.

As described in Section 1.1.1, the facility will process up to 200,000 tpa and the nearest residential dwelling is located less than 250m away from the site entrance. Therefore, the proposed project would constitute a State Significant Development under Clause 23(3) of Schedule 1 of the *State Environmental Planning Policy (State and Regional Development)* 2011. As the proposed development is considered to be a State Significant Development, it requires an Environmental Impact Statement.

This Environmental Impact Statement is part of the development application.

2.6.5 *Protection of the Environment Operations Act* 1997

The *Protection of the Environment Operation 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 Act requires a person to obtain an Environment Protection License (EPL) from the NSW Environment Protection Authority before carrying out any of the premise-based activities described in Schedule 1 of the Act.

Schedule 1 of the Act (Clause 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.

These activities are declared to be a scheduled activity if it meets the following criteria:

- If the premises are in the regulated area: (a) involves having on site at any time more than 1,000 tonnes or 1,000 cubic metres of waste, or (b) involves processing more than 6,000 tonnes of waste per year.

The relevance to the proposed development is as follows:

The proponent will require a licence to operate from the NSW EPA. The proponent will apply for an Environment Protection Licence following submission of this development application.

2.6.6 *Waste Avoidance and Resource Recovery Act* 2001

The *Waste Avoidance and Resource Recovery Act* 2001 (WARR Act) promotes waste reduction and better use of our resources in NSW. It includes provisions for waste strategies and programs, and for industry actions to reduce waste.

The WARR Act requires the Environment Protection Authority to produce and implement a state-wide waste strategy. The NSW Waste Avoidance and Resource Recovery Strategy 2014-2021 sets a recycling rate target for C&D materials of 85% by 2020-21.

The proposed development will assist in meeting the NSW state target for recycling C&D materials.

2.6.7 *Water Management Act* 2000

The objects of the *Water Management Act* 2000 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:

- Ecologically sustainable development;
- Protect, enhance and restore water recourses;
- Recognise and foster social and economic benefits;
- Recognise the role of the community;
- Provide efficient and equitable sharing of water;
- Management of water sources with other aspects of the environment including native vegetation and native fauna;
- Encourage the sharing of responsibility and efficient use of water; and
- Encourage best practice management and use of water.

In NSW, the regulator and policy maker for water resource management is the NSW DPI Water. The department develops natural resource management policy frameworks, strategies and plans related to water management. DPI Water is accountable for water sharing plans (WSPs), which define the rules for sharing the water resources of each regulated river valley between consumptive users and the environment. WSPs are made under the *Water Management Ac*t 2000. WaterNSW operates in accordance with these WSPs and delivers water to customers and the environment. Customers' water accounts are credited with their shares of available water and, as they use their water, their usage is debited from their accounts.

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 on water that cannot be adequately mitigated or managed.

2.6.8 *Biodiversity Conservation Act* 2016

The purpose of this Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development, in particular to:

- Conserve biodiversity at bioregional and State scales;
- Maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations;
- Improve, share and use knowledge, including local and traditional Aboriginal ecological knowledge, about biodiversity conservation;
- Support biodiversity conservation in the context of a changing climate;
- Support collating and sharing data, and monitoring and reporting on the status of biodiversity and the effectiveness of conservation actions;
- Assess the extinction risk of species and ecological communities, and identify key threatening processes, through an independent and rigorous scientific process;
- Regulate human interactions with wildlife by applying a risk-based approach;
- Support conservation and threat abatement action to slow the rate of biodiversity loss and conserve threatened species and ecological communities in nature;
- Support and guide prioritised and strategic investment in biodiversity conservation;
- Encourage and enable landholders to enter into voluntary agreements over land for the conservation of biodiversity;
- Establish a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity;
- Establish a scientific method for assessing the likely impacts on biodiversity values of proposed development and land use change, for calculating measures to offset those impacts and for assessing improvements in biodiversity values;
- Establish market-based conservation mechanisms through which the biodiversity impacts of development and land use change can be offset at landscape and site scales;
- Support public consultation and participation in biodiversity conservation and decision-making about biodiversity conservation; and
- Make expert advice and knowledge available to assist the Minister in the administration of this Act.

The *Biodiversity Conservation Act* 2016 and the supporting Regulations establish a modern and integrated legislative framework for land management and biodiversity conservation. Biodiversity elements include major innovations to offsetting and private land conservation, as well as improvements to threatened species conservation and how we manage human-wildlife interactions. The Act and its Regulations are administered by the Office of Environment and Heritage.

Consideration of the *Biodiversity Conservation Act* 2016 is required as part of the proposed development, given requirement for clearing of some native vegetation, which will generate the requirement for Biodiversity Offsets. This is assessed in full in this EIS.

2.6.9 *State Environmental Planning Policy (State and Regional Development)* 2011

Clause 23 of the *SEPP (State and Regional Development)* 2011 defines the following waste and resource management facilities as State Significant Development. Clause 23(3), in particular, applies to the proposed development:

> **23 Waste and resource management facilities**
>
> (3) Development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste.

Under these circumstances, it is evident that the proposed development is a project to which Part 4, Division 4.7 State Significant Development of the *Environmental Planning and Assessment Act* 1979 applies. Under Clause 4.12(8) of the *Act,* an Environmental Impact Statement, in the form prescribed by the Regulations, must accompany the development application.

The proposed State Significant Development requires an EIS to support the development assessment process. The consent authority is the Independent Planning Commission.

2.6.10 *State Environmental Planning Policy (Infrastructure)* 2007

The *State Environmental Planning Policy (Infrastructure)* 2007 (Infrastructure SEPP) has specific planning provisions and development controls for 25 types of infrastructure works or facilities:

1. air transport facilities
2. correctional centres
3. educational establishments
4. electricity generating works
5. electricity transmission and distribution
6. emergency services facilities and bushfire hazard reduction
7. flood mitigation works
8. forestry activities
9. gas transmission and distribution
10. health services facilities
11. housing and group homes
12. parks and other public reserves
13. port, wharf and boating facilities
14. public administration buildings and buildings of the Crown
15. rail infrastructure facilities
16. research stations
17. road and traffic facilities
18. sewerage systems
19. soil conservation works
20. stormwater management systems
21. telecommunications networks
22. travelling stock reserves
23. waste or resource management facilities
24. water supply systems
25. waterway or foreshore management activities.

The Infrastructure SEPP outlines the planning rules for these works and facilities, including:

- Where such development can be undertaken;
- What type of infrastructure development can be approved by a public authority under Part 5 of the Environmental Planning and Assessment Act (EP&A Act) following an environmental assessment (known as 'development without consent');
- What type of development can be approved by the relevant local council, Minister for Planning or Department of Planning under Part 4 of the EP&A Act (known as 'development with consent');
- What type of development is exempt or complying development;
- The relationship of other statutory planning instruments to the Infrastructure SEPP.

Division 23 Clauses 120 and 121 applies to the proposed development:

Division 23 Waste and resource management facilities

120 Definitions

In this Division:

prescribed zone means any of the following land use zones or a land use zone that is equivalent to any of those zones:

(a) RU1 Primary Production,

(b) RU2 Rural Landscape,

(c) IN1 General Industrial,

(d) IN3 Heavy Industrial,

(e) SP1 Special Activities,

(f) SP2 Infrastructure.

Resource recovery facility means a facility for the recovery of resources from waste, including such works or activities as separating and sorting, processing or treating the waste, composting, temporary storage, transfer or sale of recovered resources, energy generation from waste gases and water treatment, but not including re-manufacture of material or goods or disposal of the material by landfill or incineration.

121 Development permitted with consent

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

(2) Development for the purposes of a waste or resource transfer station may be carried out by any person with consent on:

(a) land in a prescribed zone, or

(b) land in any of the following land use zones or equivalent land use zones:

(i) B5 Business Development,

(ii) B6 Enterprise Corridor,

(iii) IN2 Light Industrial

(iv) IN4 Working Waterfront, or

(c) land on which development for any of the following purposes is permitted with consent under any environmental planning instrument:

(i) industry,

(ii) business premises or retail premises,

(iii) freight transport facilities.

(3) Development for the recycling of construction and demolition material, or the disposal of virgin excavated natural material (within the meaning of Schedule 1 to the Protection of the Environment Operations Act 1997) or clean fill, may be carried out by any person with consent on land on which development for the purpose of industries, extractive industries or mining may be carried out with consent under any environmental planning instrument.

The development involves establishing a facility to recycle sand, soil and building materials on a site zoned IN1 (General Industrial). Therefore, the proposed development is permissible with consent under the Infrastructure SEPP.

2.6.11 State Environmental Planning Policy No. 55 - Remediation of Land

The object of *State Environmental Planning Policy No. 55 - Remediation of Land* (SEPP 55) is to provide for a State wide planning approach to the remediation of contaminated land.

In particular, the SEPP aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment:

(a) by specifying when consent is required, and when it is not required, for a remediation work, and

(b) by specifying certain considerations that are relevant in rezoning land and in determining development applications in general and development applications for consent to carry out a remediation work in particular, and

(c) by requiring that a remediation work meet certain standards and notification requirements.

To ensure the development complies with the SEPP 55, a contaminated site assessment was undertaken (see Chapter 8).

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

The aims of the *State Environmental Planning Policy No.33 - Hazardous and Offensive Development* (SEPP 33) are:

a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments;
b) to render ineffective a provision of any environmental planning instrument that prohibits development for a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy;
c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division;
d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are considered;
e) 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; and

f) to require the advertising of applications to carry out any such development.

The relevance to the proposed development is as follows:

As a waste facility, the development is a *potentially offensive industry*. As such, a preliminary hazard analysis must be prepared as part of the development application. The preliminary hazard analysis is to be found in Chapter 3 of this Environmental Impact Statement.

2.6.13 *Reforms to the Protection of the Environment Operations (Waste) Regulation* 2014

The NSW Government implemented substantial reforms to modernise the NSW waste industry with the introduction of the *Protection of the Environment (Waste) Regulation* 2014.

The 2014 reforms were designed to achieve the objectives of the *Protection of the Environment Operations Act* 1997 (POEO Act), including to protect the environment and reduce risks to human health in New South Wales. The reforms also aimed at providing a level playing field for waste operators, minimise illegal dumping and minimise activities that distorted the market, including excessive stockpiling.

The 2014 reforms led to significant improvements in the operation of most waste facilities and improved ability for the EPA to efficiently regulate waste facilities. Despite this, based on numerous investigations, industry feedback and data analysis, the EPA has become aware of a range of ongoing issues in the construction and demolition (C&D) waste sector.

The EPA has proposed that the government make a number of changes to the waste regulatory framework in NSW to meet the objectives of the POEO Act. These proposed changes complement existing waste policy in NSW, including the NSW Government's *Waste Avoidance and Resource Recovery Strategy* 2014–21.

The proposed reforms adopted in November 2018 are set out in the *Standards for Managing Construction Waste in NSW* (NSW EPA, 2019).

The relevance to the proposed development is as follows:

To ensure best practice standards are met now and, in the future, the proponent will implement these proposed measures:

- Implement waste inspection requirements;
- Implement the waste sorting requirements;
- Implement the waste storage requirements; and
- Comply with transport requirements.

2.6.14 Commonwealth Policy and Legislation - *Environment Protection and Biodiversity Conservation Act* 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) came into force from 16 July 2000. The EPBC Act requires actions which are likely to have a significant impact on matters of National Environmental Significance, or which have a significant impact on Commonwealth land, to be referred to the Commonwealth Minister for the Environment for approval.

The relevance to the proposed development is as follows:

The subject site is not listed as a national heritage place and the proposed development would not impact on any national heritage places. The proposed development would not impact on any threatened species or communities.

No National Environmental Significance matters would be impacted by the proposed development. As such, the proposed development has not been referred to the Commonwealth Minister for the Environment and approval pursuant to the EPBC Act is not required.

2.6.15 Approvals/Licenses Required

The development is considered to be a State Significant Development under Schedule 1 of *State Environmental Planning Policy (State and Regional Development)* 2011.

A State Significant Development is development for which a development application is to be submitted to the Minister for Planning with an Environmental Impact Statement.

As part of the development assessment process, it is understood that an Environment Protection Licence (EPL) for the site will be required under the *Protection of the Environment Operations Act* 1997. As part of the approvals process, the Proponent will apply for an EPL that reflects the waste materials that can be lawfully received on site for recycling, total annual processing limit, the authorised amount (that is, the amount of waste that can be stored on-site at any one point in time) and environment protection licence discharge limits.

2.6.16 Local Environmental Planning Instruments

2.6.16.1 Gosford Local Environment Plan 2014

The proposed development of the KSSS sand, soil and building materials recycling facility is permitted under the *Gosford Local Environmental Plan* 2014 with consent. The proposed development will focus on upgrading the resource recovery activities on land zoned as IN1 General Industrial. The objectives of the IN1 zoning are as follows:

- To provide a wide range of industrial and warehouse land uses;
- To encourage employment opportunities;
- To minimise any adverse effect of industry on other land uses;
- To support and protect industrial land for industrial uses;
- To promote ecologically, socially and economically sustainable development;
- To ensure that retail, commercial or service land uses in industrial areas are of an ancillary nature; and
- To ensure that development is compatible with the desired future character of the zone.

Under the *Gosford Local Environmental Plan* 2014, the following land uses are permitted with consent (Table 2.10).

Table 2.10. Land uses are permitted with consent under the *Gosford Local Environmental Plan* 2014.

Permitted types of development in IN1 General Industrial Zones (*Gosford Local Environmental Plan* 2014)	
Recreation areas	Neighbourhood shops
Depots	Places of public worship
Freight transport facilities	Restaurants or cafes
Garden centres	Roads
General industries	Rural supplies
Hardware and building supplies	Timber yards
Industrial training facilities	Vehicle sales or hire premises
Landscaping material supplies	Warehouse or distribution centres
Light industries	Any other use not prohibited in the LEP (including a recycling facility).

It is noted that the building and landscape supplies business fits the definition of “landscape material supplies” under the Gosford LEP. As such, it is explicitly permitted with consent under the Gosford LEP 2014.

While the resource recovery facilities are not specifically defined as permissible development, they fall under the category of under the LEP as "Any other development not specified in item 2 (Permitted with Consent) or 4 (Prohibited)". Therefore, the use of the site as a sand, soil and building materials recycling facility is permitted with consent under the Gosford LEP 2014. It is also noted that the development of a 'resource recovery facility' with consent under clause 120 of the *State Environmental Planning Policy (Infrastructure)* 2007 overrides the provisions of the Gosford LEP.

2.6.16.2 Gosford Development Control Plan 2014

The purpose of the *Gosford Development Control Plan* 2014 is:

- To identify Council's expectations and requirements for development within Gosford local government area and build upon the Gosford LEP 2014, the Gosford Planning Scheme Ordinance and Interim Development Order No. 122 by providing detailed objectives and controls for development;
- To ensure that all development is consistent with the desired character for the surrounding neighbourhood;
- To identify approaches and techniques which promote quality urban design and architectural outcomes in Gosford local government area; and
- To promote best practice and quality environmental outcomes.

The development is required to demonstrate full compliance with the following elements of the *Gosford Development Control Plan* 2014.

- Chapter 3.11 Industrial Development: This chapter sets out constraints for industrial developments, including lot sizes, road widths, stormwater drainage, setbacks, building height, carparks, landscaping and pollution control.
- Chapter 6.1 Acid Sulphate Soils: Under this chapter, a preliminary soil assessment to determine the extent of acid sulfate soils at the site will be required. If acid sulfate soils are present, an Acid Sulfate Soils Management Plan will need to be prepared for submission with the development application.
- Chapter 6.3 Erosion Sedimentation Control: Under this chapter an Erosion and Sediment Control Plan (ESCP), developed to the Soils and Construction Managing Urban Stormwater Standards (Landcom 2004) standards, will be required to gain development consent or building approval. The ESCP must be approved before commencement of site works.
- Chapter 6.6 Preservation of Trees or Vegetation: This chapter sets out when Council consent or permission is required to remove trees in areas not already defined as protected by other legislation. The flora and fauna study will need to comply with this chapter and assess the vegetation on the site against criteria listed in this chapter of the DCP.
- Chapter 6.7 Water Cycle Management: This chapter requires a Water Cycle Management Plan strategy to be prepared to address the management of all water on site, including stormwater and waste water. The Water Cycle Management Plan strategy must incorporate water sensitive urban design principles and development control targets.
- Chapter 7.1 Car Parking: This chapter sets out the required number of carparking spaces and the design criteria for carparking areas.
- Chapter 7.2 Waste Management: Under this chapter, a Waste Management Plan is required to be prepared. The Waste Management Plan is to be submitted with the development application and is to cover the construction and ongoing operational phases of the development.

The following studies and supporting documentation will need to be prepared for the proposed development. Minimum requirements are:

- Streetscape perspective
- Landscape concept plan and report
- Arborist report
- Noise impact assessment report
- Geotechnical Report
- Preliminary Soils Assessment or Acid Sulfate Soil Management Plan
- Drainage Management Plan
- Erosion and Sediment Control Plan
- Traffic impact assessment report
- Heritage impact assessment report
- Aboriginal archaeological assessment report
- Bushfire assessment report
- Flora & Fauna Impact Assessment Report
- Threatened species impact assessment report
- Flood study
- Demolition work plan
- Water Cycle Management Plan
- Waste management plan.

Key parts of the DCP that relate to this development are outlined in Table 2.11 below. A summary of how the development complies with DCP requirements is also provided in this table.

Table 2.11. Key provisions in the *Gosford Development Control Plan* 2013 that have been considered in the EIS.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
Chapter 3.11 Industrial Development			
3.11.3 Objectives	The general objectives of this chapter are as follows: a. To encourage good design solutions for industrial development. b. To ensure that new industrial development represents a high level of urban design with recognition of the form and character of the existing man-made and natural context. To ensure the efficient use of urban land by maximising development potential of new and existing land and infrastructure.	Building and infrastructure design	Complies. The development will meet the requirements in the DCP.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
3.11.5 Building	c. Side and rear boundaries shall observe the following minimum set-back requirements: i. Lots 2500m^2 to 4000m^2 3m ii. Lots greater in area than 4000m^2 5m	Weighbridge placement. Although not strictly a building, the noise barriers are built structures. The noise barrier along the Eastern boundary will need to be at least 5m from the site boundary.	Complies. The weighbridge will be set back more than 5m inside the site boundary. Noise barrier to be constructed along the Eastern boundary will be set back at least 5 m from the site boundary.
	f. Where the industrial allotment adjoins or abuts rural, residential or open space land the development is not to be carried out within five (5) metres of the boundary of the allotment adjoining or abutting that land.	Although not strictly a building, the noise barriers are built structures. The noise barrier along the Eastern boundary will need to be at least 5m from the site boundary.	Complies. Noise barrier to be constructed along the Eastern boundary will be set back at least 5 m from the site boundary.
3.11.5.3 Building Height	A maximum requirement is not prescribed; however, the following principles are to be followed in the design and location of buildings within the site: a. The privacy and amenity of any adjoining residential areas is to be maintained and protected. b. The overshadowing of adjoining properties is to be minimised, with special attention to employee amenity or recreation areas. The building(s) should not project above the skyline and detract from the natural landscape when viewed from a distance.	Although not strictly a building, the noise barriers are built structures.	Complies. The noise barrier along the Eastern boundary is 5 high. It will comply by being set back from the boundary, behind trees. The noise barrier is expected to be less than the height of the existing trees along the boundary. The noise barrier will increase the privacy to the neighbouring property.
3.11.5.4 Building Appearance	This clause sets out appearance of buildings that can be seen from the road and the colour of roofs that can be seen from neighbouring properties.	This clause does not apply to this development.	Complies. The noise barriers will not be visible from the road and will not have roofs. The front entrance and boundary of the site will be landscaped according to the Landscape Concept Plan and blend in similar to other industrial development in Somersby. It is noted that the Warehouse Building is already approved by Central Coast Council under DA52541/2017.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
3.11.6.2 Outdoor Storage Areas	a. Where the proposed use of the site shall require open areas for the storage of goods or materials, adequate provision is to be included in the design layout of the site and should not encroach on carparking areas, driveways or landscaped areas. These areas are required to be screened from view from any road or other public area. Where the use of the proposed development is not known, outdoor storage area(s) shall be provided. b. Screen fences should be of materials compatible with or which complement the materials, colours, textures, etc. of the materials used in the buildings on the site. When the screening is visible from roads etc., the materials should be in relation to those used for the front facade of the building. Note: Security fencing and screen fencing should not intrude into the front set back area between the street frontage and the building.	Much of the development will consist of storage of incoming materials awaiting processing and outgoing products awaiting sale.	Complies. The storage areas are well back from the street front and set back from the site boundaries. The front, east and west boundaries of the site with be attractively landscaped. The stored materials will not be visible from the road, nor the neighbouring property. Materials will be stored in purpose-built concrete bunkers, which are widely used in this industry. Refer to the Visual Impact Assessment in Chapter 15 and Appendix S.
3.11.7.3 Loading and Unloading	a. Provision must be made on-site for the loading and unloading of vehicles, with adequate manoeuvring space so that vehicles can enter and leave the site travelling in a forward direction. b. Wherever practical loading docks or vehicular entries to building shall not be provided on any street elevation. Where such facilities can only be provided to street frontages, they must be screened with landscaping. c. The loading/unloading and associated manoeuvring areas are to be exclusive of the relevant carparking requirement. d. Loading docks may be internal or external and shall be located so as not to be visible from any adjoining residential area and not to transmit excessive noise to any such area. A minimum loading area/dock of 3.5 metre width x 8 metre length x 3.6 metre height clearance for single unit truck vehicles is to be provided. Large-scale developments shall be designed to accommodate semi-trailers. In general, turning circles will be required to be provided to accommodate the largest type of truck which could reasonably be expected to service the site.	Loading and unloading vehicles is a key feature of the site's operations.	Complies. On-site traffic plans, with swept paths showing vehicle manoeuvring space and turning circles are provided in the site plans at Appendix E. Adequate space is provided for all vehicles to enter and leave in the front direction. All unloading of waste will occur indoors within the Tip and Spread Building, which has maximum height at the front opening of 14.6m to enable the tipping of all heavy vehicles.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
3.11.8.3 Landscaping	a. All set back and carparking areas are to be landscaped and maintained in accordance with sound landscaping principles. b. The design of all buildings, car parks, storage areas, access, and other features such as open drains shall be integrated with the landscape proposals. Trees should be incorporated wherever possible. In open car parks they should be so spaced that at least 50% of the area of car parking spaces will be under the canopy of the trees when they reach maturity. c. Landscaping must be provided across the frontage of a site having a minimum depth of five (5) metres except in the case of corner allotments where the secondary street frontage shall have a minimum depth of two (2) metres. Earth mounding should be considered within this setback area. The earth mounding should not be steeper than a 1:3 grading in order for satisfactory maintenance of the mound. d. All existing trees shall be retained except for those which have been accurately shown and marked for removal on the development application and their removal is approved by Council; or where in any other case the prior written consent of the Council is obtained for their removal under the provisions of the Cl 5.9 of Gosford LEP 2014 and the Preservation of Trees or Vegetation Chapter of this DCP. Further detailed information is contained in the Chapters titled Preservation of Trees or Vegetation and Landscaping in this DCP. e. All necessary measures are to be taken to prevent damage to trees and root systems during site works and construction. Failure to adhere to this requirement may render the developer and/or the agent liable to action under the provision of Cl 5.9 of the Gosford LEP 2014. f. Landscaped areas shall be planted and maintained with appropriate trees, shrubs and ground covers of advanced plant stock in accordance with the detailed landscape plan to be submitted for the site and approved by Council prior to the release of the complying development certificate. g. Plants used in landscape areas shall generally be selected native plants chosen for their	Large areas of the site will be landscaped or left as vegetation to meet the requirements of the DCP.	Complies. The Landscape Plan in Appendix F has been prepared in accordance with this clause of the DCP. Also refer to Appendix E for site civil designs on retaining walls on the western side of the site. These plans show landscaping measures and kerb and guttering to separate the grassed swales for treatment of surface runoff from operational hardstand areas.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
	suitability to the area and their intended purpose and, where grass is not used, fast growing ground covers in tanbark, wood chips, or other approved mulch of at least 100mm depth shall be used. h. Council prefers that Australian native trees and shrubs be used for landscaping due to their more likely suitability to their natural habitat, their relatively fast growth and low maintenance characteristics and to assist in achieving a common landscape theme. All landscaped and grassed areas shall be separated from adjacent driveways and parking areas by means of a kerb or other approved device to prevent vehicle encroachment.		
3.11.8.4 Pollution Control	a. Noise Any premises, machinery, or activity shall not give rise to an offensive noise to either residential or other industrial premises and shall comply with the requirements of the Industrial Noise Policy of the Department of Environment and Climate Change. Noise should not be transmitted to adjoining incompatible land uses or be permitted to invade into areas within developments that require low noise levels. Where this is likely to be an issue, or where requested by the Council, an acoustic consultant's assessment and report is to be submitted.	The crushing and grinding operations can generate significant noise. Noise mitigation measures will be required to meet the required outcome.	Complies. Waste receival and processing to all occur indoors, to minimise noise emissions. An overview of the results of the Noise and Vibration Impact Assessment and a summary of the proposed mitigation measures are provided in Chapter 11. A copy of the Noise and Vibration Assessment Impact Assessment is provided at Appendix O.
	b. Air Premises must comply with the requirements of the Protection of Environment Operations Act, 1997 and regulate the control of air impurity emissions as defined.	Dust is the primary air emission from C&D recycling facilities. The facility will need to implement dust-mitigation measures	Complies. The modelling indicates that dust emissions will be controlled and no off-site dust impacts will occur. An overview of the results of the Air Quality Impact Assessment and a summary of the proposed mitigation measures are provided in Chapter 9. A copy of the Air Quality Assessment Impact Assessment is provided at Appendix M.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
	c. Liquid Wastes Liquid Wastes from industrial processes shall be disposed of to comply with the requirements of the relevant Water Supply Authority and any requirements of the Office of Environment and Heritage.	A small quantity of oil and grease will be captured through on coalescing plate separator attached to the car wash. This will be disposed or treated off-site by a licenced liquid waste contractor. Treated wash water from the truck wash bay will be directed to sewer subject to licensing by Central Coast Council. Organic material from treated recycled water from the membrane filtration plant will be discharged to sewer subject to licensing by Central Coast Council.	Complies. The measures to be employed for dealing with liquid wastes are outlined in Chapter 7 and Appendix I.
	d. Stormwater Stormwater drainage systems must be designed so that significant levels of nutrients and other substances are not discharged into the hydrological environment of the City.	The final site layout and civil design must ensure stormwater run-off is captured and remains on-site, with adequate treatment to meet water quality targets.	Complies. The proposed final land contours and stormwater plan are discussed in Chapter 7 , and a copy of the Stormwater Plan is provided in Appendix E and Appendix I. The assessment shows that the proposed stormwater design fully meets council's on-site detention and water quality targets.
3.11.8.6 Advertising Signs	All advertising signs should be designed as an integral part of the design of the external elements of the development i.e. building - landscaping - signage. Signs are to be primarily for the identification of the premises and its occupants, and any development providing for different ownership or tenancies shall include a single Pole or Pylon Sign providing space for each operation to be included and in accordance with the Advertising Signage Chapter of this DCP. For details as to the control of the signs and types of signs which may be utilised refer to the Advertising Signage Chapter of this DCP	Appropriate signage.	Complies. Signage will comply with the DCP.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
3.11.9.2 Road Access	a. To ensure satisfactory road access for safety and convenience, industrial developments should be on land serviced and accessed by fully constructed and sealed roads. Where this situation does not exist, the developer will be required to: i. provide kerb and gutter along the total frontage of the site and the construction of a sealed road to Council requirements, and ii. extension of a constructed sealed road to Council requirements to give road access to the nearest sealed arterial or distributor road. All construction work to be in accordance with engineering plans approved by the Council and in accordance with the Council specification. b. Access crossings from public roads and driveways with the building set-back are to be perpendicular to the road, and be i. separated or divided at the property boundary for ingress and egress movements. ii. a minimum of six (6) metres from an intersecting road or break in a traffic island, and located to provide adequate sight distance	The site will be regularly accessed by large vehicles. Safe site access is essential.	The proposed upgrade to the site access road, and the addition of a turning lane on Gindurra Rd is outlined in Chapter 10 and the plans are provided in Appendix N.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
3.11.9.3 Stormwater Drainage	a. All surface and roof stormwater are to be drained to the nearest Council piped stormwater system provided the system is capable of carrying the discharge. If the existing system is not capable of carrying the discharge, the water is to be discharged via a new system to be provided by the developer as directed by Council. This may include a requirement to provide on-site detention of stormwater flows. b. For sites which require drainage through adjoining property(s), the applicant shall be responsible for the acquisition of inter-allotment drainage easements (where necessary) and shall lodge proof of agreement with adjoining owner(s) with the development application. c. In addition to the erosion and sedimentation controls, energy dissipation may be required at the point of discharge from the property, to reduce erosion potential. d. Design for stormwater drainage shall be in accordance with the procedures specified in "Australian Rainfall and Runoff Vols 1 and 2, Edition 1987" and Council's "Specification for Drafting and Design of Stormwater Drainage Works and Roadworks". e. Provision is to be made for the collection and dispersal of overland runoff upstream of the development for the 1% AEP flood event. The floor level of buildings is to be a minimum 500mm above the finished site surface levels or 500m above the 1% AEP Flood Level where applicable.	Design of stormwater system and operations.	Complies. All stormwater will be captured and retained on-site. A Stormwater Management Plan is summarised in Chapter 7 and a copy of the Plan is provided in Appendix E. Water Cycle Management is described in the Water Impact Assessment report provided at Appendix I.
3.11.9.4 Water and Sewer	Arrangements are to be made with the relevant Water Supply Authority for the provision of reticulated water and sewer services. Headworks and Augmentation contribution charges will be applied to ensure that each additional user pays the appropriate charge for the provision of those services.	Water and sewage services for the development operations.	Complies. The site is already connected to the town water supply. Connection to the council sewerage system will be performed under DA52541/2017.2.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
3.11.9.5 Solid Wastes	A garbage and recycling storage area is to be provided, designed and constructed in accordance with Council's requirements so as to conceal its contents from view from public places and adjacent properties and is to be blended into the landscaping layout. The storage area is to be located so as to be readily accessible from within the site, and to the garbage collector from the adjoining road. The storage area is to be of sufficient size to accommodate trade wastes and recyclable material generated.	Waste management	Complies. A waste management plan is summarised in Chapter 6 and a copy of the Plan is provided in Appendix H.
3.11.9.6 Other Services	Arrangements must be made with the relevant service authority for the supply of electricity, gas and telephone. Early discussion with the appropriate Authorities is recommended, and applications to Council for development consent should identify requirements for electricity sub-stations and other facilities which will affect the design and layout of the proposed development.	Supply of utility services to the site suitable for the development.	Complies. The development covered by this development application and this EIS requires electricity to supply the weighbridge, processing equipment within the Secondary Sorting Warehouse and the membrane filtration plan. External plant and equipment will be powered by diesel. Ausgrid has been consulted as part of the preparation of this EIS.
Chapter 6.1 Acid Sulphate Soils			
6.1.5 Development Application Procedure	Step 1 Check Clause 7.1 of the Gosford LEP 2014 and the Development Control Plan 2013 - Acid Sulfate Soils maps. These maps introduce various classes of land and determine whether a Development Application is necessary. Step 2 If the Gosford LEP 2014 and the Development Control Plan 2013 - Acid Sulfate Soil Maps held by Council identify that a Development Application is required, there are two options. Either: (a) A suitably qualified professional is required to carry out a preliminary soil assessment to determine the extent of acid sulfate soil. Details are provided in Section 6.1.9 of this chapter and the Office of Environmental Heritage (OEH) Guidelines.	Site construction	Complies. The ASS Map shows site has the ASS Class 5. This has been considered in the Water Impact Assessment (Appendix I). A Contaminated Site Assessment is summarised in Chapter 8 and a copy of the Contaminated Site Assessment report is provided in Appendix L.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
	(b) Assume that the soils within the site of the proposal contain acid sulfate soil and by-pass this step and carry out step 3. Step 3 Engage a suitably qualified professional to prepare an Acid Sulfate Soil Management Plan for all proposals which will disturb/expose acid sulfate soils or potential acid sulfate soils.		
Chapter 6.3 Erosion Sedimentation Control			
	The objectives of this chapter are: • To prevent land from being degraded by soil erosion or unsatisfactory land and water management practices. • To protect streams and waterways from being degraded by erosion and sediment caused by unsatisfactory land and water management practices. To promote and protect biodiversity.	Civil works, construction and site contours.	Complies. An Erosion and Sediment Control Plan is summarised in Chapter 7 and a copy of the Plan is provided in Appendix E. A Water Cycle Impact Assessment is summarised in Chapter 7 and a copy of the full report is provided in Appendix I. A Landscape Plan is summarised in Chapter 16 and a copy of the Plan is provided in Appendix F. The development will comply with the provisions of the DCP.
Chapter 6.5 On-site Effluent and Greywater Disposal			

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
6.5.3 Objectives of Chapter	The objectives of this Chapter are as follows: a. To protect the health of people through proper on-site disposal of effluent and waste water. b. To protect the natural environment from improper methods of on-site effluent and waste water disposal. To specify the requirements of suitable on-site sewage disposal systems and waste water recycling systems.	Management of sewage generated on-site.	Complies. Connection to the council sewer system will be implemented as part of DA52541/2017.2.
Chapter 6.6 Preservation of Trees or Vegetation			
6.6.1.4 Objectives of the Chapter	To preserve the amenity of the Gosford City Local Government Area through the preservation trees and other vegetation. a. To define Council's responsibilities and requirements with respect to the protection, retention and replacement of trees and native vegetation. b. To ensure proper consideration is given to trees and vegetation in planning, designing and constructing development. c. To minimise unnecessary injury to, or destruction of, trees and vegetation. d. To facilitate the removal of undesirable exotic plants, noxious weeds, dangerous trees and other inappropriate plantings. To specify the requirements for the submission of sufficient and relevant information by those who wish to ringbark, cut down, top, lop, remove, injure or wilfully destroy any tree or other vegetation.	Site clearing and landscaping.	Complies. A Landscape Plan is summarised in Chapter 16 and a copy of the Plan is provided in Appendix F.
Chapter 6.7 Water Cycle Management			

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
6.7.3 Objectives	The objectives of this chapter are to: • Provide direction and advice to applicants in order to facilitate WSUD, IWCM and Flood Mitigation within the development application process • Provide design principles that will assist development to meet the purpose of this chapter of the DCP. Provide objectives and performance targets for specific water management elements including water conservation, retention / detention, stormwater quality, and flooding caused by Local Overland Flooding, Mainstream Flooding or Storm Surge.	On-site water management.	Complies. A Water Cycle Management Strategy is summarised in Chapter 7 and a copy of the Strategy is provided in Appendix I. The facility intends to use captured surface run-off for dust control.
Chapter 7.1 Car Parking			
7.1.1.3 Objectives	The objectives of this chapter are as follows: a. To facilitate traffic management and safe traffic movement. b. To establish an appropriate environmental quality for parking facilities associated with site development c. To provide parking facilities which are convenient and sufficient for the use of service groups, employees, and visitors. To ensure that a balance is achieved between the needs of the proposed development and its use, and that of vehicular and pedestrian traffic.	Car parking	Complies. Twelve carpark spaces are provided for employees adjacent to the warehouse / office complex approved in DA52541/2017 on 17/11/2017.
Chapter 7.2 Waste Management			
7.2.3.2 Objectives	**Waste minimisation** • To assist applicants in planning for suitable waste management, through the preparation of a waste management plan. • To minimise resource requirements and construction waste through reuse and recycling and the efficient selection and use of resources.	Waste management	Complies. A Waste Management Plan is summarised in Chapter 6 and a copy of the Strategy is provided in Appendix H.

DCP Clause No.	Objective / Requirement	How this DCP clause will influence the proposed development	Compliance
	• To minimise demolition waste by promoting adaptability in building design and focusing upon end of life deconstruction. • To encourage building designs, construction and demolition techniques in general which minimise waste generation. • To maximise reuse and recycling of household waste and industrial/commercial waste. **Waste management** • To assist applicants in planning for sustainable waste management, through the preparation of a waste management plan. • To assist applicants to develop systems for waste management that ensure waste is transported and disposed of in a lawful manner. • To provide guidance in regard to space, storage, steep narrow allotments, amenity and management of waste management facilities. • To ensure waste management systems are compatible with collection services. • To minimise risks associated with waste management at all stages of development.		

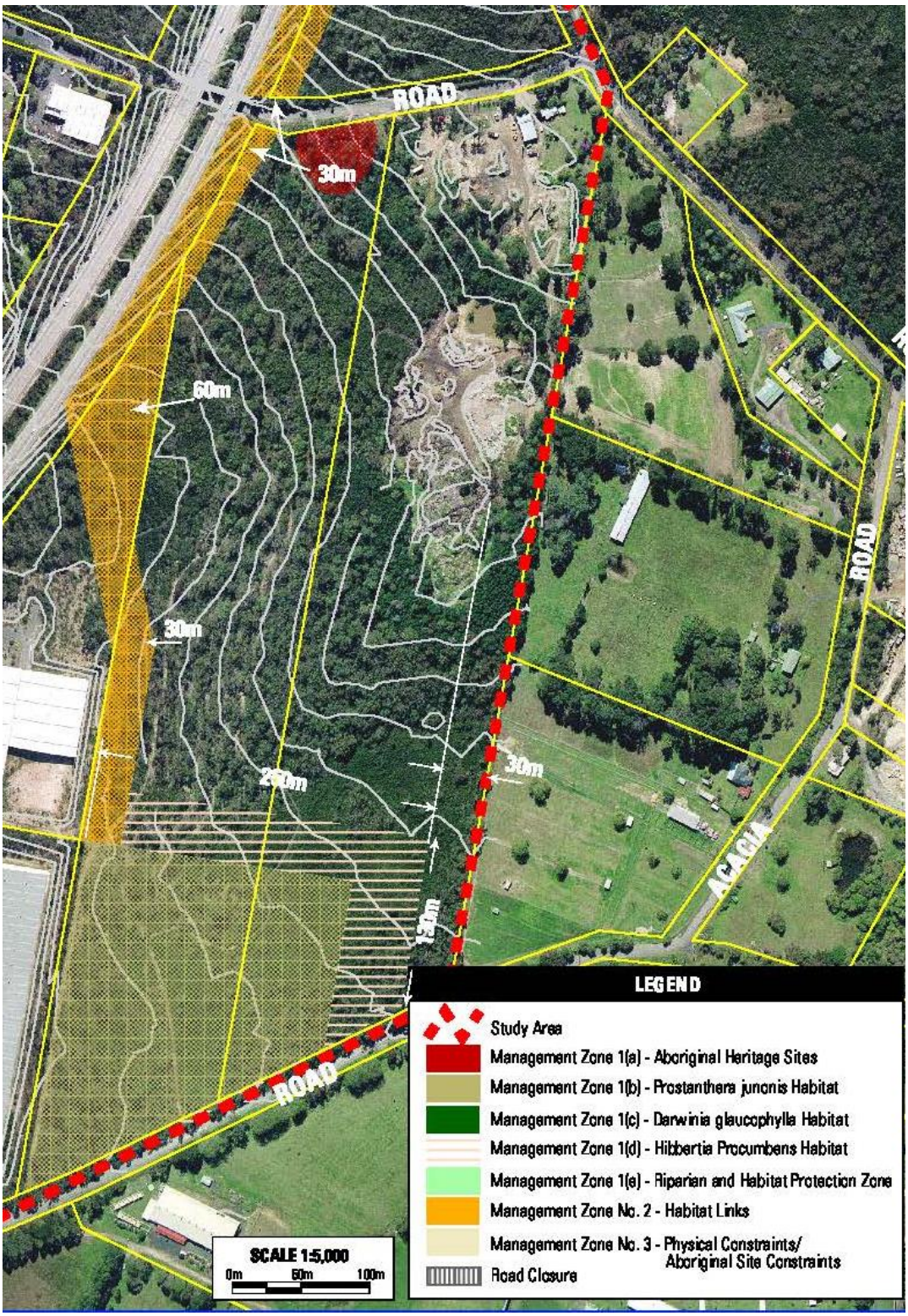
2.6.17 Somersby Industrial Park Plan of Management

The Somersby Industrial Park Plan of Management was prepared for the City of Gosford in 2005 (Connell Wagner Pty Ltd, 2005). The Plan identifies key environmental values in the Somersby area, and identifies areas that should be protected.

The draft Plan identifies a small area of land on the (western) adjacent lot that is an Aboriginal management zone. However, this should not be impacted by the proposed development (also refer to Chapter 15 and Appendix T for more information on the impact assessment conducted).

Appendix B of the Somersby Industrial Park Plan of Management contains a series of maps showing various key environmental values within the Somersby study area. The draft Plan identifies much of the existing vegetation on the proposed development site as being significant habitat. However, the recommended management areas are confined to the south of the site, which would be unaffected by the proposed development (see Figures 4.1, 4.1a and 4.9 in Appendix B of the draft Plan). The management zones on the site are shown in Figure 2.16 below.

Figure 2.16. Extract from Draft Somersby Industrial Park Plan of Management showing management areas on the site. Source: Draft Somersby Industrial Park Plan of Management 2005.



2.6.18 Draft Somersby to Erina Corridor Strategy

The Central Coast Council's Draft Somersby to Erina Corridor Strategy (Central Coast Council, 2019) was released for comment in 2019. The Somersby to Erina Corridor is the collection of six centres connected by the Central Coast Highway.

The Somersby to Erina Corridor Strategy (the Corridor Strategy) has been prepared by Central Coast Council to:

- Guide the growth and investment in the six centres of Somersby, Mount Penang and Kariong, West Gosford, Gosford City Centre, East Gosford and Erina which benefits the entire region and
- Implement the directions of the NSW Government's Central Coast Regional Plan 2036 (CCRP).

The Corridor Strategy identifies Somersby as an industrial area, with a primary focus on employable lands. The proposed development is consistent with this objective.

The Corridor Strategy emphasises commercial development around the Somersby centre, and a revival of tourism assets. The proposed recycling facility is on the eastern side of the M1 Pacific Motorway and is sufficient distance from the Somersby Centre and tourist attractions to not have any adverse impact.

It should be noted that a local construction and demolition recycling facility, and earthworks supplies depot, will assist in the sustainable development of the area.

3 Environmental risk assessment of the potential impacts of the development identifying key issues for assessment

A Preliminary Hazard Analysis and Environmental Risk Assessment has been performed to identify key potential impacts of the development, as well as potentially offensive or hazardous issues that need to be considered as part of the EIS process.

The assessment has been performed according to AS/NZS ISO 31000: 2009 *Risk Management – Principles and Guidelines* and the Preliminary Hazardous Analysis has been informed by the *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33* (NSW Department of Planning , 2011). We have also considered the following guidelines published by the NSW Department of Planning in 2011:

- *Hazardous Industry Planning Advisory Paper No 2 - Fire Safety Study Guidelines* (NSW Department of Planning, 2011)
- *Hazardous Industry Planning Advisory Paper No 3 - Risk Assessment* (NSW Department of Planning, 2011)
- *Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning* (NSW Department of Planning , 2011)
- *Hazardous Industry Planning Advisory Paper No 6 - Hazard Analysis.* (NSW Department of Planning, 2011)

3.1 Scope

The assessment has been performed to identify the risks posed to people, property and the environment, and to identify potential hazardous and offensive issues that need to be addressed as part of the development to ensure compliance with SEPP 33. 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.

3.2 Methodology

The methodology used to inform preliminary hazard analysis and environmental risk assessment has included the following steps:

- Identify and screen the hazards associated with the project;
- Examine the maximum reasonable consequence of identified events;
- Qualitatively estimate the likelihood of events;
- Proposed risk treatment measures;
- Qualitatively assess risks to the environment, member of the public and their property arising from atypical and abnormal events and compare these to applicable qualitative criteria;
- Recommend further risk treatment measures if considered warranted; and
- Qualitatively determine the residual risk assuming the implementation of the risk treatment measures.

It is important to note that this preliminary hazard analysis and environmental risk assessment has been undertaken at an early stage of the proposed development to help inform key issues to be considered in the EIS. All hazards need to be identified, and an assessment of the resultant risk levels on a cumulative basis is also undertaken as part of the study.

3.3 Risk management

The environmental risk assessment has been informed by AS/NZ 31000: 2009 *Risk Management Principles and Guidelines* and *Hazardous Industry Planning Advisory Paper No 3 - Risk Assessment* (NSW Department of Planning, 2011). The risk management process has been informed by the following elements:

- Establish the context;
- Identify the risks;
- Analyse the risks;
- Evaluate the risks; and
- Treat risks.

3.4 Risk criteria

The following principles have been adopted to identify and assess risk in this study. This has been informed by the *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning* (NSW Department of Planning , 2011).

- the avoidance of all avoidable risks;
- the risk from a major hazard should be reduced wherever practicable, even where the likelihood of exposure is low;
- the effects of significant events should, wherever possible be contained within the site boundary; and
- where the risk from an existing installation is already high, further development should not pose any incremental risk.

3.4.1 Qualitative measurement of consequence, likelihood and risk

To undertake a qualitative risk assessment, it is useful to describe the levels of consequence of a particular event, and the likelihood or probability of such an event occurring. Risk assessment criteria have been developed in AS/NZS ISO 31000: 2009 which allows the risk assessor to develop risk criteria during the establishment of the context.

In according with AS/NZS ISO 31000: 2009, the following tables have been reviewed as part of establishing the context of the project. These tables were considered to be consistent with the specific objectives of the preliminary hazard analysis and environmental risk assessment.

Table 3.1. 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 3.2. Qualitative measures of maximum reasonable consequence.

Event	People	Environment	Asset / Production
1	Multiple fatalities	Extreme environmental harm (e.g. widespread catastrophic impact on environmental values of an area)	More than $1B loss or production delay
2	Permanent total disabilities, single fatality	Major environmental harm (e.g. widespread substantial impact on environmental values of an area)	$100M to $1B or production delay

Event	People	Environment	Asset / Production
3	Minor injury or health effects (e.g. major lost workday case / permanent disability)	Serious environmental harm (e.g. widespread and considerable impact on environmental values of an area)	$5M - $100M loss or production delay
4	Minor injury or health effects (e.g. restricted work or minor lost workday case)	Material environmental harm (e.g. localised and considerable impact on environmental values of an area)	$250K to $5M loss or production delay
5	Slight injury or health effects (e.g. first aid / minor medical treatment needed)	Minimum environmental harm (e.g. minor impact on environmental values of an area)	Less than $250K or production delay

Combining the probability and consequence tables, Table 3.3 provides a qualitative risk analysis matrix to assess risk levels.

Table 3.3. Qualitative risk analysis matrix used in this preliminary hazard analysis and environmental risk assessment.

Consequence	Probability‡					
		A	B	C	D	E
	1	1 (H)	2 (H)	4 (H)	7 (M)	11 (M)
	2	3 (H)	5 (H)	8 (M)	12 (M)	16 (L)
	3	6 (H)	9 (M)	13 (M)	17 (L)	20 (L)
	4	10 (M)	14 (M)	18 (L)	21 (L)	23 (L)
	5	15 (M)	19 (L)	22 (L)	24 (L)	25 (L)

‡ Legend – L: low; M: Moderate; H: high; Risk numbering: 1 – highest; 25 – lowest risk. Colour coding: Green: tolerable risk; orange: ALARP – as low as reasonably practicable; red: intolerable risk.

Risk acceptance criteria for the project have been formulated following consideration of the *Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning* (NSW Department of Planning , 2011) and AS/NZS ISO 31000 2009 – *Risk Management Principles and Guidelines.*

In assessing the tolerability of risk from potentially hazardous development, both qualitative and quantitative aspects need to be considered. Relevant general principles considered in this study as documented in the *Hazardous Industry Planning Advisory Paper No 4 - Risk Criteria for Land Use Safety Planning* (NSW Department of Planning, 2011):

- the avoidance of all avoidable risks;
- the risk from a major hazard should be reduced wherever practicable, even where the likelihood of exposure is low;
- the effects of significant events should, wherever possible be contained within the site boundary; and
- where the risk from an existing installation is already high, further development should not pose any incremental risk.

3.5 Hazardous materials stored on-site

The NSW Department of Planning in the *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33* (NSW Department of Planning , 2011) sets out a process for screening potentially hazardous materials that are stored on site as part of a proposed development.

Potential risk typically of holding certain types of hazardous materials on site depends on:

- The properties of the substance(s) being handled or stored;
- The conditions of storage or use;
- The quantity involved;

- The location with respect to the site boundary; and
- The surrounding land uses.

Risk screening needs to be undertaken as part of the SEPP 33 guidelines based on an estimate of the consequences of fire, explosion or toxic release from material(s) being handled. It considers information from the proponent on the properties of the materials, quantity, type of storage or use, and location. A risk screening analysis for the proposed development is given in Table 3.4 below.

None of the waste streams or recovered products are dangerous goods or hazardous. However, several streams are flammable; timber, mulched timber, paper/cardboard, plastics. The storage and risk management of these streams is addressed in the Fire Safety Study (see Appendix Q).

Table 3.4. Risk screening analysis of potentially hazardous materials held on site as part of the development.

Material / potential pollutant	Storage location	Dangerous Goods Class[1]	Packing Group[2]	Maximum quantity on site (tonnes if a unit is not given)	Screening method[3]	Threshold[4]	Notes
Soil (Bay 1)	Waste storage bays	n/a	n/a	1,243	n/a	n/a	Not a dangerous good and is not flammable
Soil (Bay 2)	Waste storage bays	n/a	n/a	1,243	n/a	n/a	Not a dangerous good and is not flammable
Soil (Bay 3)	Waste storage bays	n/a	n/a	1,243	n/a	n/a	Not a dangerous good and is not flammable
Virgin Excavated Natural Material	Waste storage bays	n/a	n/a	616	n/a	n/a	Not a dangerous good and is not flammable
Metals	Waste storage bays	n/a	n/a	904	n/a	n/a	Not a dangerous good and is not flammable
Timber	Waste storage bays	n/a	n/a	904	n/a	n/a	Not a dangerous good
Asphalt	Waste storage bays	n/a	n/a	1,243	n/a	n/a	Not a dangerous good and is not flammable
Mixed building waste	Waste storage bays	n/a	n/a	791	n/a	n/a	Not a dangerous good
Concrete / masonry / tiles	Waste storage bays	n/a	n/a	672	n/a	n/a	Not a dangerous good and is not flammable
Crusher building	Inert concrete for crushing	n/a	n/a	660	n/a	n/a	Not a dangerous good and is not flammable
	Processed inert product in piles	n/a	n/a	1,320	n/a	n/a	Not a dangerous good and is not flammable
	Residual waste	n/a	n/a	22	n/a	n/a	Not a dangerous good and is not flammable
Mulcher building	Timber feed awaiting processing	n/a	n/a	206	n/a	n/a	Not a dangerous good and is not flammable

Material / potential pollutant	Storage location	Dangerous Goods Class[1]	Packing Group[2]	Maximum quantity on site (tonnes if a unit is not given)	Screening method[3]	Threshold[4]	Notes
	Mulched processed product	n/a	n/a	884	n/a	n/a	Not a dangerous good and is not flammable
Blending area	Processed products awaiting blending of blended awaiting for storage in landscaping supplies bays	n/a	n/a	6,110	n/a	n/a	Not a dangerous good and is not flammable
Secondary Sorting Warehouse	Recovered sorted materials from magnet and picking line.	n/a	n/a	42	n/a	n/a	Not a dangerous good
Secondary Sorting Warehouse	Recovered soil from trommel	n/a	n/a	30	n/a	n/a	Not a dangerous good and is not flammable
Landscaping supplies	Landscape storage (centre of site 12 bays total)	n/a	n/a	6,110	n/a	n/a	Not a dangerous good and is not generally flammable
Aggregate storage bays	Aggregate storage area (4 bays)	n/a	n/a	1,716	n/a	n/a	Not a dangerous good and is not flammable
Landscape storage bays at front of site (13 bays)	Landscape storage bays at front of site (13 bays)	n/a	n/a	11,105	n/a	n/a	Not a dangerous good and is not flammable
Diesel	Above ground bunded fuel tank in warehouse	3	III	5,000 L	Table 1	10,000 L or kg	Below threshold
Engine coolant	Warehouse	n/a	n/a	100 L	n/a	n/a	Not classified as a dangerous good
Hydraulic oil	Warehouse	3	III	1,000 L	Table 1	10,000 L or kg	Below threshold
Engine oil	Warehouse	3	III	1,000 L	Table 1	10,000 L or kg	Below threshold
Gear oil	Warehouse	3	III	1,000 L	Table 1	10,000 L or kg	Below threshold
Transmission oil	Warehouse	3	III	1,000 L	Table 1	10,000 L or kg	Below threshold
Degreaser	Warehouse	3	III	1,000 L	Table 1	10,000 L or kg	Below threshold
Brake fluid	Warehouse	3	III	500 L	Table 1	10,000 L or kg	Below threshold

Material / potential pollutant	Storage location	Dangerous Goods Class[1]	Packing Group[2]	Maximum quantity on site (tonnes if a unit is not given)	Screening method[3]	Threshold[4]	Notes
Grease drum cartridges	Warehouse	3	III	<100 L	Table 1	10,000 L or kg	Below threshold
Gas (LPG) – Forklift gas	North side external wall of warehouse, under cover, locked cage	2.1	n/a	1,000 kg	Table 3	10,000 kg	Below threshold

[1] Class 2.1 Dangerous Goods are classified as 'flammable gases'; Class 3 Dangerous Goods are classified as 'flammable liquids'; [2] Packing Group III is a group of dangerous goods that are classified as 'substances presenting lower danger'. [3] Screening method is the methodology used to assess dangerous goods in the NSW Department of Planning (2011) *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33*. [4] Where dangerous goods are stored on-site which exceed the nominated thresholds as per Department of Planning (2011) *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33*, the proposed development is considered to be hazardous and requires detailed assessment under SEPP 33.

3.5.1 Soil, metals, asphalt, concrete / tiles / masonry, timber / stumps and mixed construction & demolition waste

The proposed development will receive loads of waste materials comprising soils and virgin excavated natural material), asphalt, concrete/tiles/masonry, timber, stumps and rootballs and mixed construction and demolition waste which will be tipped and inspected within the Tip and Spread Building, then stored in separate concrete block bays in the waste receival area. These waste materials are then processed in the Processing Area then the Secondary Sorting Warehouse and stored in the landscaping or waste processing area for sale and dispatch. A maximum of 50,000 tonnes of these waste materials and processed products will be stored on site at any one point in time.

While these materials are not classified as dangerous goods according to the Dangerous Goods Code, timber/stumps/rootballs and the mixed construction and demolition waste are combustible if exposed to a prolonged and persistent heat source.

Though materials are stored in a dry state, strict procedures are in place at the premises to avoid any hot work during operations and smoking is strictly prohibited in all parts of the site. Generally, dust is will be suppressed during shredding of timber/stumps/rootballs outdoors, so the risk of fire or explosion caused by dust is considered very low.

It is noted that no waste materials will be stored in the Secondary Sorting Warehouse. All materials processed in the warehouse and sorted and recyclable materials removed in bins for further processing outdoors and stockpiled for sale in the Landscape Supplies area.

Surrounding land uses are industrial or rural residential with neighbours identified in Section 2.2.3 of this EIS. Surrounding land uses are not considered to be a fire risk, and the likelihood that fire could spread and impact on the proposed development is considered to be low. The risk of fire resulting from a bushfire that could be propagated by adjoining properties with bushland is considered in Chapter 14 and Appendix R of this EIS.

3.5.2 Diesel

Diesel is classified as a Class 3 combustible liquid according to the Australian Dangerous Goods Code. Limited volumes of diesel will be stored in the warehouse for the purpose of fuelling of trucks or mobile plant and equipment on-site. In the event of a spill, diesel is damaging to soils and aquatic ecosystems and fires can occur if it is ignited (flash point 61°C to 150°C).

The risks associated with this project include diesel storage and use. The use of diesel will be in accordance with the requirements of AS 1940: 2004 - *The storage and handling of flammable and combustible liquids* (Australian Standards, 2004). The above ground tank of diesel stored in the warehouse will be appropriately bunded to ensure any spills are contained within the bunding. Given the small quantity to be stored on site (5,000 L), this hazardous material is considered to be low risk on the site.

3.5.3 Engine coolant

Very small quantities of engine coolant (100 L) will be stored in the warehouse for servicing on-site vehicles. Engine coolant, containing water and ethylene glycol mixes are not considered hazardous according to the Australian Dangerous Goods Code, but can be poisonous if ingested and can be toxic to aquatic organisms if leaked into waterways.

Engine coolant will be appropriately stored in a bunded container in the warehouse and stored and used in accordance with its approved Material Safety Data Sheet (Shell Australia, 2016).

3.5.4 Hydrocarbons (including hydraulic oil, engine oil, gear oil, transmission oil, brake fluid, grease drum cartridges and degreaser)

Liquid hydrocarbons including hydraulic oil, engine oil, gear oil, transmission oil, brake fluid, grease and degreaser are classified as Class 3 combustible liquids according to the Australian Dangerous Goods Code. Limited volumes of these fluids are stored in the warehouse for the purpose of servicing on-site vehicles. In the event of a spill, these hydrocarbons can be damaging to soils and aquatic ecosystems and fires can occur if it is ignited.

The risks associated with this project include storage and use of hydrocarbons. The use of these fluids will be in accordance with the requirements of AS 1940: 2004 - *The storage and handling of flammable and combustible liquids*. The above containers of these fluids stored in the warehouse will be appropriately bunded to ensure any spills are contained within the bunding. Given the small quantity to be stored on site these hazardous material (5,600 L in total) is considered to be low risk on the site.

3.5.5 Gas (LPG) – Forklift gas

Liquefied petroleum gas (LPG) used as a fuel in forklifts on site is classified as a Class 2.1 flammable gas under the Australian Dangerous Goods Code. Limited volumes of LPG are stored external to the warehouse on the northern side under the awning structure for the purposes of fuelling the forklift units.

The risks associated with the storage of small volumes of LPG will be minimised in a dedicated space on the external wall on the northern side of the warehouse (under the awning structure) in an approved rack with safety chains consistent with the Material Safety Data Sheet (ELGAS, 2016).

3.5.6 Further hazard identification, scenarios, consequence, likelihood analysis and risk assessment

To help understand further hazards possible as part of the proposed development, a series of potential worst-case scenarios have been assessed to determine possible consequences, likelihood and risk. The NSW Department of Planning's *Hazardous Industry Planning Advisory Paper No 6 - Hazard Analysis* has been used to assist in guiding this analysis.

As per the above guidelines, we have qualitatively assessed the impacts of the largest possible event on people, plant and the environment. The worst-case scenarios reflect any foreseeable factors that could exacerbate the severity of an accident, including abnormal process conditions, out of hours manning levels, and the potential for control measures to be disabled or rendered inoperable by the accident.

The worst-case scenarios we have assessed include the following:

- Entry to site:
    - Vehicle collision on entry to the site, resulting in fire and possible death;
    - Leaks / spills on vehicle entry or within the site, with potential impacts on stormwater and fire risk;
    - Vehicle/plant/equipment or material within warehouse or across site stolen, and leads to equipment failure and possible safety risk to staff;
    - Excess noise and vibration from truck movements on site;
- Secondary Sorting Warehouse operations:
    - Vehicle collision in warehouse, resulting in fire and possible death;

  - Leak / spill from vehicle collision adjacent to warehouse, with potential impacts on stormwater and fire risk;
  - Vehicle or plant/equipment theft and malicious damage, leading to equipment failure and injury to person(s);
  - Fire caused by ignition source (e.g. cigarette, hot work, welding or bushfire) near the warehouse;

- Waste receiving and processing operations:
  - Collision between vehicles with other on-site vehicles through driver error, or pedestrian, resulting in possible fire or death;
  - Vehicle/plant/equipment across site stolen, and leads to equipment failure and possible safety risk to staff;
  - Vehicle/plant/equipment theft and malicious damage, leading to equipment failure and injury to person(s);
  - Fire caused by excess dust and build-up of electrostatic electricity associated with outdoor processing;
  - Asbestos is concealed and received in mixed construction and demolition waste;
  - Excess noise and vibration from operational plant on site;
  - Excess dust from operations of plant and equipment on the site;
  - Dust created by internal traffic movements of plant, equipment and trucks during dry weather;
  - Fire caused by ignition source (e.g. cigarette, hot work, welding or bushfire) near the waste receiving and processing area;

- Landscaping supplies operation:
  - Collision between vehicles with other on-site vehicles through driver error, or pedestrian, resulting in possible fire or death;
  - Spilling of landscaping supplies material on operational pad during loading, that may then impact on stormwater;
  - Dust created during loading of trucks on windy days or during dry weather.
  - Fire caused by ignition source (e.g. cigarette, hot work, welding or bushfire) near the landscape supplies area.

Prevention and treatment measures to reduce the likelihood and resulting consequences from these worst-case scenarios are mapped out in Table 3.5 below. Note that a risk rating category has been prepared to understand the significance of these risks – on the environment and human health. Note that the risk ratings estimated as part of the qualitative analysis are specified after implementation of the risk prevention, treatment and detection measures.

As a result of this analysis, it is suggested that the worst-case scenarios modelled with risk prevention, treatment and detection measures are all moderate or low risks. All risks are low except those that involve potential for hazardous waste receiving, excess noise / vibrations and excess dust.

The proposed project is not considered a potentially hazardous development as per Figure 11 of the SEPP33 Guidelines (NSW Department of Planning , 2011), so no further Preliminary Hazard Analysis or Multi-Level Risk Assessment has been performed.

However, we have identified a number of moderate risks to the environment, people and property, and these will be evaluated further in this EIS. These risks are described in Section 3.6.

Table 3.5. Hazard identification, scenario, consequence, prevention/treatment measures and risk rating table.

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
Entry to site						
Vehicle collision	Vehicle collision on entry to the site, resulting in fire and possible death	Fire possible near warehouse, potentially spreading to landscaping supplies or waste receiving area with potentially flammable materials (e.g. shredded timber mulch). Possible impacts on stormwater from discharge of fire water	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Contact emergency services (NSW Fire & Service)	Unlikely (D)	4	21 (Low risk)
Leak / spill	Leaks / spills on vehicle entry or within the site, with potential impacts on stormwater and fire risk	Collision causes leakage of vehicle fuel or oil onto road pavement and possible stormwater impacts and a fire risk	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Emergency response • Communications	Possible (C)	5	22 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			• Spill containment and sweeping of hardstand • Contact emergency services (NSW Fire Service)			
Vehicle / plant / equipment theft / malicious damage	Vehicle / plant / equipment or material stolen	Components of a truck or plant/equipment are stolen and leads to equipment failure and possible safety risk to staff	• Ensure staff compliance with site security measures • Emergency management / response plan • Traffic management plan • Work health and safety plan • Contact emergency services (Police) • Site security / limited access	Possible (C)	5	22 (Low risk)
Excess noise and vibration from truck movements on site	Increased truck vehicle movements result in excess noise and vibration impacts on neighbours	Increased truck movements result in excess noise and vibration nuisance impacts on neighbours	• Ensure vehicle speed limits and regular driver education • Traffic management plan • Ensure site complies with operating hours in the development consent	Possible (C)	5	22 (Low risk)
Warehouse operations						
Vehicle collision	Possible collision of delivery vehicles with other on-site vehicles through driver error, or pedestrian, resulting in possible fire or death	Fire possible in warehouse, potentially spreading to landscaping supplies or waste receival area with potentially flammable materials (e.g. shredded timber mulch). Possible impacts on stormwater from discharge of fire water	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training	Unlikely (D)	4	21 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			• Contact emergency services (NSW Fire & Rescue)			
Leak / spill	Leakage of fuel and oil containers in warehouse	Leaking fuel and oil potentially moving into stormwater impacts and a fire risk	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Emergency response • Communications • Spill containment and sweeping of hardstand • Contact emergency services (NSW Fire Service)	Possible (C)	5	22 (Low risk)
Vehicle collision	Leak / spill from vehicle collision adjacent to warehouse	Fire possible in warehouse, potentially spreading to landscaping supplies or waste receival area with potentially flammable materials (e.g. shredded timber mulch). Possible impacts on stormwater from discharge of fire water	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training	Unlikely (D)	4	21 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			• Contact emergency services (NSW Fire & Rescue)			
Theft / malicious damage	Vehicle or plant/equipment theft and malicious damage	Components of a truck / plant or equipment are stolen and leads to equipment failure and possible safety risk to staff	• Ensure staff compliance with site security measures • Emergency management / response plan • Traffic management plan • Work health and safety plan • Contact emergency services (Police) • Site security / limited access • Contact emergency services (NSW Police)	Unlikely (D)	5	24 (Low risk)
Fire and bushfire	Fire caused by ignition source (e.g. cigarette, hot work, welding or bushfire)	Fire possible in warehouse, potentially spreading to landscaping supplies or waste receival area with potentially flammable materials (e.g. shredded timber mulch). Possible impacts on stormwater from discharge of fire water	• Ensure staff compliance with hot work procedures • Regular machinery maintenance and safety inspections • Dust minimisation practices • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training Contact emergency services (NSW Fire Service)	Unlikely (D)	4	21 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
Waste receival and processing operations						
Vehicle collision	Collision between vehicles with other on-site vehicles	Fire possible in waste receival and processing area. Possible impacts on stormwater from discharge of fire water	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Contact emergency services (NSW Fire & Rescue)	Unlikely (D)	4	21 (Low risk)
Theft	Vehicle/plant/equipment across site stolen, and leads to equipment failure and possible safety risk to staff	Components of a truck / plant or equipment are stolen and leads to equipment failure and possible safety risk to staff	• Ensure staff compliance with site security measures • Emergency management / response plan • Traffic management plan • Work health and safety plan • Contact emergency services (Police) • site security / limited access • Contact emergency services (NSW Police)	Unlikely (D)	5	24 (Low risk)
Theft / malicious damage	Vehicle/plant/equipment theft and malicious damage, leading to equipment failure and injury to person(s)	Components of a truck / plant or equipment are stolen and leads to equipment failure and possible safety risk to staff	• Ensure staff compliance with site security measures • Emergency management / response plan • Traffic management plan • Work health and safety plan • Contact emergency services (Police) • site security / limited access	Unlikely (D)	5	24 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			• Contact emergency services (NSW Police)			
Excess dust and fire	Fire caused by excess dust and build-up of electrostatic electricity associated with outdoor processing	Excess build-up of dust during baling operations, and spark through electrostatic electricity or spark through equipment electrical failure	• Ensure staff compliance with hot work procedures • Regular machinery maintenance and safety inspections • Dust minimisation practices and dust suppression systems in place • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Contact emergency services (NSW Fire & Rescue)	Unlikely (D)	4	21 (Low risk)
Hazardous waste receival	Asbestos concealed and received in mixed construction and demolition waste	Release of asbestos fibres and inhalation by staff	• Ensure all waste inspected on receival • Any asbestos waste separated by trained staff in asbestos identification and management consistent with the non-confirming waste procedure • Wrapping and sealing of asbestos for lawful off-site disposal • Pollution incident response management plan / Environmental management plan • Work health and safety plan • Hazardous material management plan	Possible (C)	3	13 (Moderate risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			• Contact EPA			
Excess noise and vibration	Excess noise and vibration from operational plant on site	Operational plant and equipment results in excess noise and vibration nuisance impacts on neighbours	• Tipping and inspection to be conducted inside the Building • Approved operating hours to be complied with • Noise minimisation procedures complied with • Regular machinery maintenance and safety inspections	Possible (C)	3	13 (Moderate risk)
Excess dust	Excess dust from operation of plant and equipment on the site	Operational plant and equipment results in excess dust and nuisance impacts on neighbours	• Tipping and inspection to be conducted inside the Building • Regular machinery maintenance and safety inspections • Dust minimisation practices • Dust suppression equipment, including misting system	Possible (C)	3	13 (Moderate risk)
Excess dust	Dust created by internal traffic movements of plant, equipment and trucks during dry weather	Excess build-up of dust during dry weather, leading to off-site dust movement and nuisance impacts on neighbours	• Dust minimisation practices • Dust suppression equipment • Dust minimisation practices • Traffic management plan • Work health and safety plan • Operator and driver training	Possible (C)	3	13 (Moderate risk)
Fire	Fire caused by ignition source (e.g. cigarette, hot work, welding or bushfire) near the waste receival and processing area	Fire possible in waste receival and processing area. Possible impacts on stormwater from discharge of fire water	• Ensure staff compliance with hot work procedures • Regular machinery maintenance and safety inspections • Dust minimisation practices • Firefighting equipment • Emergency management / response plan	Unlikely (D)	4	21 (Low risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
			• Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Firewater containment within the site OSD system • Contact emergency services (NSW Fire Service)			
Landscape supplies operations						
Vehicle collision	Collision between vehicles with other on-site vehicles	Collision through driver error, or pedestrian, resulting in possible fire or death	• Ensure vehicle speed limits and regular driver education • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Contact emergency services (NSW Fire & Rescue)	Unlikely (D)	4	21 (Low risk)
Spill	Spilling of landscaping supplies material on	Spill of soil or landscaping material that may generate dust	• Operator and driver training • Spill response equipment and training • Spill containment and sweeping of hardstand	Possible (C)	3	13 (Moderate risk)

Facility / event	Cause / comment	Possible scenarios, results & consequences	Prevention, Treatment Measures and Detection Protection Required	Likelihood	Consequence	Risk rating and category (after treatment measures)[1]
	operational pad during loading	and be transferred into stormwater causing water pollution				
Excess dust	Dust created during loading of trucks on windy days or during dry weather	Excess generation of dust during dry weather, leading to off-site dust movement and nuisance impacts on neighbours	• Dust minimisation practices • Dust suppression equipment • Dust minimisation practices • Traffic management plan • Work health and safety plan • Operator and driver training	Possible (C)	3	13 (Moderate risk)
Fire and bushfire	Fire caused by ignition source (e.g. cigarette, hot work, welding or bushfire) near the landscape supplies area	Fire possible in landscaping supplies area. Possible impacts on stormwater from discharge of fire water	• Ensure staff compliance with hot work procedures • Regular machinery maintenance and safety inspections • Dust minimisation practices • Firefighting equipment • Emergency management / response plan • Pollution incident response management plan / Environmental management plan • Traffic management plan • Work health and safety plan • Hazardous material management plan • Operator and driver training • Spill response equipment and training • Firewater containment within the site OSD system • Contact emergency services (NSW Fire Service)	Unlikely (D)	4	21 (Low risk)

Risk rankings: 1, highest risk; 25, lowest risk. Colour coding: Green: tolerable risk; orange: ALARP – as low as reasonably practicable; red: intolerable risk.

3.6 Risks to the environment, people and property to be investigated in this EIS

In addition to the SEAR's requirements to be addressed as part of this EIS, the following issues have been identified for further analysis and assessment. These principal issues have already been identified as part of the Preliminary Environmental Assessment to inform the SEAR's requirements, however the Preliminary Hazard Analysis and Environmental Risk Assessment has identified as number of sub-issues which need to be addressed in the EIS.

The list of issues below (Table 3.6) have all been classified as moderate risk according to the risk assessment done. All risks that have been identified as low risk are within acceptable limits and will be controlled through the mitigation measures as defined in Chapter 18.

Table 3.6. Key risks to the environment, people and property to be considered in addition to the SEAR's requirements as part of this EIS.

Principal issue or risk	Description	Study to assess issue or risk
Hazardous waste receival	Asbestos concealed and received in mixed construction and demolition waste, leading to release of asbestos fibres and inhalation by staff	Waste management study (Chapter 6 and Appendix H)
Excess noise and vibration	Excess noise and vibration from operational plant on site. Operational plant and equipment results in excess noise and vibration nuisance impacts on neighbours	Noise and vibration impact assessment (Chapter 11 and Appendix O)
Excess dust	Excess dust from operation of plant and equipment on the site, including vehicle movements during dry weather and loading of landscaping supplies during dry weather. Operations lead to excess dust and nuisance impacts on neighbours	Air quality impact assessment (Chapter 9 and Appendix M)

4 Capital investment value

Muller Partnership was engaged to conduct an independent capital investment value estimation for the project. Based on the proposed development requirements, the total capital investment value (CIV) of the project is estimated to be $14,866,000, excluding GST.

The original CIV estimate for the exhibited project was $9,197,000, excluding GST. Therefore, the overall cost of the project has increased 62% as a result of the various design changes made to address the comments and feedback on the initial project proposal.

A summary of the costs is provided in Table 4.1. The full Capital Investment Valuation report is provided at Appendix G.

Table 4.1. Summary of Capital Investment Costs.

CAPITAL INVESTMENT VALUE SUMMARY	
Item	**Total Cost ($)**
Demolition & Site Preparation	1,861,000
Construction Works	
Crusher Operation Building	184,000
Mulcher Operation Building	134,000
Tip and Spread Building	830,000
Secondary Sorting Warehouse	EXCL
Admin Office and Amenities	EXCL
External Works and Service	7,203,000
Works Outside Boundary	59,000
Mobile Plant and Equipment	3,622,000
Design Development Allowance	EXCL
Preliminaries, Overheads and Profit (7%)	973,000
Total Construction Cost (Excl GST)	**$14,866,000**

NB. Above costs are rounded to nearest thousand.

4.1 Assumptions

The following assumptions have been made in the preparation of the Capital Investment Value Estimate: -

1. The works will be competitively tendered to a number of suitable qualified contractors on a lump sum basis.
2. Works will be completed during normal working hours.
3. Works are included for Stage 2 only (Stage 1 to include all demolition works and construction of warehouse).
4. Assumed builder will have clear access to the work area.
5. Assumed existing service connections are sufficient (NB: Unless noted otherwise in our foregoing estimate).
6. Assumed no hazardous material to be removed from site.

7. All hazardous materials and excess spoil is to be stockpiled and remain on site.
8. All volumes have been taken from Sustainability Workshop's provided bulk quantities as per the provided Civil Drawings (Refer to Schedule of Information for Details).
9. Sustainability Workshop Bulk Earthwork Quantities are assumed to be for Stage 2 only and exclude earthworks to the Stage 1 Structures.
10. Quantity of trees (25 No.) to be removed is a provisional quantity.
11. Heavy vehicle pavement and asphalt pavement profiles has been assumed.
12. Waste receive area concrete slab profile has been assumed.
13. An allowance for site signage has been assumed to be required.
14. All electrical services have been assumed include extent of lighting and connection requirements.
15. Retaining wall details have been assumed based on previous project data and should be updated once further information becomes available.
16. Fencing has been assumed to be included in Stage 1 works as per the Waste Management Report prepared by Jackson Environment and Planning Pty Ltd.
17. Supply of equipment has been adopted as per Jackson Environment & Planning advice.
18. Project duration for road work has been assumed to be 1 week and include afterhours work.
19. Preliminaries, Overheads and Profit allowance of 7% has been included.
20. We have made allowances for the following Provisional Sums:
    - Weighbridge - $200,000
    - Signage - $10,000
    - Floating wetlands -$33,795
    - Traffic Light (2 Sets) - $25,000
    - Dust suppression system $228,765.

4.2 Exclusions

The following costs have been excluded from the capital investment valuation:

1) Contamination & remediation.
2) Services diversions.
3) Excavation in rock.
4) Ground water.
5) Dewatering.
6) Disposal of excavated material as VENM at local waste facility.
7) Demolition of existing sheds/buildings on site.

8) Site security fencing including sliding entry gate and 6m wide double gate.
9) Secondary Sorting Warehouse and Admin Office and Amenities.
10) Outbound weighbridge once facility reaches 100KTPA.
11) Waste skip bins / receptables.
12) Retroreflective markers.
13) Greywater reuse system.
14) OSD tank approved under Stage 1.
15) Sewer pump station.
16) External gas supply.
17) Maintenance to landscaping.
18) CCTV.
19) Substation.
20) Amplification of existing services.
21) Escalation & changes in market conditions.
22) Client Side Project Management.
23) Finance costs.
24) Works outside normal hours.
25) Aboriginal and Heritage impacts.
26) Delays resulting from approvals such as Environmental/ Authorities.
27) Construction contingency.
28) Design contingency.
29) Professional Fees.
30) Authority Fees.
31) GST.

More details are provided in the Capital Investment Value Estimate report provided at Appendix G.

5 Consultation

A consultation report was prepared to help brief neighbours, Council and agencies on the project and the key environmental issues. The consultation summary report was sent to key stakeholders, including State Government agencies, Central Coast Council and 33 properties within 500m of the site.

A large number of comments were received from Government Agencies on the first submission of the EIS. In addition, a large number of public submissions were received during the public exhibition process. As a result, the proponent embarked on a comprehensive supplementary community engagement process.

The Community Consultation report is provided at Appendix X. The consultation conducted for the project addresses all of the SEARs requirements under SSD8660.

5.1 SEARs consultation requirements

The SEARs included the requirement to consult with key government agencies, Council and local residents and properties. This included:

- Environment Protection Authority;
- Roads and Maritime Services;
- Central Coast Council;
- Office of Environment and Heritage;
- Department of Primary Industries;
- Ausgrid;
- NSW Fire and Rescue;
- Rural Fire Service; and
- The surrounding land owners and occupiers that are likely to be impacted by the proposal.

A copy of the SEARs (SSD 8860) is provided at Appendix C.

5.2 Consultation with Central Coast Council

A pre-lodgement meeting was held with Central Coast Council on 6 July 2017. A pre-lodgement summary of the project was prepared that provided an overview of the proposed development and identified the most likely environmental issues arising from the development. The pre-lodgement report was provided to Central Coast Council ahead of the meeting and used as the basis for discussion.

In addition, Council provided input into the SEARs. In addition to the points raised at the pre-lodgement meeting, Council requested that the development application provide an analysis of the economic and social benefits of the project, and the need for the project at that location.

Council confirmed that the site is does have a water connection, and connection to sewer is available (following resolution of developer contributions, which has now been resolved). Any development application would need to address either connection to sewer or on-site waste water treatment.

Council confirmed the management areas in the Somersby Industrial Park Plan of Management, which includes areas at the back of the site, which are not to be developed. The southern end of the site includes protected biodiversity areas. A flora and fauna assessment is required for the proposed development area. In addition, an Aboriginal Heritage due diligence assessment would be required.

Council confirmed that impact assessments and management plans would be required to address the key issues of noise, dust, soil, water, stormwater and traffic. In addition, a plan showing the management of any hazardous materials, such as hazardous waste and chemicals, should be prepared.

The site is in a bushfire prone area. This needs to be taken into consideration for any building design.

Comments were received from Central Coast Council on the public exhibition EIS. These are addressed in detail in the Response to Submissions Report and are incorporated into the site design changes and this EIS report.

It should be noted that the proponent has had ongoing contact with Central Coast Council regarding development at the site while the development approval process for Stage 1 of the project was proceeding.

5.3 Agency consultation

Consultation with a number of different State Government agencies was a requirement of the SEARs. In the first instance, a SEARs summary report was prepared, and submitted to the Department of Planning and Environment. This was circulated to various agencies for their comments and for them to provide input into the SEARs.

In addition, each of the agencies were sent a copy of the consultation summary report, to provide the agency with the opportunity to provide any additional input, as they saw fit.

The section below summarises the key requirements in the SEARs from each agency. Full details of the requirements by each agency is provided in the copy of the SEARs at Appendix C.

Over 100 comments were received from government agencies. These are addressed in detail in the Response to Submissions report. All comments have been addressed and incorporated into the site design changes.

5.3.1 NSW Department of Planning, Industry and Environment

The Department of Planning, Industry and Environment (DPE) required that an Environmental Impact Statement (EIS) be prepared, which specifically addressed the following issues:

- Waste management;
- Traffic and transport;
- Air quality and odour;
- Fire and Incident Management;
- Noise and Vibration;
- Soil and water;
- Biodiversity;
- Hazards;
- Heritage; and
- Visual impact.

DPE also listed the key stakeholders to be consulted during the preparation of the development application. DPE confirmed no additional issues need to be considered in the EIS.

Comments were received from Department of Planning, Industry and Environment on the public exhibition EIS. These are addressed in detail in the Response to Submissions Report and are incorporated into the site design changes and this EIS report.

Subsequent comments were received from DPIE in February 2020. Further discussions and consultations were held with DPIE officers, specifically on the stormwater treatment arrangements.

5.3.2 NSW Environment Protection Authority

The NSW Environment Protection Authority (EPA) provided comprehensive details of the requirements of the EIS. In addition, it specifically highlighted the following issues to be addressed:

- The management, processing of storage of waste received at the premises;
- Impacts on water quality and site water management;
- Potential noise impacts during construction and operations;
- Potential odour issues during operation; and
- Impacts on air quality.

EPA also highlighted the need for the development to include a weighbridge for the purpose of recording waste received. It also required that a Pollution Incident Response Management Plan be prepared. As a result of the consultation, the EPA confirmed they have no additional issues that need to be considered in the EIS.

It is further noted that the EPA was formally consulted to help inform the Water Cycle Management Plan in December 2018 (Mr Tristan Hinchcliffe, NSW EPA, Newcastle Office).

Comments were received from NSW EPA on the public exhibition EIS. These are addressed in detail in the Response to Submissions Report and are incorporated into the site design changes and this EIS report.

5.3.3 (Former) Office of Environment and Heritage

The former Office of Environment and Heritage (OEH), now Biodiversity and Conservation Division of DPIE, recommended that the EIS specifically address the following issues:

- Biodiversity and offsetting;
- Aboriginal culture heritage;
- Water and soils; and
- Flooding.

OEH provided details on how to investigate and address each of the above issues. In addition, the Heritage Council of NSW required that a historical archaeological assessment be prepared.

Comments were received from OEH on the public exhibition EIS. These are addressed in detail in the Response to Submissions Report and are incorporated into the site design changes and this EIS report.

5.3.4 Roads and Maritime Services

The Transport Division of NSW Roads and Maritime Services (RMS) required that a traffic and transport study be prepared. The study should be consistent with the Road and Related Facilities section within the DPE's EIS Guidelines and the Traffic Impact Studies section within the RMS's Guide to Traffic Generating Developments (2002).

Specific requirements by RMS included:

- Assessment of all relevant vehicular traffic routes and intersections for access to/from the subject property;
- Current traffic counts for all relevant traffic routes and intersections;
- The anticipated additional vehicular traffic generated from both the construction and operational stages of the project;
- The distribution on the road network of the trips generated by the proposed development;
- Consideration of the traffic impacts on existing and proposed intersections, in particular, the intersection of Central Coast Highway and Kangoo Rd, and the capacity of the local and classified road network to safely and

efficiently cater for the additional vehicular traffic generated by the proposed development during both the construction and operational stages;
- Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network for the development;
- Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model;
- Any other impacts on the regional and state road network including consideration of pedestrian, cyclist and public transport facilities and provision for service vehicles; and
- Details of any measure proposed to manage and/or mitigate impacts as a result of the proposal identified in the traffic and transport study.

Comments were received from RMS on the public exhibition EIS. These are addressed in detail in the Response to Submissions Report and are incorporated into the site design changes and this EIS report.

5.3.5 NSW Rural Fire Service

The NSW Rural Fire Service required that a Bush Fire Assessment report be prepared that demonstrates compliance with the guideline *Planning for Bush Fire Protection 2006*.

Comments were received from RFS on the public exhibition EIS. These are addressed in detail in the Response to Submissions Report and are incorporated into the site design changes and this EIS report.

5.3.6 NSW Fire and Rescue

NSW Fire and Rescue did not provide any specific requirements as part of the SEARs beyond those identified by DPE.

Comments were received from FRNSW on the public exhibition EIS. These are addressed in detail in the Response to Submissions Report and are incorporated into the site design changes and this EIS report.

5.3.7 NSW Department of Primary Industries

The NSW Department of Primary Industries (DPI) recommended that the EIS specifically address the following issues:

- Water – Identification of an adequate and secure water supply for the life of the project; a site water balance; assessment of the impact on ground and surface water and details of ongoing water monitoring; and
- Biosecurity – Biosecurity risk assessment and a Biosecurity Response Plan.

Comments were received from DPI on the public exhibition EIS. These are addressed in detail in the Response to Submissions Report and are incorporated into the site design changes and this EIS report.

5.3.8 AusGrid

The key issue for AusGrid is that any changes to traffic, dust and vibration at the site do not impact on the operation of the Ausgrid warehouse located at Lot 11 Kangoo Rd, Somersby, which is located South-west of the site.

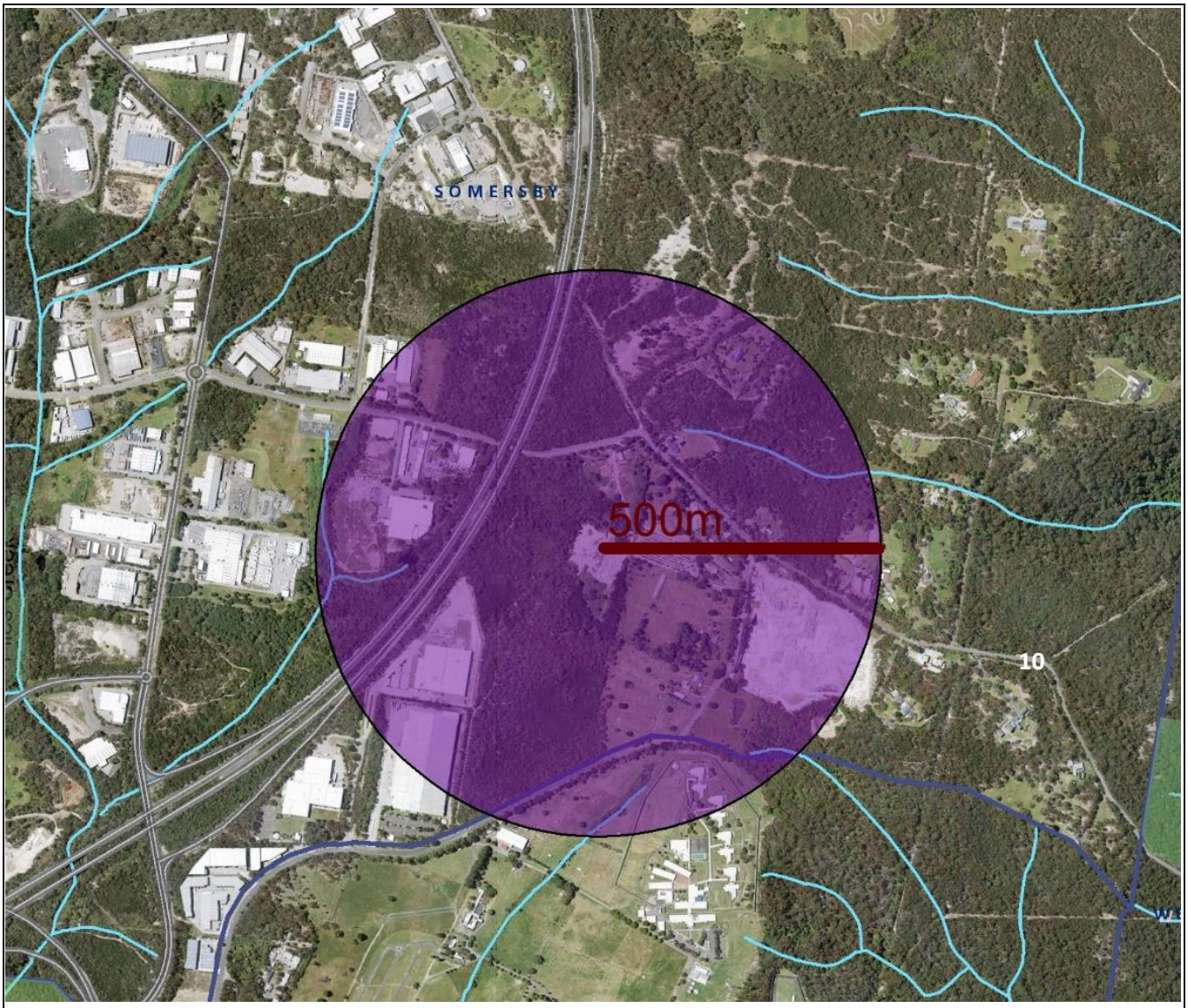
The various studies show that the likely impact on the AusGrid warehouse will be negligible.

5.4 Neighbours consulted

The SEARs required the proponent to consult with the surrounding land owners and occupiers that may be affect by the proposal. A copy of the original Consultation Summary Report was mailed to all properties within 500m of the main processing area. Property occupiers were encouraged to provide feedback. Figure 5.1 shows the area encompassed by the 500m consultation distance. Table 5.1 provides a list of all the properties attempted to be contacted as part of the pre-submission consultation.

There are a number of properties in the surrounding area that are currently vacant and undeveloped. Assistance was sought from Council to contact them to obtain feedback on the project. Of the five properties contacted by Council, two property owners requested information on the project. No comments were received.

Figure 5.1. Aerial map showing 500m radius around the proposed development site.



Date	Revision	Drawn By	Site description	Client	Kariong Sand and Soil Supplies
29/01/2018	Revision A	J Lethlean	90 Gindurra Rd, Somersby. Kariong Sand and Soil Supplies (Lot 4 / DP 227279)	Project	Upgrades to a Sand and Soil Supplies Facility
				Title	500m Consultation Radius
				Source	Central Coast Council

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Table 5.1. List of properties consulted within 500m of the site during the first consultation phase.

No.	Address	Suburb	Zone	Zone description
1	5 Acacia Rd	Somersby	RU1	Primary Production
2	10 Acacia Rd	Somersby	RU1	Primary Production
3	12 Acacia Rd	Somersby	RU1	Primary Production
4	16 Acacia Rd	Somersby	RU1	Primary Production
5	25 Acacia Rd	Somersby	RU1	Primary Production
6	32 Acacia Rd	Somersby	RU1	Primary Production
7	32 Acacia Rd	Somersby	RU1	Primary Production
8	3 Central Coast Hwy	Kariong	SP1	Special Activities
9	1A Central Coast Hwy	Kariong	SP2	Infrastructure
10	6 Chivers Rd	Somersby	IN1	General Industrial
11	97 Debenham Rd South	Somersby	RU2	Rural Landscape
12	183 Debenham Rd South	Somersby	RU2	Rural Landscape
13	184 Debenham Rd South	Somersby	RU2	Rural Landscape
14	198 Debenham Rd South	Somersby	RU2	Rural Landscape
15	223 Debenham Rd South	Somersby	RU1	Primary Production
16	239 Debenham Rd North	Somersby	RU2	Rural Landscape
17	242 Debenham Rd South	Somersby	RU2	Rural Landscape
18	252 Debenham Rd South	Somersby	RU2	Rural Landscape
19	22 Gindurra Rd	Somersby	IN1	General Industrial
20	40 Gindurra Rd	Somersby	IN1	General Industrial
21	53 Gindurra Rd	Somersby	IN1	General Industrial
22	54 Gindurra Rd	Somersby	IN1	General Industrial
23	55 Gindurra Rd	Somersby	IN1	General Industrial
24	56 Gindurra Rd	Somersby	IN1	General Industrial
25	58 Gindurra Rd	Somersby	IN1	General Industrial
26	76 Gindurra Rd	Somersby	IN1	General Industrial
27	83 Gindurra Rd	Somersby	IN1	General Industrial
28	21 Kangoo Rd	Somersby	IN1	General Industrial
29	25 Kangoo Rd	Somersby	IN1	General Industrial
30	27 Kangoo Rd	Somersby	IN1	General Industrial
31	33 Kangoo Rd	Somersby	IN1	General Industrial
32	31 Kowara Rd	Somersby	RU2	Rural landscape
33	2 Wella Way	Somersby	IN1	General Industrial

5.5 Outcomes of first consultation process

There was little feedback received on the project beyond the original agency requirements of the SEARs. Of the 33 properties within 500m, three provided feedback. The main concerns are noise, dust and traffic. In particular, the neighbouring property at 12 Acacia Rd, Somersby, has raised a strong objection to the development, citing concerns about noise, dust, groundwater and traffic. Table 5.2 provides a summary of the feedback received during the consultation.

These issues have been assessed in detail as part of the EIS investigations. The impact assessment studies conducted show that the environmental and amenity impacts on surrounding properties will be minimal, and within acceptable thresholds.

Table 5.2. Consultation summary.

Neighbour / Organisation	Reason for consultation	Issue	How issue has been addressed in EIS
NSW Department of Planning and Environment	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
NSW EPA	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
NSW Roads and Maritime Services	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
Central Coast Council	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
Rural Fire Service	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
NSW Fire and Rescue	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
Department of Primary Industries	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
Office of Environment and Heritage	SEARS Requirement	No further feedback beyond SEARs requirements	Fully addressed in the EIS
Ausgrid	SEARS Requirement	No further feedback beyond SEARs requirements. Expressed specific concern that dust, traffic and vibration are properly managed.	Fully addressed in the EIS
Surrounding Properties			
Somersby Unit Trust **54 Gindurra Rd**	Nearby property	Concerned about dust and traffic to be generated by the facility. There is another facility near to this property with large stockpiles of soil that generate dust problems for surrounding properties. Further, the amount of heavy traffic, especially on weekends, was seen as a safety concern.	Air quality issues have been addressed in the Air Quality Impact Assessment (See Appendix M). Traffic issues have been addressed in The Traffic Impact Assessment (see Appendix N). It should be noted that 54 Gindurra Rd is on the Western side of the Sydney-Newcastle Freeway. Therefore, it is unlikely to be impacted by dust and

Neighbour / Organisation	Reason for consultation	Issue	How issue has been addressed in EIS
			traffic generated by the proposed development site.
Borg Manufacturing **2 Wella Rd**	Nearby property	Confirmed that they had received the consultation report and were satisfied that environmental issues were being addressed. No concerns raised.	None required.
Frank Tripolone **12 Acacia Rd**	Nearby property	Raised concerns about excessive noise and dust, and its impact on both their own amenity and the value of the property. The proposed mitigation measures were thought inadequate. The owner also raised concerns about the impact on groundwater quality. The increase in traffic was considered excessive. The owner also noted that their property was already impacted by a neighbouring quarry, and that the proposed development would compound those impacts.	The impact assessment studies conducted in preparation of the development application, which are attached to this report, indicated that all impacts are within acceptable limits. Mitigation measure will be taken to reduce the impact of dust and noise, in particular. The proposed use is appropriate for IN1 zoned land. The proponent believes that all impacts have been fully addressed in the EIS.
Mr Guangmilg Leng **31 Kowara Rd**	Nearby property	Mr Leng owns a (currently not operating) motel business at the site. He has concerns about noise impacting on the motel business if it re-opens.	The noise mitigation measures and the distance of 31 Kowara Rd from the development site will minimise the noise impacts. See Chapter 11 and Appendix O.

5.6 Feedback post-exhibition

The Environmental Impact Statement for the development was exhibited on 31 January 2019 for a seven-week period by the Department of Planning, Industry and Environment. In total, 1,329 submissions were received. These consisted of 1,308 public submissions and 21 submissions from organisations (including government agencies).

The large number of public submissions was due to an organised campaign by a local group (Save Somersby), which provided a form letter for members of the public to send in. An analysis of the public submissions received within the public exhibition period found approximately 1,150 individual (non-duplicate) submissions. Of these, 959 were submitted as a form letter and 191 were submitted as a written submission (letter or email). The form letter had a list of issues where people could tick a box against the issues that concerned them. The majority of public submissions were from people living in the Central Coast area. However, most of the respondents lived 1km or further from the proposed development.

Key issues raised by the community involved: area character / lifestyle; air quality / dust; traffic; land / property values; biodiversity; odour; proximity to sensitive uses; area reputation / loss of business; visual impact; health / asbestos; heritage; noise and vibration; water quality; waste management; and health/pollution.

Agency submissions were received from Central Coast Council; Department of Industry; Department of Planning and Environment; Environment Protection Authority; Fire and Rescue NSW; Transport for NSW; Water NSW; (former)

Office of Environment and Heritage; Roads and Maritime Services and NSW Health. Agency submissions focused on the need for additional information on: groundwater sampling and testing; fire safety; biodiversity study to include additional field investigations; additional Aboriginal Heritage studies and consultation with designated Aboriginal groups; further air quality assessment and modelling; additional noise modelling to reflect the upgraded site layout and design; additional traffic assessment and re-design of the site entrance; and re-design of the stormwater capture system and update of the Water Cycle Management Plan.

5.7 Further site upgrades assessed

Following the assessment of submissions, a review of additional infrastructure and environmental controls was done by the proponent to consider how key issues surrounding air quality, dust, silica, noise, vibration, water quality, and health can be further mitigated to provide confidence to the community that public health and the environment would be protected at all times. Additional controls assessed include:

- All waste materials to be received indoors, to minimise impacts on the outdoor environment (e.g. dust, litter, noise and water quality);
- Buildings to enclose the crushing and mulching operations to minimise dust and noise, including misting to maximise dust control;
- A three-sided building around the waste receival area with misting to ensure that water quality is protected and dust is minimised;
- Concrete kerbing on the exit to the site to prevent any trucks using Debenham Rd;
- A redesigned stormwater pond with floating wetland and a membrane filtration plant to supply the site with high quality water for dust control via sprinklers above all storage bays;
- Further investigations to ensure that Aboriginal Heritage and biodiversity impacts are avoided or off-set;
- A commitment that recycling will increase in stages, only after independent testing is done to prove the facility is performing to the highest environmental standards. These stages proposed include:
    - Following development approval, waste receival to increase over time to a threshold of 100,000 tonnes per annum;
    - Consent to increase waste receival to 150,000 tonnes per annum;
    - Consent to increase waste receival to 200,000 tonnes per annum;
- Continuous monitoring of air quality (dust) and noise at the site boundaries.

Updates to the following studies were then performed:

- Transport and traffic impact assessment;
- Air quality impact assessment;
- Water cycle impact assessment;
- Biodiversity impact assessment;
- Aboriginal and Cultural Heritage assessment;
- Groundwater Baseline Investigation;
- Noise and vibration impact assessment;
- Bushfire Risk Assessment;
- Fire Study;
- Visual Assessment;
- Landscape Plan.

The updated investigations demonstrated that the proposed development will not negatively impact on the local environment or the health or amenity of neighbours, and health and environmental issues raised during in public submissions could all be comprehensively mitigated against and managed.

5.8 Community engagement strategy and outcomes

To help in engaging the community, seek feedback on the additional site enhancements and assist in building community understanding of the project, a comprehensive community engagement strategy was prepared and delivered between August and November 2019. The tools used included print, online, media and in person meetings were chosen to maximise participation, increase understanding and maximise engagement during this phase of the project.

As a result of the community engagement program, the following reach and participation was achieved:

- 1,000 households and businesses in the Somersby Industrial Estate received a four-page fact sheet on the proposed development, and further site enhancements proposed;
- 5,000 households in Somersby, Kariong and the surrounding districts through news stories published in community group newsletters (Kariong Connections and Mangrove Mountains & Districts Community News);
- 32 people including neighbours, community members and members of three community groups were consulted and a presentation provided on the proposed development, and further site enhancements proposed – this was achieved through direct meetings, two public meetings and one field day;
- Approximately 60,000 people living on the Central Coast and Sydney community were exposed to a media story published on the proposed development on 9th November 2019 in the Central Coast Express Advocate (online edition); and
- 233 unique visitors to the Kariong Sand and Soil Supplies web site between August and November 2019.

A detailed review of all matters raised and how they will be addressed as part of the development has been documented in this report. The consultation found that neighbours on surrounding rural properties were the most concerned in relation to the development, though perceived impacts on property values, dust and traffic were the three key issues most commonly cited as of concern. Properties outside of the vicinity of direct neighbours were less concerned in relation to the proposed development. Nevertheless, all matters raised as part of the community consultation process have been addressed and evaluated as part of the updated EIS.

Ongoing education and community engagement has been identified as a very important process that will need to be maintained post approval. Working closely with the community will be important to demonstrate and prove how the facility is being managed to protect the community and the environment. A post approval community engagement plan has been prepared as part of this report to assist with ongoing community engagement and involvement in the project post-approval, to ensure the development is built and operated to protect people and the environment at all times.

Details of the community engagement conducted are provided in the Community Consultation Report at Appendix X. More details of the changes made to the project in response to the comments received during the public exhibition of the EIS and the community engagement process are provided in the Response to Submissions report for the project.

6 Waste Management

6.1 Introduction

As outlined in Section 2.3.1, the majority of waste received at the site will be processed into saleable products and sold from the site. The amount of waste generated on-site that requires disposal at a licensed landfill will be minimal.

A Waste Management Plan has been prepared that meets the requirements of the Gosford *Development Control Plan* 2013. The objectives of the Waste Management Plan as stated in the Gosford *Development Control Plan* 2013 (the DCP) are to:

- Maximise reuse and recycling of materials;
- Minimise waste generation;
- Ensure appropriate collection and storage of waste;
- Minimise the environmental impacts associated with waste management;
- Avoid illegal dumping;
- Promote improved project management;
- Optimise adaptive reuse opportunities of existing building/structures;
- Ensure appropriate waste storage and collection facilities;
- Maximise source separation and recovery of recyclables;
- Ensure waste management facilities are as intuitive for occupants as possible and readily accessible to occupants and service providers;
- Ensure appropriate resourcing of waste management systems, including servicing;
- Minimise risk to health and safety associated with handling and disposal of waste and recycled material and ensure optimum hygiene;
- Minimise adverse environmental impacts associated with waste management; and
- Discourage illegal dumping by providing on site storage, and removal services.

A full Waste Management Plan is given in Appendix H.

6.2 Legislative requirements and related documentation

The explicit details of managing particular types of wastes are clearly defined in the *EPA Waste Classification Guidelines* of the *Protection of Environment Operations Act 1997 (POEO Act*) to manage different waste types generated on-site. These include:

- Taking waste to the right waste management facility; and
- Specialised storage, handling, treatment and disposal requirements.

Other relevant legislation and publications are:

- *Environmental Planning and Assessment Act* 1979*;*
- *Waste Avoidance and Resource Recovery Act* 2001*;*
- *Protection of the Environment Operations (Waste) Regulation* 2014*;*
- *Work Health and Safety Act* 2011 and the *Work Health and Safety Regulations* 2011;
- *Environmental Protection (Controlled Waste) Regulation* 2001*;*
- *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008: Part 5A, Division 4, Clause 5A.26 Garbage and waste storage;*
- *Australian Standards 2601-2001 Demolition of Structures;*
- *Gosford Development Control Plan 2013 – Part 7.2 Waste Management;*

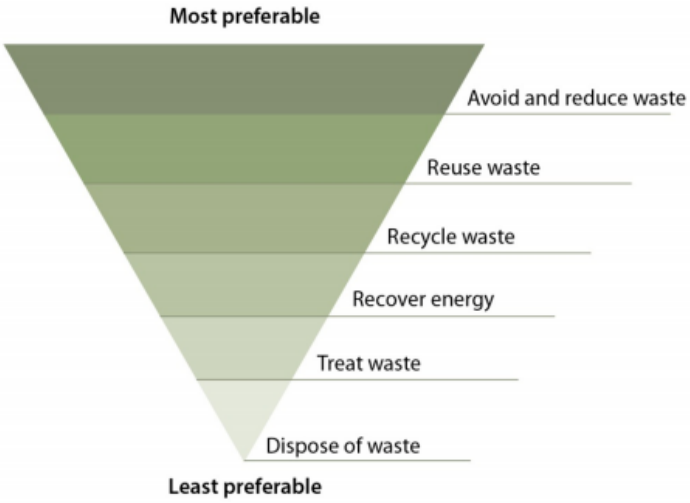
- *Excavated Natural Material Order 2014 and Excavated Natural Material Exemption 2014*
- *Recovered Aggregate Order 2014 and Recovered Aggregate Exemption* 2014*;*
- *"Batch Process" Recovered Fines Order 2014 and "Batch Process" Recovered Fines Exemption* 2014*; and*
- NSW EPA's *Draft Protocol for managing asbestos during resource recovery of construction and demolition waste.*
- NSW EPA (2018) *Standards for Managing Construction Waste in NSW.*

The *Waste Avoidance and Resource* Recovery *Strategy 2014-21* has the following objectives:

- Waste Avoidance
- Increase recycling rate of Construction and Demolition waste to 80%
- Divert 75% waste from landfill
- Manage problem wastes better
- Reduce Litter
- Reduce Illegal Dumping

The manner in which waste is to be managed is driven by the Ecologically Sustainable Development principles. Guidance in managing waste has been provided by the hierarchical chart below (Figure 6.1).

Figure 6.1. The waste hierarchy as published in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21.



6.3 Waste Management

The implementation of waste management practices outlined in this waste management plan meet the key objectives of Gosford DCP Part E7.2. These measures address the economic, environmental and safety imperatives during the demolition and construction phases and into the operational phase. These enhanced management practices also produce triple bottom line benefits including financial efficiencies, sustainable demolition and construction methods and a safe work site for the duration of the demolition and construction process.

These positive outcomes will be achieved through thorough planning and procurement of exacting measurements reducing upfront costs of demolition and construction which will benefit the business directly.

The benefits of the management practices outlined in the plans will be realised from the outset by both the business and the broader community in the form of reduced costs of disposal, reduced costs of legal liability and common good through:

- Separation of waste at the source during the demolition phase;
- Maximising recovery of valuable resources;
- Exercising due diligence for safe disposal of waste; and
- Providing a safe worksite.

6.3.1 Demolition and construction phase

The demolition / construction phase consists of removing existing stockpiles of concrete, rubble and metal from the site. The site then needs to be cleared and levelled. This will involve excavating some areas and filling other areas of the site. The site will then be compacted, to form a working hard stand using recycled concrete aggregate above a waterproof layer. Selected areas of the site will be surfaced in recycled asphalt (under the landscaping material storage bays and waste storage bays), which will be brought onto the site. The crushed concrete aggregate hardstand areas will be compacted to form a hardstand surface suitable to support the operational machinery and heavy vehicle traffic. The main access driveway and the tip and spread inspection area will be provided with an engineered concrete hardstand.

There are a number of stockpiles on site, mainly used concrete (approximately 18,090 m^3). There is also a small stockpile of recyclable metal.

This phase of the project involves removing excess stockpiled material, levelling and filling the site to achieve desired contours, constructing hardstands and roads across the site, and constructing three buildings.

Material in the existing stockpiles will be tested for contamination, specifically asbestos. Contaminated material will be removed from site by a licensed contractor and disposed at an appropriately licensed facility. Soil and other inert material that is found to not be contaminated will be re-used for fill or pavement construction. Cleared woody garden organics and trees will be mulched and either used on-site or sold. The scrap metal will be removed from site for recycling.

6.3.1.1 Waste generation

The waste streams generated on site during the demolition and construction phase are as summarised in Table 6.1 below.

It should be noted that existing concrete stockpiles on site need to sampled and tested for compliance with the EPA's *Recovered Aggregate Resource Recovery Order* 2014 to confirm the material is acceptable for use in construction works on the site. Non-compliant materials will be removed by a licensed contractor for disposal at an appropriate facility.

Table 6.1. Estimated waste generation during demolition and construction phase.

Source	Material	Description	Estimated amount
Land clearing	Woody garden organics	Tree stumps and branches, as well as some grasses.	100 m^3
Stockpile removal, processing	Stockpiled C&D waste	Existing concrete stockpiles on site need to sampled and tested for compliance with the EPA's *Recovered Aggregate Resource Recovery Order* 2014 to confirm the material is acceptable for use in construction works on the site.	18,090 m^3

Source	Material	Description	Estimated amount
		There are also small amounts of scrap metal stockpiles at the site. These will be removed from site and transferred to a scrap metal recycler.	
Site levelling	Soil	The cut and fill plan indicates a net importation of 71,300 m^3 of fill will be required for the development.	Nil.
Site capping / pavement construction	Recycled concrete and asphalt	Recycled crushed concrete will be used as an engineered pavement (above a waterproof membrane) across the operation areas. Recycled asphalt will be brought onto the site to be laid down and compacted to produce a final sealed layer beneath the waste storage bays, landscaping storage and aggregate storage bays. All material brought onto the site will be used on-site.	Nil.
Building construction	Metal & mixed building waste	The buildings will be constructed primarily of metal. Small amounts of packaging materials may be associated with transport of building materials	20m^3
Employee waste	MSW	Small amounts of packaging waste and other MSW will be generated by employees on site conducting the development project.	240L per week for 12 weeks

6.3.1.2 Waste management measures

The management and destination of waste materials from the demolition and construction phase of the project is summarised in Table 6.2 below.

As noted above, the stockpiles of used concrete need to be inspected and tested for compliance with the EPA's *Recovered Aggregate Resource Recovery Order* 2014 to confirm the material is acceptable for use in construction works on the site.

Table 6.2. Waste management measures during demolition and construction phase.

Material	Treatment / destination	Estimated recovery rate
Woody garden organics	Woody garden organics will be shredded and either used as mulch on site or sold as mulch in the landscape products business.	100%
Stockpiled C&D waste	Concrete stockpiles will be investigated and tested for compliance with EPA *Recovered Aggregate Resource Recovery Order* 2014. Compliant materials to be used a base for the hardstand area. Scrap metal will be sold. Any non-useable material, including stockpiles found to be contaminated will be removed from site and disposed in a licensed landfill.	95%
Soil and concrete	Any excess material will be sold directly off-site as fill or stockpiled for sale in the building products business.	100%
Recycled asphalt	Recycled asphalt brought onto the site will comply with EPA Reclaimed Asphalt Pavement Resource Recovery Order 2014 the will be used as a top layer for the hardstand that forms the operational area of the site in accordance with the EPA Reclaimed Asphalt Pavement Resource Recovery Exemption 2014. Any excess will be sold as product in the building supplies business.	100%
Mixed building waste	Any metals will be separated for re-use or recycling. Mixed building waste will be collected in a skip bin and sent to landfill.	10%
MSW	MSW will be collected in a MGB and removed weekly by a licensed waste removal contractor and disposed at a licensed landfill.	0%

The overall waste recovery rate for the demolition / construction phase will be 95-100%.

Residual waste will be collected in a separate stockpile or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426). Recovered metal will be removed to a metal recycler off-site (One-Steel, EPL: 1977).

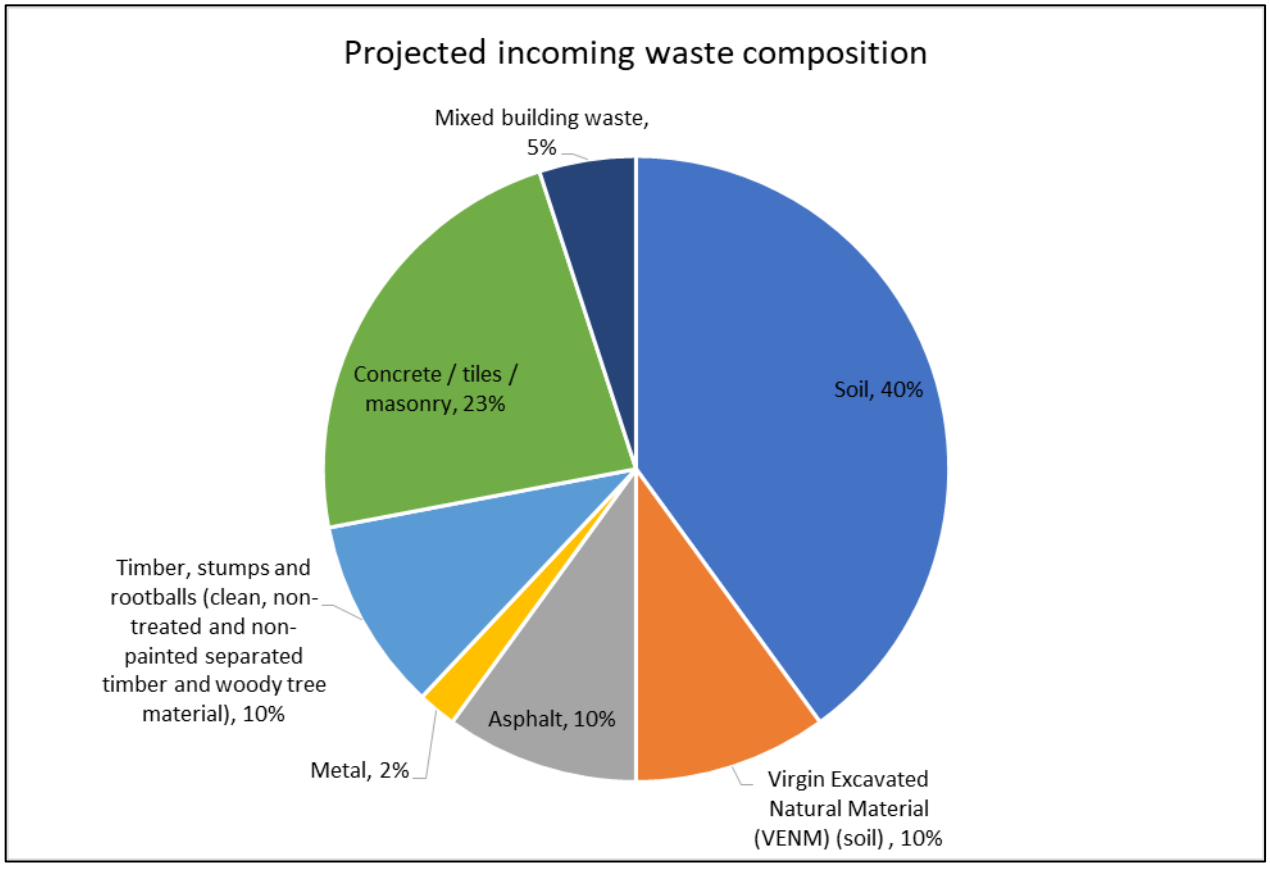
6.3.2 Operational phase

The operational phase consists of the operation of the 200,000 tpa C&D recycling facility, as well as the 10,000 tpa landscape supplies business. The recycling facility will be operated in accordance with the NSW EPA's *Standards for Managing Construction Waste in NSW* (NSW EPA, 2019).

6.3.2.1 Waste generation

The site operations will generate very little waste itself. The vast bulk of "waste" materials will be brought onto site for processing. While a small proportion of this material will be non-recyclable "residual" waste, most material will be recovered, processed and sold as products. The total amount of residual waste is expected to range from approximately 2,340 tonnes in the first year of operation up to approximately 5,225 tpa once the facility reaches full capacity. Figure 6.2 shows the anticipated composition of the material that will be delivered to the site for processing. Figure 6.3 shows the extrapolated tonnes received over the first 6-7 years of operation, assuming the facility reaches full capacity in 2027. As these charts show, the majority of the waste will be source-separated, inert material, such as soil or concrete/brick/tiles. The aim will be to recover as much material as possible to recycle into products for sale through the landscape and building supplies business to be located at the site.

Figure 6.2. Composition of incoming waste stream.



6.3.2.2 Waste inspection, acceptance and non-conforming waste

The incoming waste inspection and management of non-conforming loads will conform to the standards in the NSW EPA's *Standards for managing construction waste in NSW* (NSW EPA, 2019). These are summarised below.

Standard 1 Inspection requirements

At the verified weighbridge on entry into the facility (inspection point 1), trained personnel must:

1. Inspect the entire top of each load from an elevated inspection point or by using a video camera connected to a monitor and determine whether or not the load contains any asbestos waste and any other unpermitted waste;

2. Where the load is identified as containing, or is reasonably suspected to contain, any asbestos waste, reject the entire load of waste by directing the driver to immediately leave the facility and record the information required by Standard 1.4 into the C&D waste facility's rejected loads register; and

3. Where the load is not rejected, record the details as required by clause 27 of the Waste Regulation and direct the driver and the load of waste to proceed directly to inspection point 2.

At the tip and spread inspection area (inspection point 2), trained personnel must:

1. Direct the driver of the vehicle to tip the entire load on the tip and spread inspection area;

2. Spread the entire load and inspect the visible surface area for any asbestos waste and any other unpermitted waste. Tipped loads must not come into contact with any other waste materials;

3. Manually turn, or direct a plant operator to turn, the entire load and inspect the entire load for any asbestos waste and any other unpermitted waste on or beneath the visible surface;

4. Where any asbestos waste is identified, reject the entire load of waste.

5. Where any other unpermitted waste is identified, remove that waste from the load or reject the entire load of waste.

6. Where a load is rejected, ensure that the entire load is immediately reloaded onto the vehicle in which it arrived or onto another vehicle and ensure that the vehicle with the rejected load leaves the C&D waste facility on the same business day and then immediately record the information required by Standard 1.4 into the C&D facility's rejected loads register; and

7. Ensure that all waste that may lawfully be received at the C&D waste facility proceeds to be sorted and stored in accordance with Standards 2, 3 and 4.

Standard 1.2 does not apply to a load of construction waste received at the C&D waste facility that, upon receipt, only contains waste that meets the requirements of a resource recovery order, as evidenced by a statement of compliance for that waste which has been provided and kept in accordance with the applicable resource recovery order and is current at the time of receipt. The statement of compliance must be made available for inspection to an authorised officer of the EPA if requested. This load of waste must be immediately transferred to the appropriate waste storage area referred to in Standard 4.

6.3.2.1 Waste management measures

Table 6.3 summarises the waste treatment and destination for each of the incoming waste streams. The majority of waste received at the site will be processed into re-usable products for sale through the on-site building and landscape supplies business. The small amount of dry residual waste will be stored separately on-site, in either skip bins or bunkers, prior to removal to a licensed landfill for disposal.

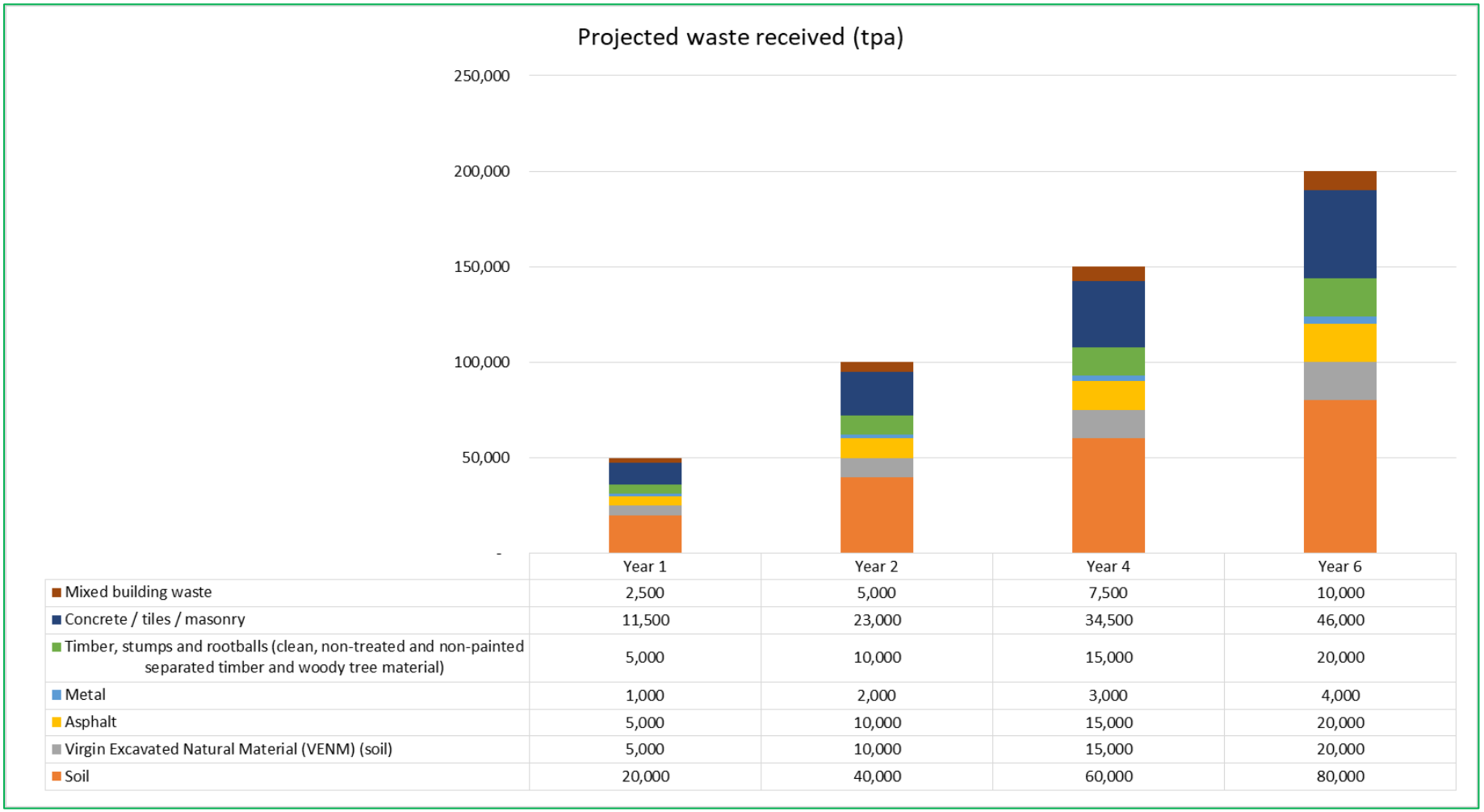
It is noted that the NSW Government intends to revoke the general Resource Recovery Order and Resource Recovery Exemption for recovered fines. When this occurs, KSSS intends to apply for a site-specific resource recovery order to enable it to sell its recovered fines as replacement soil product for construction works. In the meantime, KSSS will seek EPA-approved landfill alternative daily cover markets for its recovered fines.

6.3.2.2 Stockpile heights

Stockpile heights have been based on best practice guidelines outlined in the South Australian Environmental Protection Agency (SA EPA, 2017) in order manage fire, dust and odour:

- Stockpiles of waste materials in the designated waste storage area will be limited to 3m. Height guidance will be provided by the 3m height of the concrete block bays;
- Stockpiles will be limited to a maximum height of 3m in the processing area near the Crusher Building;
- Stockpiles of inert material such as concrete, brick, soil etc. will be limited to a maximum of 3m in height in the processing and blending areas. Height poles to the exact length (3m) will provide on-site guidance for stockpile management;
- Stockpiles of organic material such as timber and mulch will be limited to a maximum of 3m in height in the processing and blending areas. Height poles to the exact length (3m) will provide on-site guidance for stockpile management; and
- Stockpiles of all processed products, aggregates and landscaping supplies will be limited to 3m. Height guidance will be provided by the 3m height of the concrete block bays.

Figure 6.3. Estimates of amounts of incoming waste during operational phase.



	Year 1	Year 2	Year 4	Year 6
Mixed building waste	2,500	5,000	7,500	10,000
Concrete / tiles / masonry	11,500	23,000	34,500	46,000
Timber, stumps and rootballs (clean, non-treated and non-painted separated timber and woody tree material)	5,000	10,000	15,000	20,000
Metal	1,000	2,000	3,000	4,000
Asphalt	5,000	10,000	15,000	20,000
Virgin Excavated Natural Material (VENM) (soil)	5,000	10,000	15,000	20,000
Soil	20,000	40,000	60,000	80,000

Table 6.3. Waste Management during the operational phase.

Incoming Material	Description	Processing / treatment	Destination	Resource Recovery Order for Products	Expected recovery rate (wt%)
Mixed building waste	Mixed building waste from demolition or construction projects. Waste may contain cardboard, plastic, etc. among the concrete, bricks, soil, metal.	Loads will be received separately in B-Doubles, semi-trailers, skip bins or rigid trucks, tipped in an unloading bay in the Tip and Spread Building, then moved via front end loader to the 'Mixed building waste' storage bay. Material will then be subject to a primary sorting process using a grab excavator to remove concrete, steel and timber. Residual waste to be stored in skip bin or a separate bunker and disposed off-site. Concrete, masonry, clean timber from the primary sorting process will be separated and crushed/shredded and screened to specifications to produce saleable products. Residual waste from the primary sorting process will be stored in skip bin before being transferred to a secondary sorting facility located in the warehouse building at the North of the site. The secondary sorting process consists of a screen trammel, a picking station, a magnet and a blower. Concrete, brick, asphalt, paper, cardboard, plastic and metals will be separated at the secondary processing stage. Separated materials will be stored in skip bins prior to being transferred for recycling. Residual waste from the secondary processing stage will be stored in skip bins prior to being disposed off-site at a landfill.	Recovered materials will be processed into saleable products and sold either directly to customers or through the on-site building supplies business. Aggregate will be sold to construction and road projects. Recovered fines will be sold as landfill alternative daily cover. Re-useable timber will be sold for construction and landscape projects. Residual waste will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426).	Recovered Aggregate Resource Recovery Order 2014; "Batch process" Recovered Fines Resource Recovery Order 2014 Mulch Resource Recovery Order 2016; Recovered Plasterboard Resource Recovery Order 2014.	85%

Incoming Material	Description	Processing / treatment	Destination	Resource Recovery Order for Products	Expected recovery rate (wt%)
Concrete / tiles / masonry	Source-separated inert building materials, such as concrete, tiles, bricks and rubble.	Loads will be received separately in B-Doubles, semi-trailers or rigid trucks, tipped in the unloading bay associated with the 'Waste receiving area', then moved via front end loader to the 'Concrete/tiles/masonry' storage bay. Material will then be crushed / screened in the 'Processing area' then stored in a pile then moved to the 'Landscape supplies' bunker for sale.	Clean, inspected material will be crushed, screened and blended to produce aggregate and soil-replacement products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426).	The Recovered Aggregate Resource Recovery Order 2014; The "Batch process" Recovered Fines Resource Recovery Order 2014	99%
Timber, stumps, and rootballs	Clean, non-treated and non-painted separated timber and woody tree material.	Loads will be received separately in rigid trucks, tipped in the unloading bay associated with the 'Waste receiving area', then moved via front end loader to the 'Timber' storage bay. Material will then be chipped in an on-site shredder. Chipped material will then be moved via front end loader to the 'timber' mulch storage bay in the landscape supplies area	Clean, inspected material will be shredded, screened and blended to produce a range of mulches and landscape products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426).	Mulch Resource Recovery Order 2016	99%
Metal	Steel, iron, copper, aluminium and other metal items.	Loads will be received separately in rigid trucks, tipped in the unloading bay associated with the 'Waste receiving area', then moved via front end loader to the 'Metals' storage bay. Material will then be picked up and taken off-site for recycling in a semi-trailer on a periodic basis.	Clean, inspected metals will be sorted into metal types. Some scrap metal may be shredded to reduce size and save space. Recovered metal will be removed to a metal recycler off-site (One-Steel, EPL: 1977). Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426).	n/a	99%

Incoming Material	Description	Processing / treatment	Destination	Resource Recovery Order for Products	Expected recovery rate (wt%)
Asphalt	Recovered asphalt from re-surfacing roads and pavements.	Loads will be received separately in B-Doubles, semi-trailers or rigid trucks, tipped in the unloading bay associated with the 'Waste receiving area', then moved via front end loader to the 'Asphalt' storage bay. Material will then be crushed / screened in the 'Processing area' then stored in a pile then moved to the 'Landscape supplies' bunker for sale.	Clean, inspected material will be crushed, screened and blended to produce aggregate and soil-replacement products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426).	Reclaimed Asphalt Pavement Resource Recovery Order 2014	99%
Virgin Excavated Natural Material (VENM)	Natural material that has been excavated or quarried from the ground in an area uncontaminated by chemicals and does not contain sulphidic soils.	Loads will be received separately in B-Doubles, semi-trailers or rigid trucks (e.g. 12 t), tipped in the unloading bay associated with the 'Waste receiving area', then moved via front end loader to the 'VENM' storage bay. Material to be sold as VENM will be transferred, unprocessed, to the sale area.	Material to be sold as VENM will be transferred, unprocessed, to the sale area.	Excavated Natural Material Resource Recovery Order 2014	100%
Soil	Soils that meet the CT1 thresholds for general solid waste in Table 1 of the NSW EPA's Waste Classification Guidelines	Loads will be received separately in B-Doubles, semi-trailers or rigid trucks, tipped in the unloading bay associated with the 'Waste receiving area', then moved via front end loader to the soil storage bay. Material will then be screened in the 'Processing area' then stored in a pile then moved to the 'Landscape supplies' bunker for sale. Soil loads that meet the criteria for Excavated Natural Materials (ENM), will be either sold unprocessed as ENM, or blended and processed with other soil materials to produce manufactured soils.	Clean, inspected material will be crushed, screened and blended to produce aggregate and soil-replacement products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill.	The "Batch Process" Recovered Fines Order 2014 Excavated Natural Material Resource Recovery Order 2014 – where appropriate	99%

6.4 Management of hazardous, toxic and liquid waste

As far as possible, no hazards, toxic or liquid waste will be accepted at the site. Where such material is delivered, but not detected at arrival, it will be removed and stored in a designated area awaiting removal by a licensed waste contractor. The procedure for detecting and managing unacceptable waste is provided at Attachment 1 of Appendix H. This procedure is consistent with the NSW EPA guidelines. Chemical, flammable and radioactive wastes will be managed using the same procedures.

6.5 Incident Management – Spills

Spills on-site during the demolition and construction and operational phases likely to occur are oils, fuel, paints and primers. To better manage a spill incident Spill Response Kits will be kept on-site, at various clearly identified locations in easily accessible areas. The MSDS will be placed within sight and near spill kits. The MSDS has clear instructions on spill response management – cleanup and disposal.

6.6 Impacts assessment and mitigation measures

During the demolition and construction process, a series of best practice resource recovery measures will be implemented to avoid, reduce/reuse and recover waste to minimise disposal to landfill and maximise recovery.

To help in waste management planning during each stage of the project, an estimate of the types and quantities of waste to be generated during the demolition / construction and operational phases has been prepared. This analysis is given in Table 6.1 and Figure 6.3.

It is noted that the majority of materials to be generated through the demolition and construction phase is inert material, mainly concrete and soil. The majority of this will be re-used on site. Any waste resulting from building construction will be either recycled or re-used on site, with the minimal amount of residual waste disposed off-site to landfill.

Some living and dead trees, shrubs and grasses (as identified in the Biodiversity report) will need to be cleared from the site to permit construction. As mentioned earlier, all waste materials will be processed at the facility or sent to a licensed recycling facility for processing.

The overall recovery rate during the operational phase is expected to be very high (approximately 95%). It is anticipated that a maximum approximately 5,225 tpa of residual waste requiring off-site disposal will be generated at the site, once the site is operating at full capacity. Residual waste will be regularly removed from site and disposed in a licensed landfill.

Overall the waste impacts of the facility are believed to be positive, with wastes being recovered and recycled, instead of being sent to landfill.

6.7 Conclusion

The waste generated during the demolition / construction phase of the project is estimated to be 18,090 m^3 of inert material (recycled concrete, rubble, and soil), 5 m^3 of scrap metal, 100 m^3 of woody garden organics, 20m^3 mixed building waste and 3 m^3 of municipal solid waste (MSW). Inert material will be used as fill on site. The metal will be recycled at a scrap metal recycling facility, off-site. Woody garden organics will be shredded to produce mulch, and either used on-site or sold. MSW will be removed from site and disposed in a licensed landfill.

During the operational phase, up to 200,000 tpa of waste materials will be received on site for recycling. The majority will be soil or source-separated inert material. It is estimated that the recycling rate for the facility will be approximately 95%, with approximately 5,225 tpa of residual waste being removed for disposal to landfill. The recovered material will be processed into various building and landscaping products and sold from the premises.

This facility will make a major contribution towards meeting the NSW Waste Strategy's target of 80% recycling of C&D waste by 2021.

7 Water Impact Assessment

7.1 Introduction

This chapter provides a summary of the investigation into water management issues for the proposed development. Sustainability Workshop Ltd was engaged to prepare a Soil and Water Management Plan and a Water Cycle Management Plan for the proposed industrial development at 90 Gindurra Road, Somersby. The two plans are incorporated into the report provided at Appendix I.

Samples of the freshwater in the dams that are currently on-site were taken and tested to determine whether the existing stockpiles had resulted in any stormwater or surface water contamination. The results are provided at Appendix J.

A Baseline Groundwater Investigation was conducted by Douglas Partners, to determine the quality of the groundwater at the site. The Baseline Groundwater Investigation report is provided at Appendix K.

7.2 Legislative requirements

Section 6.3.6.1 of the Gosford DCP 2013 requires that a Soil and Water Management Plan be prepared for any developments where the soil surface exposure is greater than 2,500m^2. Similarly, *Managing Urban Stormwater: Soils and Construction*, (Landcom, 2004) (the Blue Book) requires a SWMP for developments over 2,500m^2.

The Water Cycle Management Plan has been prepared in accordance with the requirements of Chapter 6.7 – Water Cycle Management of Gosford City Council's Development Control Plan 2013 (DCP 2013). The objectives of this Water Cycle Management Plan align with the purpose of Gosford City Council's Chapter 6.7 (Water Cycle Management) from DCP 2013. These include to:

1) Maintain and restore natural water balance whilst reducing the cost of providing and maintaining water infrastructure in a sustainable and efficient manner;

2) Reduce risk to life and damage to property by restricting and controlling building and other development so that it minimises risks to residents and those involved in rescue operations during floods;

3) Reduce nuisance and high-level flooding and the cost of providing and maintaining flood mitigation infrastructure whilst improving water quality in streams and groundwater;

4) Reduce potable water demand by using stormwater as a resource;

5) Protect and enhance natural water systems (creeks, rivers, wetlands, estuaries, lagoons and groundwater systems);

6) Protect and enhance the water quality, by improving the quality of stormwater runoff from the urban catchments; and

7) Integrate stormwater management systems into the landscape in a manner that provides multiple benefits, including water quality protection, stormwater retention and detention, public open space and recreational and visual amenity.

7.3 Baseline conditions

The site currently has only a limited area cleared. As such, most of the site has natural landform contours. The site currently falls to the south and south-west at approximately 7% grade.

None of the site is paved. Some cleared areas are compacted soil. However, most of the site is pervious. A review of the NSW Office of Environment and Heritage, eSPADE V2.0 Mapping System (NSW Office of Environment and Heritage, 2016) indicates that the site is situated within the Sydney Town landscape (9130st) typically comprising undulating to rolling low hills and moderately inclined slopes on quartz sandstone of the Terrigal and Hawksbury sandstone formations with typical slope gradients of between 5- 25%. Moderate to severe sheet erosion and rilling is present in areas where vegetation has been extensively cleared for development. Soil profiles are expected to comprise up to 0.3m of loose brown loamy sands overlying 1.5m of brown sandy clay loams and underlying sandstone bedrock. It is understood that these soils possess strong sodicity and high erodibility.

The site has three dams/ponds to collect water from the cleared areas; two in the centre of the site and one on the western boundary (see site survey at Appendix D). Water quality testing of the on-site water found that the water quality was below the trigger values in the ANZSECC Guidelines for Marine and Fresh Water Quality (ANZECC, 2000). The test results are provided at Appendix J.

The development site is currently partially cleared with no incised flow paths. Overland flows would be characterised as broad shallow, low velocity flows. It would be of value to maintain the broad shallow overland flows and to avoid creation of an incised high velocity drain through the site.

The distance between the point of discharge from the proposed development and the nearest waterfront land is approximately 400m. The flow path to the creek is well vegetated with a mix of native vegetation on the development site and grass. Kangoo Road has recently been upgraded with the installation of kerb and gutter and drainage. Flows from the site would be conveyed, along with road runoff, in the Council drainage system.

A Flood Information Letter for the lot was obtained from Central Coast Council and indicates the site is not subject to 1% AEP flooding. Interrogation of Council's on-line mapping tool shows that there are floodplains to the east and west of the site however the lot in question is not subject to flooding.

A Baseline Groundwater Investigation was conducted that installed three groundwater wells around the site and tested the groundwater for a range of potential contaminants. Groundwater seepage was encountered within the weathered Hawkesbury Sandstone formation with stabilized depths to groundwater ranging between 1.15m (bgl) and 7.25m (bgl) in June 2019. The measured groundwater elevations infer a groundwater gradient and potentially a groundwater flow to the south-west and west. Groundwater at the site was assessed to be generally fresh (low salinity levels) and moderately to highly acidic, which is considered to be consistent with local background groundwater conditions. No signs of obvious contamination were observed in the groundwater at the borehole locations. Generally, low concentrations of potential contaminants were detected within the wells.

However, some detectable concentrations of zinc and/or lead were reported that exceeded the comparative freshwater Groundwater Investigation Level (GIL). The zinc concentrations are likely to be consistent with background conditions with the Hawkesbury Sandstone formation and do not necessarily indicate a potential source of zinc impact within the site. The marginally-elevated concentration of lead, combined with the increased proportion of Calcium and SO_4 in Well 2, may indicate that former site activities have had some impact on site groundwater conditions. It should be noted, however, that the lead concentration in Well 2 was significantly less than the comparative drinking level GIL. The full Baseline Groundwater Investigation report is provided at Appendix K.

7.4 Proposed development

Stage 2 of the proposed development includes clearing the development area (approximately 5.6 ha). Stage 2 of the proposed works involves a range of construction works as described in Section 2.3.4 and as shown on the General Arrangement Plan drawing for the site, included in Appendix E.

The site requires significant amounts of fill to achieve the proposed final landform contours, which will enable the stormwater to drain properly to the OSD basin in the south-west corner of the site. A cut and fill plan is provided at Appendix E.

The site entrance road to the weighbridge and to the waste receival area, the waste receival area and the area around the warehouse building will be paved with concrete. The waste and product storage bays will be sealed with asphalt. The remainder of the site will be covered with crushed compacted concrete over a waterproof membrane layer.

The Tip and Spread area will be enclosed in a three-sided building. Ten 18kL water tanks will capture rainwater from the roof of the Tip and Spread Building. This water will be re-used in the misting system in the Tip and Spread Building for dust suppression. The misting system will be backed up by town water supply, if the water tanks are depleted during an extended dry period.

The site will be contoured such that stormwater will be channeled towards grassed swales then an On-site Detention (OSD) and Water Storage Basin at the south-west corner of the site. The main flow to the OSD basin will be via a channel drain along the western boundary. There is also a pipe drain leading from the waste storage bays.

The OSD basin will be surrounded by gross pollutant traps and grass swales to reduce erosion and sediment build up in the basin, as well as help reduce the nutrient load in the stormwater. The Stormwater Plan (Appendix E) and Landscape Plan (Appendix F) provide details of the grass swale plantings. The species to be used for the bio-swales include *Dianella caerulea, Hardenbergia violacea* and *Lomandra longifolia*.

The OSD basin will have compartments for trapping sediment, which will be regularly cleared. The overflowing water is captured in a central compartment. Stormwater will be treated through a membrane filtration plant, recycled and utilised for on-site uses, such as dust suppression. In addition to the 5 ML water quality pond, an emergency spill pond of 500 m^3 volume will be provided. This will enable up to 60 mm of runoff to be contained in the spill pond from the high risk catchment, including the waste storage bays and the timber processing area. Online monitoring of water quality will be performed, to enable decisions on management of this water (e.g. if suitable for discharge into the OSD pond, to sewer as trade waste or requires off-site disposal).

The overflow from the OSD basin will flow to a level spreader via a spillway. In the event of an overflow, excess stormwater will flow to the undeveloped southern end of the property. No stormwater should leave the property. Figure 7.2 shows the stormwater layout. More detail is provided in the site layout and civil plans in Appendix E.

The site will be connected to both town fresh water and to the town sewerage system. Potable water connections will be provided to supply fire hydrants and as back-up for dust suppression systems. The wastewater from the recycled water treatment unit and from the wash bay water treatment unit will be disposed as trade waste to sewer. Figure 7.3 shows the layout of the hydraulic services planned for the site. It should be noted that the Stage 1 hydraulic services have been approved and are currently being installed.

7.5 Impact assessment

7.5.1 Potential Impacts

Key sources of stormwater pollution will arise from:

- An increase in impervious areas of 6 hectares – here volume is considered a pollutant in its own right;
- Atmospheric deposition of nitrogen on impervious surfaces (this occurs whenever impervious surfaces are created and is not peculiar to this development);
- Storage of raw materials and blended landscape and building products in open areas;

- Handling and transport of raw materials and products including metals, sands, soils, crushed concrete aggregate, recycled aggregates and shredded timber;
- Vehicular traffic – truck and plant and equipment such as front-end loaders and trucks bringing waste and transporting products from the site;
- Transforming and processing waste product into a product – for example crushing concrete or shredding timber. However, these activities will happen under cover using machinery, which has inbuilt dust suppression equipment. Supressing dust will positively impact water quality by reducing the spread of particulates around the site which later could otherwise become mobilised in runoff when it rains.

The Water Cycle Impact Assessment and Soil and Water Management Plan assesses both chronic and acute water quality impacts. Chronic impacts are those that arise from the day to day operation of the site and which would occur over the life of the development. Acute impacts are those where a single event can result in ecosystem stress – for example an accidental spill of a chemical or sedimentation arising from construction. We have also assessed geomorphic impacts arising from alteration of the flow regime.

The key acute stormwater pollutants of concern will be:

- Total suspended Solids (TSS) – during construction substantial volumes of sediment can be exported from a site and cause acute ecosystem impacts;
- Risk of an accidental spill;
- Fire emergency where foam could be used.

The key chronic stormwater pollutants of concern will be:

- Volume of runoff – a pollutant is defined as anything that can cause an ecosystem to become stressed. In this context volume of runoff can become an ecosystem stressor especially where it causes erosion;
- TSS during operation - especially from handling sands, soils, shredded timber, crushed concrete etc. TSS is the generic term given to particulates that are mobilised in runoff when it rains;
- Total Phosphorus (TP) – considered to be mostly particulate though dissolved phosphate will also be present;
- Total Nitrogen (TN) – mostly particulate (60%) but dissolved nitrogen (N) will also be present due to the creation of impervious surfaces. Little ammonia should be produced as gross pollutants will keep captured solids in a dry state. Dissolved N would be in the nitrate and nitrite form (NO_x). Organic, particulate N would be the dominant form of N while some organic nitrogen will be dissolved for example tannins which could leach from stockpiles;
- Heavy metals – Zinc and Copper tend to be the metals that occur at concentrations that have the potential to cause harm while other metals are likely to be present but not at concentrations that have the potential to cause harm;
- Alkalinity – the use of extensive concrete and crushed concrete on the site resulting in alkaline runoff which can change the nature of receiving waters from slightly acidic to slightly basic and result in substantial changes to ecological communities.

In a 2009 research paper titled “How sustainable are stormwater management practices with respect to heavy metals? A multinational perspective”, Liebman et al examined if TSS, TP and TN are reasonably used as surrogate pollutant indicators. The research found removal of all three surrogates, to best practice levels, would see other toxicants such

as heavy metals (Zn and Cu) reduced to harmless levels. Others including Professor Tim Fletcher (*pers. comm*) have examined this issue with similar results.

The discharge point for the proposed development is located 400m away from a waterway. The largest potential impacts are considered to be the impacts on the health and stability of the bushland from the proposed discharge. On first principles, it is considered most probably that the receiving bushland will absorb most of the runoff and on some infrequent occasions contribute runoff to the first order creek 400m away from the discharge point.

Keeping the bushland healthy and stable should therefore be the primary focus of mitigation works.

7.5.2 Applicable Targets – Quality, Quantity and Peak Flows

ANZECC Guidelines identify the need for catchment managers to derive local trigger values for ambient water quality however these do not provide appropriate water quality targets for assessing the discharge from any single site as they are guidelines for ambient water quality. Moreover, trigger values are not applicable to a single site discharge because statistical metrics used in the guidelines for river flows are not applicable to development sites that don't have a continuous streamflow leaving the site, i.e. it is not possible to use them even if we wished to use them. Approaches in the UK see a dilution factor applied to trigger values to determine if a proposal would result in a change of class of a receiving water. ANZECC alludes to dilution but does not provide further guidance.

Central Coast Council has derived trigger values or guideline values for tributaries of the Brisbane River estuary. The site drains to Mooney Mooney Creek which is a separate estuary.

Overseas guidelines are not applicable to Australian waterways which can be particularly susceptible to nutrients and algal growth. Adoption of UK Highways Agency guidelines would see only Copper and Zinc criteria applied to this site (Liebman & Jonasson, 2009) and ignore TSS, TP and TN which remain the main pollutants of concern and for which we have an accepted scientifically based method for predicting pollutant loads before and after mitigation.

The NSW DECC (then part of the NSW EPA) published a consultation draft (NSW DECC, 2007) under the Managing Urban Stormwater series which they considered reflected an "affordable level of treatment". These Draft DECC guidelines were broadly adopted by many Councils and the Growth Centres Commission. The draft EPA guidelines specified 80% removal of TSS and 45% removal of TP and TN. These guidelines have been adopted by Central Coast Council in its DCP and they remain the only defined stormwater guidelines on this project. These are load based guidelines and are applied to stormwater because it is rare for concentrations at toxic levels to be exported and focussing on loads is critical to the growth of algae etc. The NSW EPA has dismissed the applicability of its own guidelines.

The former NSW Office of Environment and Heritage, having carried out its own detailed risk assessment of development discharge into Lake Illawarra, a sensitive estuary like Mooney Mooney Creek, decided to implement the same load based policy being applied by Central Coast Council to any part of the release area while the remaining part was to be subject to a neutral or beneficial effect test.

In this instance it is proposed that a neutral or beneficial effect test (NorBE) should be applied. This is the most stringent test applied by any regulator in NSW and is typically applicable to drinking water catchments – which we note this catchment is not.

Nonetheless it is a test which passes the requirements of the Protection of the Environment Operations Act (POEO Act).

Licence limits for similar facilities around the State include limiting TSS to less than 50 mg/L. On occasion, where high loads of TN and TP are also likely to be present, they also have an EPL limit of 10 and 0.3 mg/L respectively applied at the 100th percentile.

This development proposal should demonstrate compliance with these maximum concentration limits as well as its load-based and NorBE targets. In other words, if it passes all three tests the impact on water quality is likely to be negligible and compliant with the POEO Act.

Frequency of site discharge is considered an indicator of geomorphic impacts. If the frequency of site discharge can remain close to predevelopment conditions, then it is likely that the discharge will have few geomorphic (erosional) impacts.

Ensuring the discharges from the site, when they do occur, remain below erosive thresholds is also critical as is the need to ensure that the development does not increase flood risk by increasing peak flow rates or flow volumes for a range of storms and exceedance probabilities. Here the 1 in 1 year event and 1 in 100 year event are used as benchmarks.

Harvested stormwater should comply with the NSW stormwater harvesting guidelines (NSW DECC, 2006) and Australian Guidelines for Water Recycling (NWQMS, 2009).

Construction phase runoff would need to comply with the *Managing urban Stormwater: Soils and Construction* hereafter referred to as the Blue Book (Landcom, 2004).

7.6 Mitigation measures

The site will comply with the requirements of the Blue Book during construction and this will ensure that construction phase sediment impacts are minimised. The Blue Book is not applicable during the operation of the site where a licence will set discharge limits for scheduled activities and where pollutant loads should be lower than construction stage loads.

The proposed long-term water quality and quantity treatment measures include:

- Risk based controls including emergency spill pond;
- Preventative measures including buildings, site grading and separation of flows from working areas;
- Rainwaters tanks;
- GPTs;
- Swales;
- Pond with floating wetlands;
- Stormwater Harvesting and Reuse;
- On Site stormwater Detention Basin which also provides for fire-fighting water storage; and
- Level Spreader.

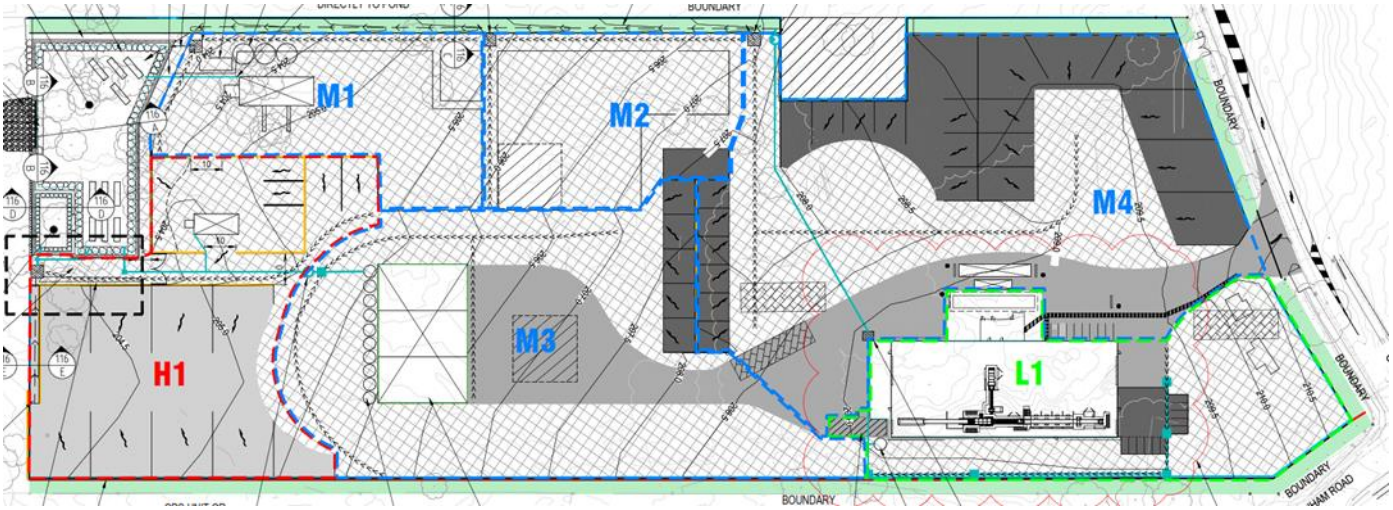
These are discussed in more detail below.

7.6.1 Risk Management Approach

It is suggested that a risk-based approach to management of stormwater would deliver better water quality outcomes. The proposed development has been divided into six distinct sub-catchments and given a risk assessment based on the proposed activity that would occur in the sub-catchment.

These sub-catchments are shown on Drawing Sheet 115 in Appendix E in detail, which repeated below for ease of reference in this document.

Figure 7.1. Sub-catchment Risk Break up.



Sub-catchment Descriptor	Risk (Low, medium, high)	Proposed Activity and potential pollutants	Treatment Measures Proposed
L1	Low	Truck parking, transport, warehouse: Generate TSS, metal runoff from roof, nitrogen runoff from roof.	1. Rainwater tanks for roof runoff. 2. CDS unit to treat sub-catchment runoff including roof. 3. Pond including floating treatment wetland.
M1	Medium	Concrete crusher: generate TSS, alkaline runoff, calcium salts.	1. House concrete crusher inside building to reduce dust generation. 2. Barramy gross pollutant trap to treat whole catchment. 3. Pond including floating treatment wetland.
M2	Medium	Blending area + minor Landscape storage: Generate TSS, nutrients, trace elements. Organic matter from blended landscape products, TPH, metals from use of plant and equipment including loaders.	1. Barramy gross pollutant trap to treat whole catchment. 2. Bioswale to carry out tertiary treatment 3. Pond including floating treatment wetland.
M3	Medium	Tip and spread roof, blended landscape product storage and transport: Will generate TSS, organic matter from landscape products, nutrients in runoff. Metals from transport and shed roof.	1. Rainwater tanks for roof runoff. 2. CDS unit to treat sub-catchment runoff including roof. 3. Pond including floating treatment wetland.
M4	Medium	Product storage bays and transport: Will generate TSS, nutrients from stored soils, organic matter from soils, calcium from crushed concrete.	1. Barramy gross pollutant trap to treat whole catchment. 2. Bioswale to carry out tertiary treatment 3. Pond including floating treatment wetland.
H1	High	Waste storage Bays and Timber Shredding area. This is deemed high risk due to both chronic and acute risks. Chronic risks include potential leaching of soils, metals, tannins, salts (ions). Acute risks consider that this area has the greatest risk of having a fire and therefore during a fire emergency it would be necessary to contain runoff from this area separately to all other areas.	1. Barramy gross pollutant trap to treat whole catchment. 2. Pond including floating treatment wetland. 3. Emergency Spill Pond if required.

7.6.2 Preventative Measures

The following measures are adopted in the site design:

- Place all heavy processing and dust generating activities inside buildings with dust suppression to reduce generation of particulates which once settled can become water borne after rain;
- Carry out waste acceptance in accordance with the waste management plan which, amongst other things, would see rejection of CCA treated timber and asbestos. This will significantly reduce the risk of CCA leaching and needing to be treated in the treatment system;
- Cover the vehicle washbay and send wastewater to trade waste not stormwater;
- Send stormwater treatment plant reject water to trade waste not back to the pond;
- The site is graded so that water is to flow out of storage bays and not into them;
- Use graded depressions/swales on the site to help divert run-on water around product blending and storage areas keeping them as dry as possible;
- Pipe main warehouse roof runoff and associated sealed parking directly to the pond in a pipeline routed toward the west of the site and under the bioswale;
- Roof runoff from the spread and tip shed will be stored in rainwater tanks and the overflow piped to the pond after treatment in a GPT; and
- Roof runoff from the timber processing shed and crusher shed will also be piped to the pond.

7.6.3 Installation of geomembrane

The whole site is to be sealed either by using concrete pavement or by using a geomembrane to protect groundwater. This will necessitate extensive use of subsoil drains across the site which shall be directed to the pond.

The 150mm thick drainage layer under the pavement is a typical drainage layer. It will need to be designed in detail but will include:

- A 5mm gravel layer
- Subsoil drainage pipes within the gravel layer. Subsoil pipe strength class will need to be sufficiently high to ensure pipes are not crushed by all plant and equipment.

7.6.4 Filtration of Metals at Source

It is proposed to place filter sausages across the metals storage bay where the risk of exporting metal contaminants is highest.

Star Water produces a technologically advanced treatment product called reactive filter media. It uses recycled waste materials as part of the constituents of a customised filter media. This media can be placed inside a filter sock and placed across a flow path to filter out targeted pollutants at source. Star Water has the technology to specifically design the media to target metals (amongst other pollutants).

It uses a combination of filtration and ion exchange to remove dissolved metals. It is proposed to use these filter sausages to filter the runoff from the metal storage bay. The sausages may also be used more widely on the site to target other specific areas.

The media in the sausages would need to be replaced in accordance with the supplier recommendations, which can only be known once the site becomes operational.

Claimed performance is for over 90% metal removal.

Filter sausages may be used elsewhere as an adaptive management technique to help improve localised water quality hot spots.

7.6.5 Rainwater Harvesting

It is proposed to include a 50 KL rainwater tank on the main warehouse roof. This water will be used to wash trucks in the truck wash bay.

It is also proposed to include ten (10) 18 kL rainwater tanks to collect runoff from the tip and spread building roof and use it for dust suppression within the building.

In order to ensure the harvested rainwater is fit for purpose it will need to be filtered in a 5 micron filter and disinfected in a UV system immediately prior to use. All downpipes shall be fitted with a first flush device to ensure the first flush of stormwater is bypassed from the tanks for health reasons. The first flush system will need to be routinely maintained by cleaning it out. On a site where dust could be generated this becomes an important critical control.

Pollutant removal processes that occur in rainwater tanks include:

1) Settlement of sediment.
2) Removal of some particulate matter which settles in the tank.

7.6.6 Barramy GPTs

Four (4) Barramy GPTs are recommended because they have been designed for environments such as the proposed development. They work to keep organic matter dry and prevent leaching of dissolved nutrients. They are easy to maintain using a back-hoe or small loader.

The material moved into the trap is allowed to dry as the trap slopes toward the right hand flow bypass channel. The screen at the end of the device also allows debris to be pushed to the back of the trap so that is becomes self-stacking. The debris is pushed against the screen and the debris itself forms a blinding layer which stops further debris from being washed through the screen.

Four traps are proposed to treat runoff from catchments M4, M2, M1 and H1.

Traps treating runoff from catchment M4 and M2 are required to reduce the loading of sediment and gross pollutants on the bioswale. This will enable the bioswales to be easily maintained into the future.

Traps treating runoff from M1 and H1 are required to keep sediment and gross pollutants out of the pond and will reduce the maintenance burden of the pond.

Processes which occur in the Barramy GPTs include:

1) Removal of gross pollutants – about 97%
2) Removal of TSS – about 30% to 50%
3) Removal of particulate nitrogen and phosphorus
4) Removal of attached metals

5) Removal of hydrocarbons bound to sediment

7.6.7 Continuous Deflective Separation (CDS) GPTs

The site plan shows two (2) CDS GPT to be installed. The first treats catchment L1. The second treats catchment M3. This CDS unit will collect and treat hardstand runoff the area to the north of the unit. It is expected this unit will mostly collect sediment and some coarser particles. The units will need to have Class D trafficable lids.

Treated water from this unit will be directed to the pond and it will bypass the "high risk" flow area which is defined as the waste storage bays and timber shredder area. CDS units are widely used in the industry for their very good water quality performance and ease of maintenance.

Processes which occur in the CDS GPTs include:

1) Removal of gross pollutants – about 97%
2) Removal of TSS – about 35% to 50%
3) Removal of particulate bound phosphorus
4) Removal of attached metals
5) Removal of hydrocarbons bound to sediment

7.6.8 Grassed Bioswales

Grassed swales have been included in the treatment train. Evidence from a Borgs Manufacturing site at Oberon is that these swales perform well to reduce TSS, TP, TN and tannins (pers comm with Mr Victor Bendevski, Environmental Manager for Borgs). Over time however, as they are designed to be a depositional tool, their depth will reduce and they will need to be maintained to reinstate their design depths.

The design bioswale dimensions adopted in this project are:

- 1 in 4 side slopes
- 1m wide base
- 0.3m deep and 3.4m wide at the top
- 3% maximum longitudinal slope
- 300mm deep filter media overlying a transition zone and gravel drainage.
- The swales would need to have subsoil drainage as shown because there will be an impermeable liner under the swales preventing groundwater impacts.

During detailed design, the maximum permissible flows in the swales will need to be checked and where the flow capacity is exceeded flow will need to be piped from that point.

Pollutant removal processes that occur in bioswales include:

1) Removal of fine TSS
2) Removal of particulate bound nitrogen, phosphorus, metals and hydrocarbons
3) Uptake of nutrients and trace elements by grass – grass clippings MUST be removed from the swales to prevent leaching of nutrients back into the media.

4) Ion exchange in the media to remove ions including metals and ammonia

5) Absorbing of large volumes of flow to reduce volumes of runoff.

7.6.9 Water Quality Pond

The design pond dimensions adopted for this project are:

- Surface area of 1,666 m^2;
- Maximum depth of 3.0 m – stratification unlikely to occur due to constant water demand drawn from the pond, i.e. the water level will flux up and down frequently;
- Volume of 5,000 m^3;
- Maximum drawdown depth of 2.4m leaving 600mm as a minimum depth for the floating wetlands to survive;
- Lined with no infiltration;
- The proposed pond has steep sides – near vertical sides and will require safety fencing;
- The pond is to be maintained by excavators and plant that are on site. A 5m wide working area for maintenance around the northern side of the pond will need to be set aside. A 2m tall koala fence with floppy top will need to be erected around outside of the maintenance working area and the southern side of the pond to prevent fauna and people from accidentally entering the steeply sided pond. An emergency ladder would be fitted to the walls. An alternative would be to pump sludge out of the pond into a sludge filter bag which dewaters the sludge. We estimate the pond would need to be emptied of sludge every 5 years and after 300mm depth of sludge was built up;
- In order to contain the firefighting water on site, water-tight penstock(s) would need to be included to ensure that no flows leave the site. How this is arranged would be determined during detailed design. Possible configurations include headwall mounted penstocks with manual spindles left permanently in place. Suggested manufacturers of the penstocks would be either SPEL or AWMA.

Pollutant removal processes that occur in water quality ponds include:

1) Removal of very fine TSS;

2) Removal of very high levels of particulate bound nitrogen, phosphorus, metals and hydrocarbons;

3) Long residence times to facilitate nitrification and denitrification to remove dissolved nitrogen;

4) Absorbing of large volumes of flow to reduce volumes of runoff;

5) UV exposure to remove pathogens;

6) Volatilisation of hydrocarbons.

7.6.10 Floating Wetlands

Up to 165 m^2 of floating treatment wetlands (FTWs) are proposed for the pond to make up the 10% assumed vegetation coverage. Wetlands provided by SPEL Stormwater are recommended as robust field tested devices.

Floating wetlands are a new technology with very promising performance both during construction and operation. Essentially the floating wetlands are a buoyant raft of macrophyte plant material with a root zone in the water column. This allows for substantial biofilm growth on the roots.

The technology in this context is used to save space and deliver a superior water quality outcome. It is likely the area of floating wetlands adopted will deliver substantial water quality impacts though they have not been accounted for in the modelling except to justify the choice of a water quality pond as modelled in MUSIC.

We note that we have not modelled the benefit of the proposed floating wetlands in the MUSIC model because it is believed that the science behind the FTWs is still in its infancy and needs further research under a broader range of conditions prior to the models being considered rigorous. Research to date has not measured the performance under a configuration such as the one proposed in this project where the pond is also used for stormwater harvesting. Research to date has focussed on measuring performance in a water quality pond where the water level was mostly static. In this project the water level in the pond will fluctuate considerably.

Based on the research by Nichols et al (2016), where they monitored a floating wetland which covered 0.1% of the catchment, it is feasible the floating wetlands would improve TSS by 80%, TP by 53% and TN by 15%. We note this proposal sees an area equal to 0.3% of the catchment covered with floating treatment wetlands (i.e. three times as much coverage) but it also sees the FTWS located in a much larger water quality pond with much dirtier inflow water and a greater vertical range in operating water levels. In conclusion at this time there is a lack of suitable scientific data available with which to model FTWs as proposed on this project. Results in the Water Quality Impact Assessment and Soil and Water Plan report are therefore to be considered somewhat conservative.

Pollutant removal processes that occur in floating treatment wetlands include:

- Removal of fine TSS through adsorption onto root mass;
- Settlement of fine TSS below root mass;
- Removal of particulate bound nitrogen, phosphorus, metals and hydrocarbons;
- Uptake of nutrients and trace elements by plants;
- Ion exchange on the biofilms on the root mass to remove ions including metals and ammonia; and
- Oxygenation of the water column to enhance BOD and COD removal.

7.6.11 Fire Fighting Water Storage

Note the proposed on-site stormwater detention basin is to be 2,500 m^3 in volume and provided the fire did not occur during a storm event (very unlikely) the OSD basin could easily contain any fire-fighting volume with substantial spare capacity.

Penstocks are water-tight gates that can open and close to completely block off flow. They are widely used in the wastewater and irrigation industries.

During a fire emergency or emergency spill event, the penstocks to the main water quality pond would be closed manually. This would require a trained operator to walk along a gangway located on the pond wall and to then close the penstocks. A portable battery powered drill can be used to close them rapidly or they can be manually wound and achieve a water-tight seal.

The penstocks would be located over each outlet opening in the pond outlet wall and therefore three would be required.

7.6.12 Emergency Spill Pond

The design includes an emergency spill pond located adjacent to the 1.45 Ha high risk area. The high-risk area is shown in Figure 7.1 and includes the waste storage area and the timber shredding area. Only the high-risk area drains to the emergency spill pond.

A fire or accidental spill is most likely to occur within the high-risk area and less likely to occur outside of this area.

If a spill occurs inside the high-risk area or there is a fire in the high risk area, then runoff from this area will be drained to the emergency spill pond where it will be captured and contained. The emergency spill pond is designed to spill into the main water quality pond as a final opportunity for capturing runoff before discharge from the site.

The proposed emergency water quality pond volume is to be 500 m^3, which will allow it to capture up to 90% percentile 5 day rainfall event without any discharge. This would allow 60 mm of either fire water/foam or polluted runoff to be fully contained in the pond without mixing with any other site runoff. This would allow fire-fighting water to be contained and removed from the emergency spill pond. This would prevent the fire water or emergency spill from mixing with water that is in the 5ML water quality pond and therefore it will potentially prevent the need to remove up to 7.5 ML of contaminated water from the site.

In the highly unlikely event that the emergency spill pond does not have enough capacity, additional capacity is available in the main water quality pond as described above.

It is proposed to install a water quality probe into a sump to monitor water quality leaving the high-risk area. The probe would monitor multiple parameters such as EC, TSS, NO_x, and turbidity. The probe would be connected to a logic controller which would be trained to identify when either unusually dirty water is being discharged or when there is an accidental spill or during a fire emergency where foam is used. These events are described as out of range events, meaning that water quality entering the pond would be of abnormally poor quality and should be isolated and stored and then investigated further if required.

The proposed system would automatically monitor water quality in real time (24/7) and then if an out of range parameter was detected a penstock leading to the main water quality pond would be closed and divert water to the emergency spill pond.

The emergency spill pond would, during normal operations need to be pumped out of rainwater to keep it dry. The same pump system could be used to pump low quality water either to sewer under a trade waste agreement if it could be demonstrated the water would meet trade waste criteria (i.e. after testing) or if very poor quality, would need to be transported off site to a lawful facility.

Trade waste agreements have strict criteria. For example, the wastewater must not contain more than 5 ppm of oil and grease. Salinity and chemical criteria also apply and would need to be established and agreed with the Water Authority during detailed design. If a trade waste agreement can't be obtained the emergency spill water would need to be tankered off-site and disposed of in a lawful facility.

It is not anticipated that this pond will be a normal part of the operating regime on the site. It is expected that it will operate only during an emergency (fire or spill) or following runoff of unusually dirty stormwater from the high-risk area.

It is proposed to link the logic controller with a modem which would send an SMS to the site manager to alert him to the fact that either an emergency has occurred, or very dirty stormwater is running off and needs immediate investigation. Careful programming of the normal operating range of parameters is critical to ensure that the scheme only operates in a genuine emergency. A similar approach has been employed on a large stormwater harvesting

scheme in western Sydney, to warn operators of poor water quality or a spill in the catchment and has worked well to date.

7.6.13 Stormwater Harvesting

It is proposed to draw approximately 48,162 kL/year from the pond. This water would be used to keep product storage bay areas containing product at optimum moisture content. In addition to irrigating products and traffic areas for dust suppression, drawing water from the pond to irrigate landscaped areas would help to reduce the mean annual volume of runoff from the site considerably.

Drawing 48,162 kL/year would allow for:

- Irrigation to a depth of 900mm of 5.1 hectares of the site;
- As well as irrigation of 1,040 m2 of M. Biconvexa buffer area (to replace water lost from the catchment due to development) and irrigation of 2,230 m2 of landscaped areas including the site swales. Irrigation of swales and adjoining areas would ensure optimum grass growth and optimum water quality outcomes. Water to irrigate landscaped areas would also assist in maintaining high quality, drought resistant landscape features and reduce fire risk.

It will be necessary to optimise the reuse of harvested water so that it can be allocated preferentially to products and dust suppression when water levels get low.

Sustainability Workshop has worked with MAK Water to develop an appropriate treatment process to ensure the stormwater would be fit for purpose and safe for use. It would need to be disinfected prior to irrigation. Because of the tannins likely to be present UV alone is not a disinfection option though both UV and chlorination are proposed.

Ultrafiltration is proposed together with UV and chlorination to ensure that guidelines (AGWR and MUS Harvesting and Reuse guidelines) identified in Section 4 are complied with.

The treatment plant would come on a skid mounted 20 ft container and need to be connected to electricity. The feed pump should include a self-cleansing intake.

The UF-B-80 system is capable of treating up to 80 m^3/day and so would be scaled to meet peak site day demand which would occur in summer and be around 240 m^3/day. Three units would need to be installed to meet this peak demand.

In addition to the treatment plant it would be necessary to store treated water for 2 days which would need to be about 480 m^3. Because the chlorination will have a residual effect it will be safe to store the water in the tanks for shorter periods. If not used, nominally within a week, the water would need to be released back into the pond (subject to design).

Hypochlorite would need to be replenished and stored on site in a refillable, bunded container. Some WHS equipment would be required adjacent to the store – such as an emergency shower. This may require a potable water supply to the treatment plant location. The potable supply would be required anyway to make up any deficit in supply needed during very dry times when the pond was empty.

A trade waste agreement with Council would need to be entered to accept the filter backwash.

During detailed design the exact plant requirements would need to be established.

An irrigation controller and moisture probes will be needed to help schedule irrigation mainly to ensure that over irrigation does not occur.

A local rainfall gauge would need to be connected to the irrigation controller to ensure that irrigation does not occur when it is raining.

7.6.13.1 Stormwater Treatment Performance

The final design of the stormwater treatment system will be undertaken to ensure the system meets all regulatory requirements including those identified earlier in this report.

All water produced by the treatment system, which includes the rainwater tanks, swales, GPTs, pond, storage tanks, ultrafiltration plant, and disinfection system, will be fit for purpose as required by legislation. It will be safe for workers and the public and its quality will exceed the requirements for survival and good health of the *Biconvexa* community, i.e. low in nutrients, low hardness, low metals, practically no TSS.

The proposed stormwater treatment plant is an ultrafiltration plant capable of filtering down to 80 nanometres. A combination of ultrafiltration together with Chlorination and UV disinfection will ensure that the plant will meet all the required human health performance criteria. As a result, the plant operator can have confidence that all WHS obligations would be met.

7.6.14 Level Spreader

It is proposed to construct a level spreader at the outlet from the pond.

A typical detail showing a level spreader is provided below. The width of the spreader should be 50m and the height of the spreader should be 300mm. On the upstream side of the spreader a gravel filled trench 1m wide and 50m long is to be included to facilitate as much infiltration as possible at that location.

7.6.15 On Site Stormwater Detention Basin

An on-site stormwater detention basin is proposed to be co-located above the water quality pond for the purpose of detaining peak flows.

The configuration of the basins should be as follows:

1) Provide storage of 2,500 m^3 between RL 201.5m and RL203m. A weir height of 300mm and weir width of 10m is recommended for extreme events beyond the 1 in 100 year event.

2) The invert level of subsoil drains discharging into the basin shall be no lower than RL203m. Based on a preliminary pavement design of 450mm plus an allowance of 150mm for subsoil drainage, this places the lowest pavement surface levels at approximately RL203.6m. This will ensure backflow into the subsoil drains does not occur – if it did it would prevent drainage of the pavement and result in substantial pollution generation.

3) Three orifice outlets from the basin corresponding to:

   a. Low flow outlet at RL 201.5 which was modelled as a 375mm diameter pipe.

   b. Second outlet at RL 202 which was modelled as a 525mm diameter pipe.

   c. Third outlet at RL 202.18 which was modelled as a 525mm diameter pipe.

7.6.16 Risk and Operation and Maintenance Plans

It is critical that a detailed operation and maintenance plan for the stormwater and recycling system is prepared and adopted. In addition to that, in accordance with Australian Recycled Water Guidelines, a risk management plan for the stormwater harvesting and reuse scheme, which includes every aspect of the stormwater treatment train on site

should also be prepared together with staff so that risk management (WHS management) becomes a shared responsibility.

The treatment plant will need to go through a proving period which will require monitoring of both influent and effluent to ensure that it is performing to specification and that the risk of using the water is as expected.

In addition, it is proposed to monitor the site discharge water for a range of parameters including any licenced parameters during the commissioning of the site and all of its water quality management systems.

It is noted it will take the site probably over 1 year to settle down and for water quality to be optimised. For example, it will take time for the bioretention swale to grow sufficient cover and for roots to penetrate to a good depth.

Monitoring of site discharge water quality should be undertaken through a water quality validation programme whenever there is a discharge from the site.

The monitoring results should be discussed with the site operator, the system designer and the site environmental officer. If the system is not performing in accordance with the modelling adaptive management measures will need to be taken. These usually take the form of prevent, source control and then end of line control. Preventative measures might be a change in operations so that for example clay based soils are always stored behind sandy soils to prevent clay based runoff.

An example of source control would be use of media filled filter sausage placed across the waste storage bin to filter out pollutants close to their source.

It is recommended that training of staff takes place once the works are commissioned. Staff will need to maintain and clean out the GPTs (minimal training required), clean out swales, nominally every 5 years or if they lose capacity then sooner, the pond will need its sludge removed and the floating wetlands will need some replanting and renewal over time.

The level spreader will need checking to ensure erosion is not occurring downstream. Culverts will need to be checked after every storm event to ensure they are not blocked.

Rainwater tanks will need first flush systems maintained and UV disinfection lamps will need replacing. Hypochlorite will need to be stored on site and will need to be topped up from time to time. Safety showers and eye wash equipment around the hypochlorite self-bunded storage vessel will need to be maintained.

The membrane filtration plant will also need to be operated and maintained and from time to time this will include replacement of membranes. If the operator wishes to extend the replacement time of membranes, then the stormwater management system will need to be maintained to a high standard. Conversely if the stormwater system is not maintained then the membranes will need to be replaced more frequently.

Establishment of good quality vegetation in the wetlands and over the swales and landscaping areas is critical to achieve expected stormwater performance. Providing staff with nominally a one day training course to explain how the system works and what needs to be done is critical. Substantial savings in avoided rectification will be made from this training investment.

7.7 Predicted results

7.7.1 Water Quality

Research on stormwater quality (Liebman & Jonasson, 2009) has shown that use of total suspended solids, total nitrogen and total phosphorus as surrogate pollutant indicators is an acceptable approach to environmental assessment (mainly due to the fact that 80% of heavy metals are typically bound to sediment) and that if these three pollutant indicators are treated to best practice then it is probable that any heavy metals would also be reduced to concentrations achieving the highest level of protection for water quality (99th percentile level of protection). The MUSIC model models the generation and decay of these three pollutant indicators from source generation through the treatment train. This is a robust approach to water quality management and one which has become a standard approach in Australia.

A MUSIC water balance and quality model for the site was constructed to assess the potential impacts of the proposed 6-hectare development and to help design appropriate mitigation measures. The model also enables the proponent to demonstrate if it complies with Council's best practice DCP water quality targets, NorBE and any likely licence limits.

MUSIC water quality model results clearly show the site will exceed its best practice target and deliver water quality that is better than what is currently discharged from the site. The predicted outputs are presented in Table 7.1.

Table 7.1. Results of MUSIC water quality model.

	Treatment-train Effectiveness (% Reduction of Pollutants)				% Reduction	
	(1) Pre-European (forested land use)	(2) Pre-development or existing loads	(3) Post Development without treatment in place	(4) Post-development (with proposed treatment system)	Reduction from column (3) to column (4)	Target %
Frequency of discharge into bushland	5	80	80	8	90	
Flow (ML/yr)	9.76	31.6	45.2	13.4	70.4	
Total Suspended Solids (kg/yr)	950	3840	7540	567	92.1	80
Total Phosphorus (kg/yr)	1.19	6.57	12.9	1.94	84.2	45
Total Nitrogen (kg/yr)	16.9	55.5	96.3	21.3	77.9	45

This development is predicted to exceed its best practice water quality targets, to achieve a substantial water quality beneficial effect and to closely match runoff flow frequencies with that of a forested land-use. Volumes of runoff and runoff frequency are reduced back to pre-European levels reducing potential impacts and protecting the bushland from any damages at the point of discharge.

We note the water quality pond volume together with the reuse system has been sized to mimic predevelopment flow frequencies to limit geomorphic impacts on the receiving bushland. Together with the detention basin and 50m wide level spreader, impacts are predicted to be minor and acceptable.

This enables us to conclude that the proposed development and mitigation measures will reduce the impacts to benign levels and allow the ecosystem and bushland to recover between minor and rare impacts, this is a sustainable outcome that will not compromise the reproductive/regenerative capacity of the local environment.

Assessing concentration at the 99th percentile it is likely that the proposal will be able to meet typical licence limits for waste management facilities.

In conclusion the development will address both chronic and acute water quality risks through a best practice state of the art water cycle management system. The development will attenuate peak flows for the whole range of events – from 1 year to 100 year.

Based on the best practice system proposed it is highly probable that the development would not cause environmental harm or pollution either in terms of total loads or absolute concentrations or in terms of alterations to flow regimes.

It is recommended the development be approved subject to the proposed mitigation measures being implemented and to conduct on-going monitoring, maintenance and management of the proposed system. A licence is likely to be required for TSS and may, subject to the EPA, be required for TP and TN.

7.1 Conclusions

The main water issues associated with the site are the potential for stormwater contamination from on-site operations and water use for dust suppression. The on-site storm water and erosion control measures will ensure that all storm water is captured and treated on-site. The discharge point for the proposed development is located 400m away from a waterway. The largest potential impacts are the impacts on the health and stability of the bushland downstream of the proposed discharge point rather than off the site.

The site will comply with the requirements of the Blue Book during construction and this will ensure that construction phase sediment impacts are minimised.

During the operational phase, erosion on site will be limited by the use of concrete pavements, asphalt and hardstands, as well as vegetation in non-operational areas. Any sediment carried in the storm water will be captured in grassed swales and gross pollutant traps, then in sediment inlet ponds, followed by storage in an OSD basin. Sediment is to be removed regularly.

To minimise the risk of stormwater contamination, the site has been divided into four stormwater capture zones. The stormwater from each zone is treated to a level appropriate to the risk of the activities within the zone, prior to be discharged into the on-site detention basin. Stormwater from the high-risk area of waste receival can be isolated, if necessary, to allow testing and, if necessary, removal from site for treatment.

The on-site detention storage is proposed as part of the storage pond in the south-western corner of the site as shown on the Stormwater Management Plan included in Appendix E: Site, civil design and stormwater plans. The OSD basin will have a storage capacity of 5ML, with a headspace of up to 1.5m to allow for capture of firefighting water, if required. The pond is to be an open water body with steep sides and an access for maintenance. Inclusion of floating treatment wetlands in the pond will further attenuate pollutants in a biological process to see metals, suspended solids and nutrients removed. Overflow from the OSD basin is discharged from the site onto adjoining bushland located on the lower 4ha of the lot via a 50m wide level spreader, which will minimise erosion at the point of discharge. Volumes of runoff and runoff frequency are reduced back to near pre-European levels reducing potential impacts and protecting the bushland from any damages at the point of discharge.

Most of the stormwater captured in the OSD basin will be treated in a membrane filtration plant and re-used for dust suppression on the stockpiles. Water captured in rainwater tanks will be used in dust misting systems, and for irrigating vegetation during extended dry periods. MUSIC water quality model results clearly show the site will exceed its best practice target and deliver water quality that is better than what is currently discharged from the site.

The high-risk part of the site is that part that contains the waste storage area and the timber processing area. This is the part of the site which affords the best opportunity to intervene to limit unusually high pollutant loads. If a potential water quality problem is going to occur on the site it is most likely to occur in this area as it stores unprocessed materials that may escape the rigorous tip and spread screening and rejection process. In the high-risk area continuous 24/7 real time water quality and flow monitoring will occur. In addition to the 5 ML water quality pond, an emergency spill pond of 500 m^3 volume will be provided. This will enable up to 60 mm of runoff to be contained in the spill pond from the high-risk catchment. Emergency spill prevention controls would include watertight penstocks which would prevent stormwater containing any spilled material from leaving the site.

A Baseline Groundwater Investigation found that the groundwater was generally fresh (low salinity levels and moderately to highly acidic, which is considered to be consistent with local background groundwater conditions, and that there were no signs of obvious contamination. Groundwater will be protected through the operational areas being either sealed hardstand or through the use of a waterproof membrane layer under areas covered in compacted crushed concrete. A groundwater monitoring and management plan will be implemented once the site is operational.

The site is connected to the town sewerage system. Wastewater from the water recycling treatment unit will be discharged to sewer as trade waste. A covered vehicle wash bay will use a coalescing plate separator to firstly treat dirty water (separating oils and grease) and then to discharge this water to trade waste.

The Stormwater Management Plan is provided in the set of Civil Plans at Appendix E. The Water Cycle Impact Assessment and Soil and Water Management Plan Report is provided at Appendix I. The Baseline Groundwater Investigation report is provided at Appendix K.

Figure 7.2. Stormwater capture, drainage and management plan (See Appendix E for a high-resolution version).

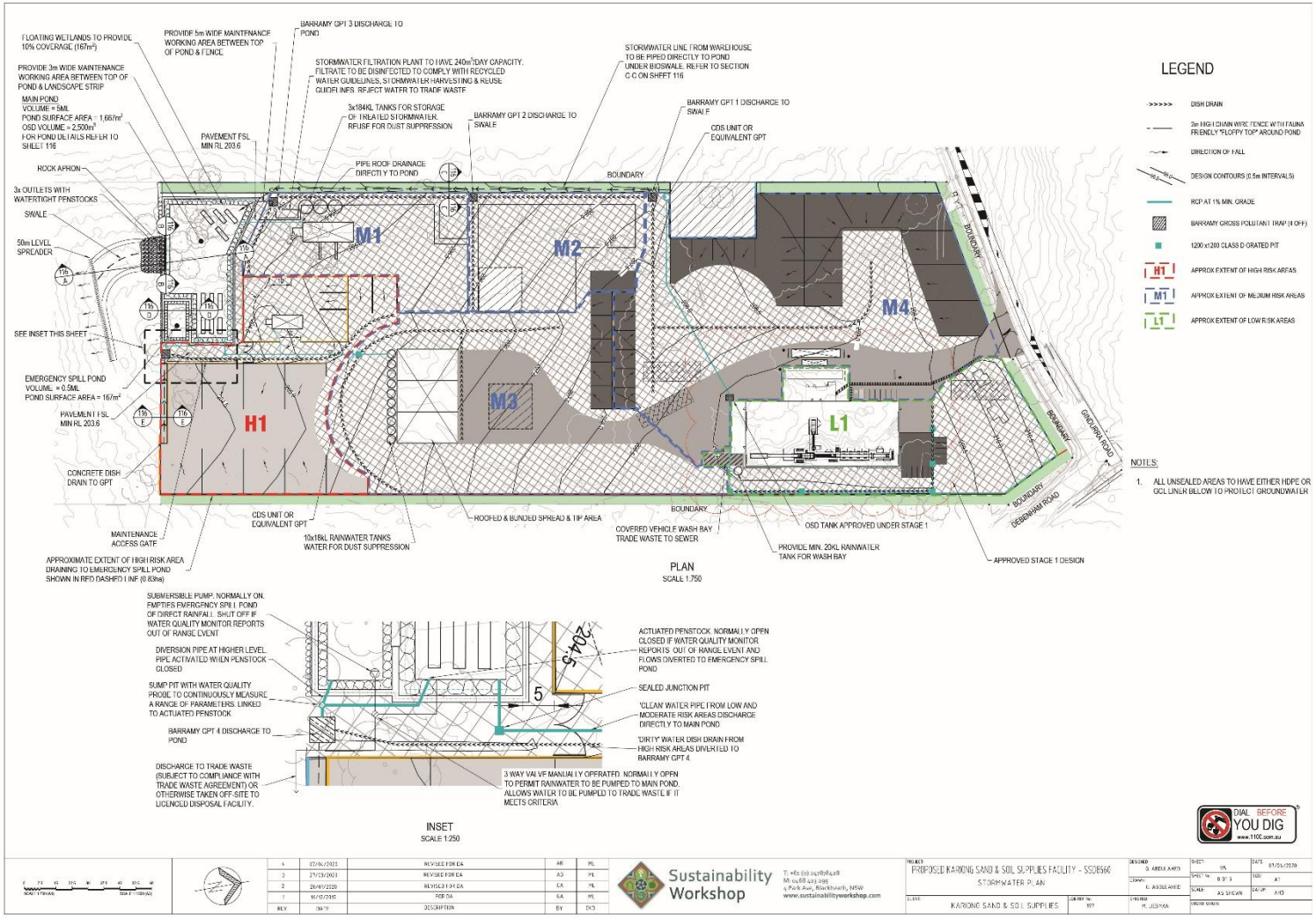
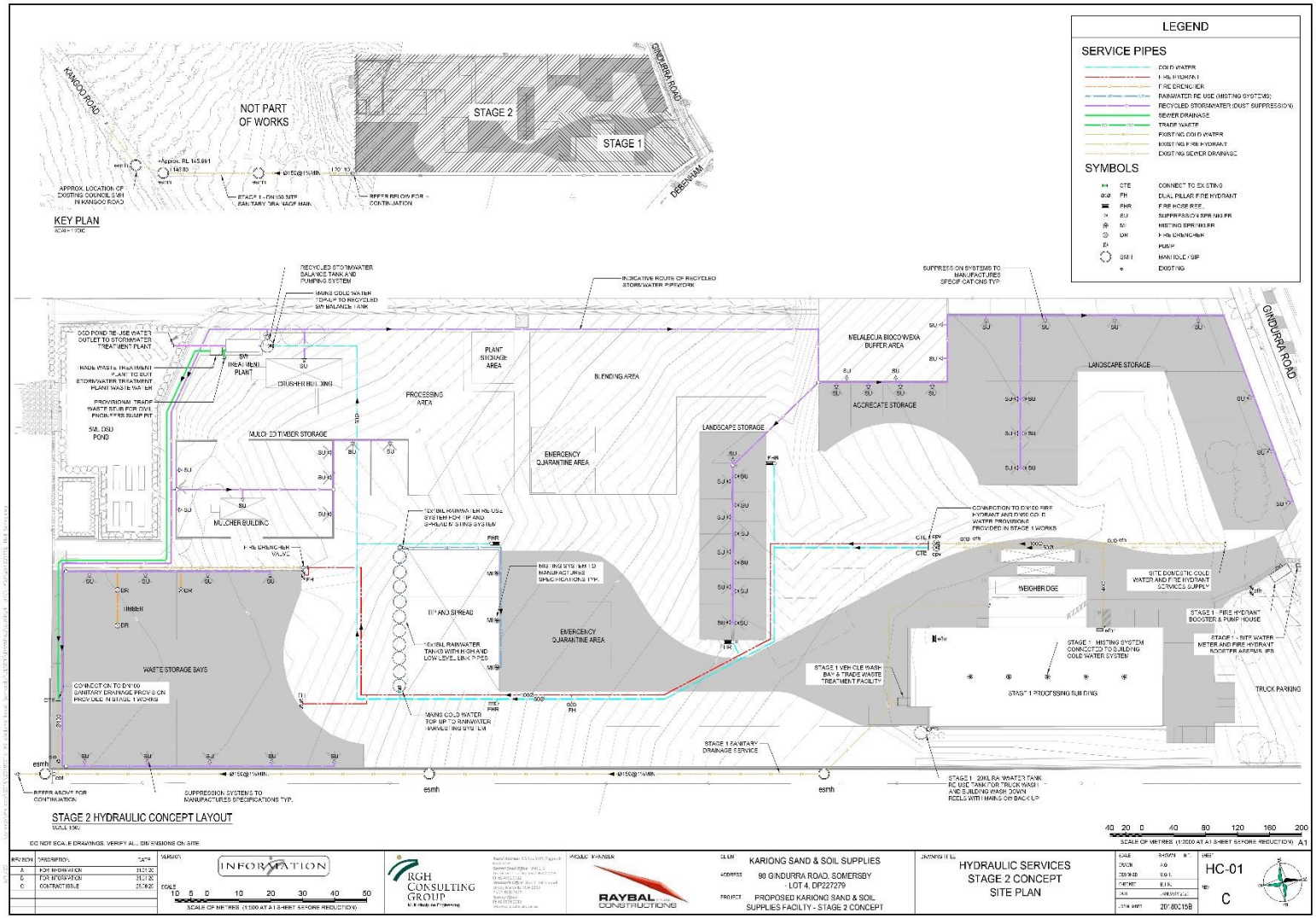


Figure 7.3. Concept hydraulic services diagram for the site (see Appendix E(iii) for a high-resolution version).



8 Soils and Contamination Impact Assessment

8.1 Introduction

Clearsafe Environmental Solutions Pty Ltd (Clearsafe) was engaged by Kariong Soil and Sand Supplies to undertake a Stage 1 Preliminary Site Investigation with limited sampling of a nominated portion of the property located at 90 Gindurra Rd, Somersby NSW 2250 (hereafter referred to as 'The Site'). The purpose of the Stage 1 Preliminary Site Investigation was to assess the nature / extent of soil contamination, if any, and identify areas of environmental concern (AEC).

8.2 Legislative requirements

A contamination assessment is required to satisfy the State Environmental Planning Policy No. 55 - Remediation of Land (SEPP 55).

The object of SEPP 55 is to provide for a State wide planning approach to the remediation of contaminated land.

In particular, the SEPP aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment:

(a) by specifying when consent is required, and when it is not required, for a remediation work, and

(b) by specifying certain considerations that are relevant in rezoning land and in determining development applications in general and development applications for consent to carry out a remediation work in particular, and

(c) by requiring that a remediation work meet certain standards and notification requirements.

The purpose of the contamination assessment is to determine whether contamination or other areas of concern (such as acid sulfate soils) exist at the site. SEPP 55 determines that consent for any remediation work is required, and that any remediation work meets appropriate standards.

8.3 Baseline conditions

8.3.1 Geology and hydrology

The site is classified as being located within the Middle Triassic Age - Hawkesbury sandstone, medium to very coarse-grained quartz sandstone, minor laminated mudstone and siltstone lenses.

Soil Landscapes of the Gosford 1:100 000 Sheet Survey (1000133), Profile 257, collected from an auger by Mr Casey Murphy on November 29, 1988, provide the following information:

- Physiography: woodland shrub understory on sandstone-quartz lithology and used for timber/scrub/unused. Slope 2.0% (measured), elevation 200.0 m, aspect south west. Surface condition is loose, profile is well drained, erosion hazard is slight, and no salting evident;
- Vegetation Use: limited clearing at the site, used for timber/scrub/unused, with improved pasture in the general area;
- Surface Conditions: loose when described, ground cover is 100%;
- Erosion/ Land Degradation: slight; wind erosion at site is none; no salting evident;
- Soil Hydrology: profile is well drained, run on is low and runoff is moderate; and
- Soil Type: Earthy Sand (GSG), Uc4.21 (PPF).

A review of the Acid Sulfate Soil Risk Map - Edition Two supplied by the Department of Land and Water Conservation indicates that the site lies in an area with no known occurrence of acid sulfate soil materials.

8.3.2 Site Condition and Surrounding Environment

The site was inspected on the 10 February 2018. At the time of inspection, the site was not operational. During the site inspection the following observations were made:

- The ground surface of the site is predominately grass cover;
- A roadway passes through a majority of the northern section of the site. The roadway was observed to consist of recycled materials including crushed brick, concrete and gravel. Asbestos cement fragments were identified within the south eastern section of the roadway;
- There is developed vegetation (large trees and shrubs) present along the entire site in particular the southern section;
- No visible signs of plant stress were observed on site;
- The topography of the site slopes in a south-western direction, therefore it is predicted that drainage on site flows in the same direction;
- Possible former watercourse that appears to be a dried-up creek bed runs from the north to the south in the western central side of the site;
- Multiple structures including old caravans, storage sheds, outhouse toilet and a demountable were observed within the northern section of the site at the time of the inspection that are currently used for storage purposes. These structures were observed to potentially contain hazardous materials including but not limited to lead paint and asbestos;
- At the time of inspection obvious signs of chemical/oil spills were observed on ground surfaces within the largest shed located in the north eastern section of the site;
- An underground septic tank was identified adjacent the outhouse toilet in the north eastern section of site;
- Multiple industrial vehicles were observed within the north eastern section of site;
- Multiple stockpiles of anthropogenic material such as brick, steal, concrete slabs etc. were identified during the inspection in various locations across the site (refer appendix A of the Soils and Contamination Impact Assessment Report). The stockpiled materials are understood to be outside the scope of the current assessment;
- Fill material of unknown origin was observed generally across the site. The identified fill material generally consisted of brown silty sandy loam with gravel, coal wash, brick, concrete, timber, glass etc. This was underlain by natural yellow sand and yellow / red sandstone rock;
- Asbestos containing material (ACM) in the form of asbestos cement (AC) fragments were identified on the ground surfaces in the north eastern corner of the site adjacent the buildings as well as within the central section of site.

8.3.3 Site history review

Site history information has been compiled from the following sources:

- Search of EPA Contaminated Lands Register;
- Review of Historical Aerial Photographs;

- Review of Section 149 (2&5) Planning Certificates; and
- Review of Previous Environmental Reports.

No information relevant to the site was found in a search of the EPA Contaminated Lands registers conducted on 19 February 2018.

The Section 149(2) certificate for the site indicates that Council has not been advised that the land is contaminated, and is not subject to a management, maintenance or audit order.

8.3.4 Sampling

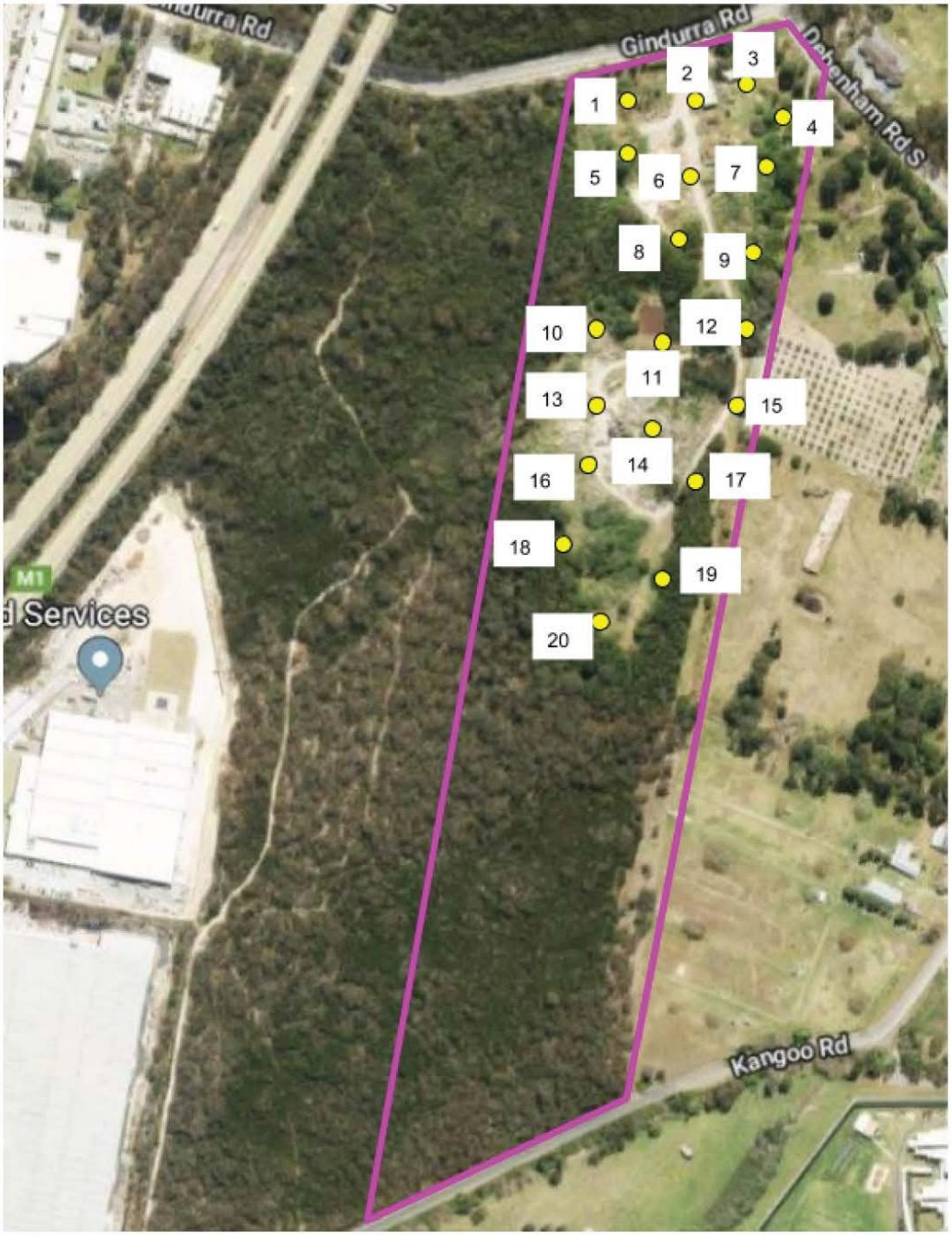
A total of twenty (20) Test Pits were excavated across the site as part of the current assessment. The sampling locations were selected primarily on the basis of a judgmental sampling pattern with sampling concentrated around potential areas of environmental concern. The final test pit locations are presented in the Site Diagram in Appendix A of the Soil Contamination Assessment in Appendix L of this report, with sampling locations labelled TP1 to TP20.

A total of thirty five (35) primary soil samples were forwarded for laboratory analysis for various combinations of the following analytes:

- Total petroleum hydrocarbons (TPH);
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Select heavy metals (As, Cd, Cr, Cu, Pb, Zn, Hg, Ni);
- Organochlorine / organophosphate pesticides (OCP/OPP);
- Polychlorinated biphenyls (PCBs); and
- Asbestos.

Samples were also collected for laboratory analysis for asbestos during the inspection with a total of thirty eight (38) samples collected.

Figure 8.1. Location of sample test pits. Source: Clearsafe Soil Contamination Assessment (Appendix L).



KEY	SITE LOCATION
Site boundary Test pit location	90 Gindurra Road Somersby, NSW 2250

Groundwater was not encountered during the site assessment. Sampling of groundwater was not undertaken as it is outside the scope of the current assessment.

The results for the soil samples collected from test pits are summarised below:

- Heavy Metals: Results of analysis were all below adopted criteria excluding 20-8613/TP3 - 0.5m, which reported a zinc concentration of 575 mg/kg which slightly exceeded the adopted ecological investigation levels;
- TPH/BTEX: Results of analysis were all below adopted criteria;
- PAH: Results of analysis were all below adopted criteria;
- PCBs: Results of analysis were all below adopted criteria;
- OCP & OPP: Results of analysis were all below adopted criteria;
- Asbestos: Multiple fragments of fibrous cement (AC) sheeting were visually observed within the north eastern corner and central section of the site. Three (3) representative samples were collected and two of them reported results of Asbestos Detected. Asbestos was not detected in the remaining soil samples collected as part of the assessment (refer to Clearsafe Reports 20-8613-01-ID & 20-8613-01-ID). Based on site observations and laboratory analysis results the identified asbestos is considered non-friable.

8.4 Proposed development

The development of the site will involve considerable earthworks at the site. Although the site is relatively level, creating the correct contours for stormwater flow and the construction of hardstand areas will involve substantial cutting and filling. As far as possible, existing soil and stockpiled concrete at the site will be re-used as fill. Additional soil will be brought on-site as required, as per the civil works plan. Any material brought onto the site will be clean fill.

The activities at the site during the operation phase include crushing and screening of inert building materials, such as concrete, brick and tiles. Some green waste and timber will also be shredded at the site and sold as mulch.

Strict waste receiving protocols will control the quality of the incoming materials, and minimise the risk of hazardous materials, such as asbestos, being received and processed at the site. A risk assessment is provided in Chapter 3. A protocol for dealing with non-conforming waste is provided in Appendix H: Waste Management Plan.

8.5 Impact assessment

The information obtained from the review of available site history materials and site inspection and sampling identified three (3) Areas of Environmental Concern (AEC) including:

AEC 1 – Fill of unknown origin

Fill material of unknown origin was observed generally across the site. The identified fill material generally consisted of brown silty sandy loam with gravel, coal wash, brick, concrete, timber, glass etc. This was underlain by natural yellow / light brown sand and sandstone rock. Fill was evident across most of the site.

Although fill of unknown origin was present across the majority of the site soil samples were all within adopted assessment criteria and predominantly below detection limits for the majority of chemicals analysed. Sample 20-8613/TP3 - 0.5m which reported a Zinc concentration of 575 mg/kg, was slightly above adopted criteria for the Ecological Investigation Levels for an Industrial/ Commercial development. Results from three neighbouring test pits (<20m away) and all other other test pits from across the site were analysed to be below the adopted criteria. Test Pit 3 is located in an area proposed for development into a sealed car park therefore the slightly elevated zinc concentration above the adopted EILs is considered a negligible risk. The Zinc result for this sample appears to be an outlier and is considerably lower than Health Investigation Levels. Therefore, no significant risk of chemical contamination is expected across the site.

Multiple stockpiles / dumping areas were identified within the central area of the site as part of the current assessment. The assessment of stockpiled materials was outside the scope of the current assessment. The stockpiled materials will be part of a detailed waste classification assessment done separately. It is noted however that the sampling undertaken as part of the current assessment included sampling of soils immediately adjacent to and centrally within stockpiling areas to assess potential impacts from stockpiles on soils throughout the site.

AEC 2 – Asbestos Containing Materials

During the assessment, multiple fragments of non-friable asbestos cement (AC) were identified on the ground surfaces within the north eastern corner of the site adjacent to onsite structures and also within the central section of the site (refer to Figure 4). The identified asbestos containing material (ACM) in the central section of the site was significantly more concentrated with several fragments of AC identified. The identified fragments in the central area of the site also included fragments in a section of the access road which consisted primarily of crushed recycled materials such as concrete, brick etc. Three representative samples of suspected asbestos cement materials were collected for laboratory analysis. Two of the samples reported as Asbestos Detected (refer to Clearsafe Report 20-8613-01-ID in Appendix L).

Asbestos was not observed at depth in any of the test pits and all soils samples across the site reported No Asbestos detected (refer to Clearsafe Reports 20-8613-02-ID in Appendix L). Based on site observations and laboratory analysis results the identified asbestos is considered non-friable. The identified asbestos containing materials appear to be limited to ground surfaces and near surface soils.

AEC 3 – Hazardous building materials within and immediately surrounding buildings and structures

During the site inspection, the onsite buildings and structures were suspected of potentially containing hazardous building materials including but not limited to asbestos containing materials (ACM) and lead paint in their construction. Prior to any proposed demolition of onsite structures, a hazardous materials survey should be undertaken.

8.6 Mitigation measures

The site is considered suitable for the proposed development subject to the following recommendations:

1. An appropriate Asbestos Management Plan should be implemented prior to any development to manage the identified non-friable ACM associated with AEC 2 (see section 8.5 above);
2. The Asbestos Management Plan should include detailed inspection and remediation prior to any future development;
3. Asbestos removal should be undertaken in accordance with an Asbestos Removal Scope of Works / Remedial Action Plan prepared by a Licensed Asbestos Assessor or Competent Person;
4. Asbestos removal works should be undertaken by a licensed asbestos removal contractor;
5. Subsequent to licensed asbestos removal work, a Clearance Certificate must be issued by a Licensed Asbestos Assessor or Competent Person prior to reoccupation;
6. Construction works should include an Unexpected Finds Protocol (UFP) to provide recommended actions for the identification of any further ACM on the ground surfaces or within excavations;
7. The Site must be managed such that the ground surfaces are at all times free of visible ACM. Any identified ACM must be managed in accordance with the UFP; and

8. Prior to demolition, the onsite buildings and structures should be assessed for hazardous materials including but not limited to asbestos and lead paint. All asbestos containing materials within the buildings and structures at the site must be removed prior to demolition in accordance with Safe Work Australia Codes of Practice.

8.7 Conclusions

A site investigation was conducted that included a review of site history, site inspection and soil sampling.

The information obtained from the review of available site history materials and site inspection identified three (3) potential Areas of Environmental Concern (AEC):

4. AEC 1 - Fill Materials of Unknown Origin - Fill materials and natural soils within the site were tested for a range of potential contaminants of concern. The samples tested reported results below the adopted criteria for the proposed development excluding 20-8613/TP3 - 0.5m, which reported a zinc concentration of 575 mg/kg which slightly exceeded the adopted ecological investigation levels. Results from three neighbouring test pits (<20m away) and all other test pits from across the site were analysed to be below the adopted criteria. The Zinc result for this sample appears to be an outlier and is considerably lower than Health Investigation Levels. Therefore, no significant risk of chemical contamination is expected across the site.

5. AEC 2 - Asbestos Containing Material - During the sampling, multiple fragments of non-friable asbestos cement (AC) were identified on ground surfaces within the north-eastern section of the site adjacent the buildings as well as in the central section of site.

6. AEC 3 - Hazardous Building Materials - Due to the age of the onsite buildings and structures, it is likely that hazardous building materials including but not limited to asbestos containing materials and lead paint may be present within these structures.

Based on the scope and limitations of the investigation, in consideration of the site observations and sample analytical results, it is considered that the site is unlikely to pose a significant contamination risk with regards to chemical contamination, however ACM was identified on ground surfaces within the north-eastern and central sections of site. A series of recommended mitigation measures will be implemented to reduce the risk at the site.

A full copy of the Contaminated Site Assessment is provided at Appendix L.

9 Air quality

9.1 Introduction

Northstar Air Quality Pty Ltd (Northstar) were engaged to perform an air quality impact assessment (AQIA) for the proposed development of the Kariong Sand and Soil Supplies site (the project) located at 90 Gindurra Road, Somersby NSW (the project site).

This AQIA forms part of the Environmental Impact Statement (EIS) prepared to accompany the development application for the project under Part 4 of the *Environmental Planning and Assessment Act* 1979. The project will be assessed as a State Significant Development under Section 89(c) of the *Environmental Planning and Assessment Act* 1979 and Schedule 1 of the S*tate Environmental Planning Policy (State and Regional Development)* 2011.

The AQIA presents an assessment of the impacts of the proposed operations at the project site, associated with both the construction phase and operational phase of the development. Regarding potential construction impacts, this has been assessed using a risk-based assessment methodology, and appropriate construction control measures proposed to manage that risk. Regarding potential operational impacts, the assessment has used a quantitative dispersion modelling assessment, and the predicted incremental change in air quality in the area surrounding the project site is presented in addition to an assessment of compliance with relevant air quality criteria associated with cumulative impacts.

As a result of comments received during the EIS exhibition period, the AQIA was updated to include additional modelling. This chapter presents a summary of the updated AQIA. The full updated AQIA is given in Appendix M of the EIS.

9.2 Legislative requirements

Secretary's Environmental Assessment Requirements (SEARs 8660) have been provided for the project by the NSW Department of Planning and Environment (DPE). In relation to air quality and odour, the SEARs state that the EIS must provide:

- A quantitative assessment of the potential air quality, dust and odour impacts of the development in accordance with relevant Environmental Protection Authority guidelines;
- the details of buildings and air handling systems and strong justification for any material handling, processing or stockpiling external to a building; and,
- Details of proposed mitigation, management and monitoring measures.

Further to the above, NSW EPA has also provided a general list of requirements, and those broad requirements have been adopted as part of this assessment.

These broad requirements are reproduced in Table 1 of Appendix M and have been given due consideration within the performance of this assessment. The section of the report where each general requirement has been addressed is provided in Table 1 of the AQIA (Appendix M).

Further to the above, the policies, guidelines and plans which have been referenced during the performance of the AQIA are discussed in the sections below.

9.2.1 Federal Air Quality Standards

9.2.1.1 National Environment Protection (Ambient Air Quality) Measure

The *National Environment Protection (Ambient Air Quality) Measure* (Ambient Air Quality NEPM) was promulgated in July 1998 and established ambient air quality standards for six key pollutants across Australia and provides a standard method for monitoring and reporting on air quality. Air quality standards and performance monitoring goals for the six key air pollutants include:

- Carbon monoxide (CO);
- Lead (Pb);
- Nitrogen dioxide (NO_2);
- Particles (particulate matter with an aerodynamic equivalent diameter of 10 microns (µm) or less (PM_{10});
- Photochemical oxidants, as ozone (O_3); and,
- Sulphur dioxide (SO_2).

The Ambient Air Quality NEPM was varied in July 2003 to include advisory reporting standards for fine particulate matter with an aerodynamic equivalent diameter of 2.5 microns (µm) or less ($PM_{2.5}$) and in February 2016 (NEPC, 2016), introducing varied standards for PM_{10} and $PM_{2.5}$. The air quality standards and goals as set out in the (revised) Ambient Air Quality NEPM for the pollutants considered within this assessment are presented in Table 9.1**.**

Table 9.1. National Environment Protection (Ambient Air Quality) Measure standards and goals.

Pollutant	Averaging period	Criterion	Allowable exceedances per year
Particulates (as PM_{10})	1 day	50 µg·m^{-3}	None
	1 year	25 µg·m^{-3}	None
Particulates (as $PM_{2.5}$)	1 day	25 µg·m^{-3}	None
	1 year	8 µg·m^{-3}	None

9.2.1.2 National Clean Air Agreement

The National Clean Air Agreement (NCAA) was agreed by Australia's Environment Ministers on 15 December 2015. The NCAA establishes a framework and work plans for the development and implementation of various policies aimed at improving air quality across Australia.

Regarding air quality standards with relevance to this report, the Initial Work Plan sets an objective to vary the Ambient Air Quality NEPM regarding PM_{10} and $PM_{2.5}$ standards.
Of relevance to the standards adopted as the relevant benchmarks for the performance of the project, the previous standards were augmented by an annual average PM_{10} concentration standard of 25 µg·m^{-3}, and the advisory reporting standards for $PM_{2.5}$ considered as standards. It is further likely that the 24-hour average PM_{10} concentration standard will be made more stringent from the current value of 50 µg·m^{-3} in time, although it is currently not possible to determine the revised standard for that metric.

9.2.2 NSW Air Quality Standards – Particulates

State air quality guidelines adopted by the NSW EPA are published in the *'Approved Methods for the Modelling and Assessment of Air Quality in NSW'* (the Approved Methods (NSW EPA, 2017)) which has been consulted during the preparation of this assessment report.

The Approved Methods lists the statutory methods that are to be used to model and assess emissions of criteria air pollutants from stationary sources in NSW. Section 7.1 of the Approved Methods clearly outlines the impact

assessment criteria for the project. The criteria listed in the Approved Methods are derived from a range of sources (including NHMRC, NEPC, DoE and WHO).

The criteria specified in the Approved Methods are the defining ambient air quality criteria for NSW. The standards adopted to protect members of the community from health impacts in NSW are presented in Table 9.2.

Table 9.2. NSW EPA air quality standards and goals.

Pollutant	Averaging period	Criterion		Notes
		µg/m³ (a)		
Particulates (as PM_{10})	24 hours	50		Numerically equivalent to the AAQ NEPM(b) standards and goals.
	1 year	25		
Particulates (as $PM_{2.5}$)	24 hours	25		
	1 year	8		
Particulates (as TSP)	1 year	90		
		g/m²/month	g/m²/month	
Deposited dust	1 year	2(c)	4(d)	Assessed as insoluble solids as defined by AS 3580.10.1

Notes: (a): micrograms per cubic metre of air
(b): National Environment Protection (Ambient Air Quality) Measure
(c): Maximum increase in deposited dust level
(d): Maximum total deposited dust level

9.2.3 Other Air Quality Standards – Silica

Respirable crystalline silica (RCS) is the portion of airborne crystalline silica that can enter the lungs and potentially cause silicosis. It generally affects workers in occupations such as mining, glass manufacturing and foundry work after long-term exposure.

The NSW EPA do not provide air quality criteria for RCS, although the Victorian EPA (VIC EPA) do include a criterion for respirable crystalline silica (as $PM_{2.5}$) as 3 µg/m³ (annual average) in their State Environmental Planning Policy (SEPP) Protocol for Environmental Management: Mining and Extractive Industries (PEM) (EPA Victoria, 2007). This criterion has in turn been adopted from the California EPA Office for Environmental Health Hazard Assessment Reference Exposure Levels.

This criterion is referenced in this assessment and calculates RCS by adjusting annual average $PM_{2.5}$ modelling results pro-rata to account for the determined maximum free silica content of the extracted material (Safe Work Australia quote a silica content of 67%(w/w) for natural sandstone) (Safe Work Australia, 2019).

Based upon the above, the impact assessment criteria presented in Table 9.3 have been applied to this AQIA.

Table 9.3. Impact assessment criteria adopted in this AQIA.

Pollutant	Averaging period	Criterion
Particulates (as TSP)	1 year	90 µg/m^3
Particulates (as PM_{10})	24 hours	50 µg/m^3
	1 year	25 µg/m^3
Particulates (as $PM_{2.5}$)	24 hours	25 µg/m^3
	1 year	8 µg/m^3
Silica (as $PM_{2.5}$)	Annual	3 µg/m^3
Deposited dust	1 year (as monthly average)	2 g/m^2/month (a) 4 g/m^2/month (b)

Notes: (a): Maximum increase in deposited dust level (b): Maximum total deposited dust level

9.3 Baseline conditions

Chapter 4 of the AQIA by Northstar Air Quality Pty Ltd provides detailed discussion of baseline air quality and receptors surrounding the proposed development (see Appendix M: Air Quality Impact Assessment).

9.3.1 Surrounding Land Sensitivity

9.3.1.1 Discrete Receptor Locations

Air quality assessments typically use a desk-top mapping study to identify 'discrete receptor locations', which are intended to represent a selection of locations that may be susceptible to changes in air quality. In broad terms, the identification of sensitive receptors refers to places at which humans may be present for a period representative of the averaging period for the pollutant being assessed. Typically, these locations are identified as residential properties although other sensitive land uses may include schools, medical centres, places of employment, recreational areas or ecologically sensitive locations.

It is important to note that the selection of discrete receptor locations is not intended to represent a fully inclusive selection of all sensitive receptors across the study area. The location selected should be considered to be representative of its location, and may be reasonably assumed to be representative of the immediate environs. In some instances, several viable receptor locations may be identified in a small area, for example a school neighbouring a medical centre. In this instance, the receptor closest to the potential sources to be modelled would generally be selected and would be used to assess the risk to other sensitive land uses in the area. It is further noted that in addition to the identified 'discrete' receptor locations, the entire modelling area is gridded with 'uniform' receptor locations that are used to plot out the predicted impacts, and as such the accidental non-inclusion of a location sensitive to changes in air quality does not render the AQIA invalid, or otherwise incapable of assessing those potential risks.

To ensure that the selection of discrete receptors for the AQIA are reflective of the locations in which the population of the area surrounding the project site reside, population density data has been examined. Population density data based on the 2016 census have been obtained from the Australian Bureau of Statistics (ABS) for a 1 square kilometre (km^2) grid, covering mainland Australia (ABS, 2017). Using a Geographical Information System (GIS), the locations of sensitive receptor locations have been confirmed with reference to their population densities.

For clarity, the ABS use the following categories to analyse population density (persons·km^{-2}):

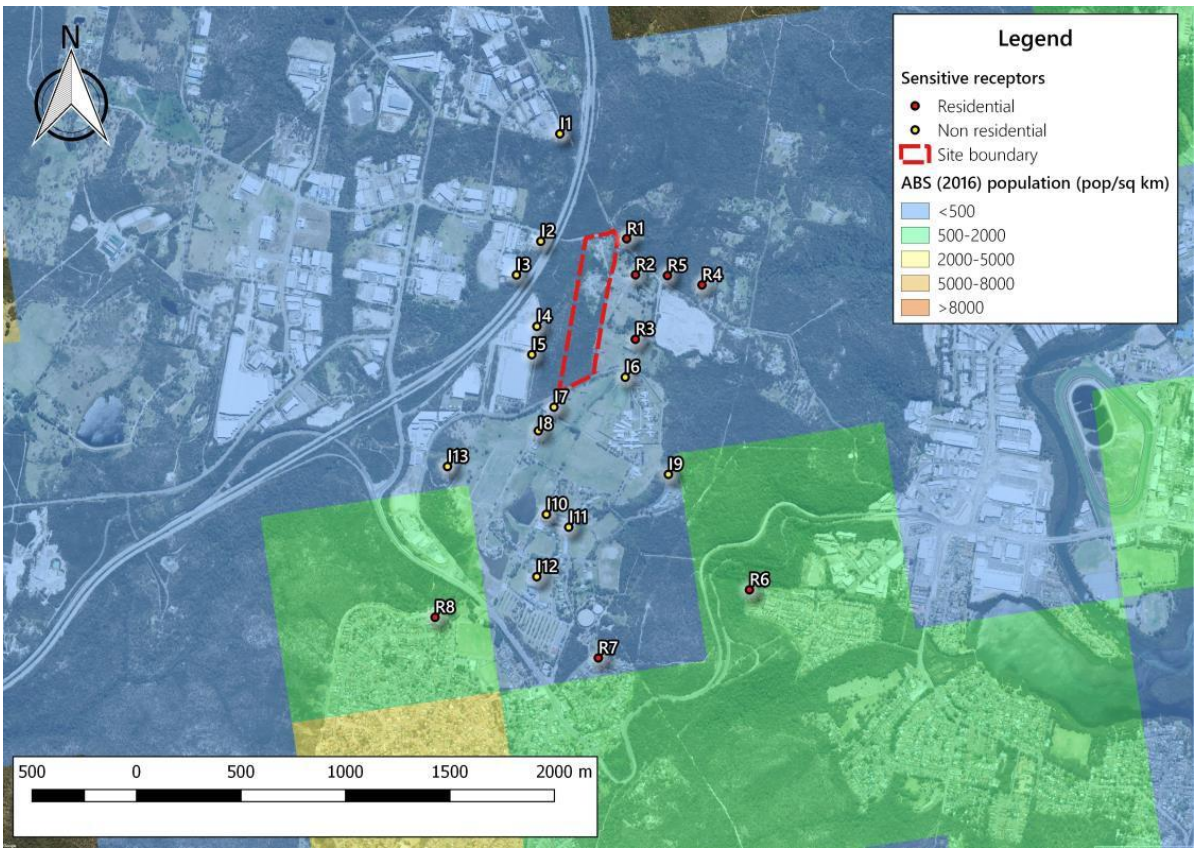
- Very high >8,000
- High >5,000
- Medium >2,000
- Low >500
- Very low <500
- No population 0

Using ABS data in a GIS, the population density of the area surrounding the project site are presented in Figure 9.1**.** The project site is located in an area of very low (<500 persons·km^{-2}), low (500 to 2000 persons·km-2) and medium (2000 to 5000 persons·km^{-2}).

A number of residential locations, industrial locations and educational receptor location have been identified and these receptors adopted for use within this AQIA are presented in Table 9.4**.** Figure 9.1 identifies that the receptors selected are located in directions which correspond to surrounding populated areas and are therefore appropriate.

The nearest identified schools to the project site are Parklands Community Preschool (I10) and Ngaruki Gulgul Central School (I13) which are located approximately 600 m from the project site boundary, and around 950 m from site activities. These sensitive receptor locations have been specifically included within the assessment.

Figure 9.1. Population density and sensitive receptors surrounding the project site.



Note: Areas with no colour represents a 1 km^2 grid cell with zero population.

Table 9.4 represents the discrete receptor locations that have been identified as part of this study (see Figure 9.1)**.**The table is not intended to represent a definitive list of sensitive land uses, but a cross section of available locations that are used to characterise larger areas, or selected as they represent more sensitive locations which may represent people who are more susceptible to changes in air pollution than the general population.

9.3.1.1 Uniform Receptor Locations

Additional to the sensitive receptors identified above, a grid of uniform receptor locations has been used in the AQIA to allow presentation of contour plots of predicted impacts.

Table 9.4. Discrete sensitive receptor locations used in the study.

Rec	Location	Location (m, Australian Map Grid, zone 56)		Land Use	Land Use Zoning
		Easting	Northing		
Residential receptor locations					
R1	242 Debenham Road South, Somersby	342,001	6,301,422	Residential	Rural Landscape
R2	10 Acacia Road, Somersby	342,046	6,301,251	Residential	Primary Production
R3	32 Acacia Road, Somersby	342,050	6,300,944	Residential	Primary Production
R4	198 Debenham Road South, Somersby	342,365	6,301,208	Residential	Rural Landscape
R5	252 Debenham Road South, Somersby	342,199	6,301,250	Residential	Rural Landscape
R6	10 Singleton Point Road, Clare	342,616	6,299,761	Residential	Low Density Residential
R7	26 Old Mount Penang Road, Kariong	341,898	6,299,425	Residential	Low Density Residential
R8	95 Mitchell Drive, Kariong	341,113	6,299,606	Residential	Low Density Residential
Non-residential receptor locations					
I1	244 Debenham Road North, Somersby	341,673	6,301,916	Industrial	Rural Landscape
I2	58 Gindurra Road, Somersby	341,590	6,301,403	Industrial	General Industrial
I3	44 Gindurra Road, Somersby	341,476	6,301,241	Industrial	General Industrial
I4	2 Wella Way, Somersby	341,578	6,300,998	Industrial	General Industrial
I5	33 Kangoo Road, Somersby	341,556	6,300,863	Industrial	General Industrial
I6	3 Central Coast Highway, Kariong	342,005	6,300,763	Correctional Centre	Infrastructure
I7	3 Central Coast Highway, Kariong	341,666	6,300,615	Education	Infrastructure

Rec	Location	Location (m, Australian Map Grid, zone 56)		Land Use	Land Use Zoning
		Easting	Northing		
I8	1A Central Coast Highway, Kariong	341,593	6,300,501	Education	Special Activities
I9	3 Central Coast Highway, Kariong	342,219	6,300,304	Correctional Centre	Infrastructure
I10	1A Central Coast Highway, Kariong	341,638	6,300,104	Education	Special Activities
I11	1A Central Coast Highway, Kariong	341,746	6,300,045	Education	Special Activities
I12	10 Festival Drive, Kariong	341,597	6,299,807	Education	Special Activities
I13	1A Central Coast Highway, Kariong	341,161	6,300,324	Education	Special Activities

9.3.2 Air Quality

The air quality experienced at any location will be a result of emissions generated by natural and anthropogenic sources on a variety of scales (local, regional and global). The relative contributions of sources at each of these scales to the air quality at a location will vary based on a wide number of factors including the type, location, proximity and strength of the emission source(s), prevailing meteorology, land uses and other factors affecting the emission, dispersion and fate of those pollutants.

When assessing the potential impact of any particular source of emissions on the air quality at a location, the impact of all other sources of an individual pollutant should also be assessed. This 'background' air quality will vary depending on the pollutants to be assessed, and can often be characterised by using representative air quality monitoring data.

A detailed description of the air quality environment surrounding the project site is presented in Appendix A of the AQIA provided at Appendix M of the EIS. A summary of the background air quality adopted for use within this AQIA is presented in Table 9.5.

Table 9.5. Background air quality data adopted for use within the AQIA.

Pollutant	Averaging Period	Maximum Concentration	Criterion from **Table 9.2**	Source
TSP	Annual	32.8 µg/m^3	90 µg/m^3	Estimated on a TSP:PM_{10} ratio of 2.2 : 1 1
PM_{10}	24 hours	58.6 µg/m^3	50 µg/m^3	Wyong AQMS 2015 [1,2]
	Annual	14.9 µg/m^3	25 µg/m^3	
PM2.5	24 hours	13.2 µg/m^3	25 µg/m^3	Wyong AQMS 2015 [1]
	Annual	5.2 µg/m^3	8 µg/m^3	
Silica	Annual	0.7 µg/m^3	3 µg/m^3	Somersby Sand AQIA (SLR, 2012)
Dust deposition	Annual	2 g/m^2/month	4 g/m^2/month	Difference in NSW OEH maximum allowable and incremental impact criterion

Notes: 1) Justification for the use of data from Wyong provided in Appendix A of the AQIA
2) Discussion of existing exceedance of criterion discussed in Appendix A of the AQIA

Table 9.5 indicates that concentrations of particulate matter (24-hour average PM_{10}) exceeded the relevant air quality criteria as detailed in Table 9.2 in 2015 (on 6 May 2015). The NSW Air NEPM Compliance Report for 2015 (NSW OEH, 2015) indicated that the exceedance on 6 May 2015 was an 'exceptional' event and was due to a dust storm which affected PM_{10} concentrations at the Wyong site and in a wider area, from Albury to Sydney and to Tamworth.

The AQIA has been performed to assess the contribution of the project to the air quality of the surrounding area. A full discussion of how the project impacts upon the air quality, including the contribution during such 'exceptional events' is presented in Chapter 6 of the AQIA at Appendix M.

9.3.3 Topography

The elevation of the project site is approximately 190 m to 210 m Australian Height Datum (AHD). No significant topographical features are present between the project site and the nearest sensitive receptor locations. The wider area does contain more significant features as shown in Figure 9.2**,** although these would not impact significantly upon the transport and dispersion of pollutants between the project site and receptors.

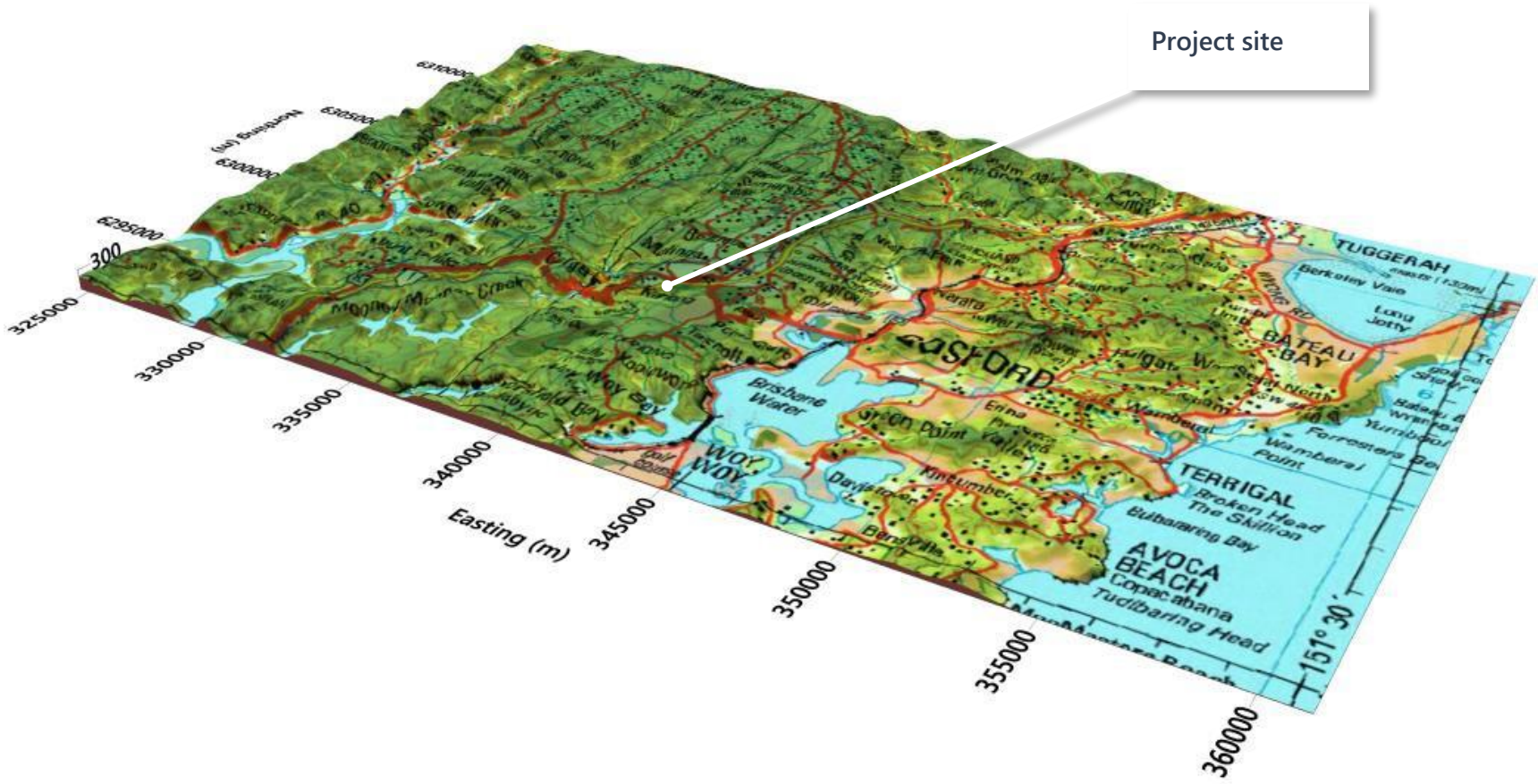
9.3.4 Meteorology

The meteorology experienced within an area can govern the generation (in the case of wind dependent emission sources), dispersion, transport and eventual fate of pollutants in the atmosphere. The meteorological conditions surrounding the project site have been characterised using data collected by the Australian Government Bureau of Meteorology (BoM) at a number of surrounding Automatic Weather Stations (AWS).

To provide a characterisation of the meteorology which would be expected at the project site, a detailed meteorological modelling and evaluation exercise has also been performed.

A summary of the inputs and outputs of the meteorological modelling assessment is presented in Appendix B of the AQIA at Appendix M.

Figure 9.2. 3-dimensional representation of topography surrounding project site.



9.3.5 Potential Sources of Cumulative Impacts

A number of existing and proposed operations which may contribute to the local particulate matter environment are located in the area surrounding the project site. A review of activities licenced by NSW EPA through the POEO environmental protection licensing (EPL) scheme, surrounding operations under Central Coast Council consent, and a review of projects proposed to be operated in the area has been performed.

Through review of those operations and through discussion with NSW EPA, the following operations have been considered in relation to potential cumulative impacts:

- Gosford Quarries, 1 Acacia Road Somersby – existing operation located approximately 250 m to the east of the project site; and,
- Proposed Somersby Resource Recovery Facility (SSD 18_9265) located approximately 20 m to the north of the project site.

Other operations identified through an initial review are located at distances over 650 m from the project site and given the results of the assessment presented in section 9.5.2 are not likely to result in cumulative impacts of any significance and have therefore not been considered further.

9.3.5.1 Gosford Quarries

Gosford Quarries performs sandstone block extraction at 1 Acacia Road, Somersby, located approximately 250 m to the east of the project site. No EPL has been issued by NSW EPA for this operation and it is therefore determined that the quarry operates under the extraction limit of 30,000 tpa outlined in Clause 19 of Schedule 1 of the POEO Act 1997 (extractive activities). The quarry operates under Development Consent provided by Council.

No information is available through Council relating to the operations being performed at the quarry. An emissions inventory has been estimated which assumes a 30,000 tpa extraction rate, sandstone block cutting, loading to vehicles, transport from the quarry on unpaved roads (with control by watering) and wind erosion. This inventory provides an estimation of PM_{10} emissions to be 503 $kg \cdot yr^{-1}$, with 75 % of those emissions being associated with material haulage on unpaved roads and 21 % associated with wind erosion.

Comparison of those annual average PM_{10} emissions with the project indicates that they may represent approximately 26 % of those emitted by the project.

No information is available to allow calculation of the potential maximum daily activity rates at the quarry, or subsequent assessment of the potential impacts of that operation on the surrounding area on that timescale.

No dispersion modelling of the quarry has been performed, and the potential impacts associated with the quarry are discussed qualitatively in section 9.5.2**.**

9.3.5.2 Proposed Somersby Resource Recovery Facility (SSD 18_9265)

In March 2018, NSW DPE received a request for SEARs associated with a proposed resource recovery facility (RRF) to be located at 83 Gindurra Road, Somersby, approximately 20 m to the north of the project site boundary.

The Applicant (Bingo Recycling Pty Ltd) is seeking approval to construct and operate an RRF with an annual throughput of up to 500,000 tpa of waste, with capacity for storage of up to 40,000 t at any one time. Based on the information provided in the request for SEARs document (Arcadis, 2018), waste is anticipated to primarily comprise construction and demolition waste, commercial and industrial waste, green waste, soils and timber waste from the Greater Sydney Area, primarily the Central Coast to Newcastle areas.

The RRF would comprise a fully enclosed processing shed incorporating processing equipment and stockpile, storage and handling areas, loading areas, vehicular access and parking, weighbridges and wheel wash stations, a site office, and associated amenities.

Material would be brought to the facility, processed into recyclables and then sold to the end user for further processing. The residual, non-reusable materials would be transferred to a licensed landfill site or alternative residual waste processing facility (Arcadis, 2018).

Dust suppression measures proposed to be included as part of the development include full enclosure of all operations, an in-ground wheel wash prior to the exit weighbridge and dust suppression systems including misting systems (Arcadis, 2018). The RRF is proposed to be operational for 24 hours per day, seven days per week. An indicative layout of the proposed Somersby RRF as provided in (Arcadis, 2018) is presented in Figure 9.3**.**

Based on the information presented within SEARs report (Arcadis, 2018) the operations performed as part of the RRF are likely to represent best practice for the industry, for a site which is a 'new build'. The use of hardstand across the site, operation of all activities within an enclosed building and use of dust suppression measures is likely to result in minor and manageable impacts at surrounding receptor locations. The potential for cumulative impacts is therefore likely to be low.

The SEARs were issued by DPE for this project in May 2018 and at the time of writing (August 2020), no EIS has been submitted by the Applicant. It is noted that the Applicant is required to lodge the EIS within two years of the SEARs being issued. As a consequence, the current SEARs has expired and is no longer valid.

At this point, based on available information, the project is assumed to be NOT proceeding. As a result, no quantification of cumulative impacts has been performed as part of this assessment.

Figure 9.3. Proposed Bingo Somersby Resource Recovery Facility located near to Kariong Sand and Soil Supplies proposed development – layout (indicative).

Source: (Arcadis, 2018).

9.4 Proposed development

A detailed overview of the proposed development (for construction and operational phases) is provided in Section 2.3 of this EIS and is further highlighted in Chapter 2 of the AQIA given in Appendix M of the EIS. No further details are repeated in this chapter.

9.5 Impact assessment

To form the quality impact assessment for construction and operational phases of the development, a series of best practice construction and operational management practices will be employed at the site to mitigate against impacts on air quality. These are given in Section 5 of the Northstar AQIA, given in Appendix M. These are not repeated in this Chapter.

9.5.1 Construction phase

The construction and enabling works for the project would involve two stages:

- The first stage will be construction work at the front of the site, involving demolition of some of the existing buildings, construction of a front office and warehouse, front parking areas and installation of the security fencing. This stage has been approved by Central Coast Council and is currently under construction. Only impacts associated with the second stage are considered within this AQIA.
- The second stage involves clearing of vegetation, earthworks to facilitate on-site drainage, construction of on-site roads, construction of a hardstand area, construction of a stormwater management system, construction of a noise barrier, construction of product storage bays, construction of the three-sided waste tipping and spreading shed, construction of the crusher and grinder enclosures, and the installation of processing equipment in the processing area and secondary sorting warehouse.

The development and grading of the site will require both cut and fill, and the volumes have been derived from cut and fill estimates produced by Cardno, which are presented in Table 9.6.

Table 9.6. Cut and fill estimates – construction phase.

Activity	Cut volume (m3)	Fill volume (m^3)	Balance volume (m^3)
Building pad	5	2,800	-2,795
Site roads	310	3,730	-3,420
Existing stockpiles	18,090	0	18,090
Total	**18,405**	**6,530**	**11,875**

The net balance equates to approximately 12,000 m^3 (rounded up) of material cut from the site as a result of the construction phase activities, and principally generated through the regrading of the existing stockpiles. That volume of cut material however will not be exported directly from the site and will be recycled as product (depending upon type and quality).

The footprint of the project site which is to be affected is estimated as: approximately 39,000 m^2, or 3.9 hectares (ha), in area.

The assumed supply route around the site during construction works may be up to 1 km as a loop to the southern extent of the processing area and back to the site entrance on Gindurra Road. It is anticipated that >50 heavy vehicle movements would be required each day to service the site, during peak periods of construction activities.

For the purposes of the assessment, the route for construction traffic to/from the site is assumed to be along Gindurra Road to the left, along Wisemans Ferry Rd then onto Pacific Highway or the Central Coast Highway. No construction vehicles are to turn right and enter onto Debenham Rd.

9.5.1.1 Step 1: Screening Based on Separation Distance

The screening criteria applied to the identified sensitive receptors are whether they are located in excess of:

- 350 m from the boundary of the site.
- 500 m from the site entrance.
- 50 m from the route used by construction vehicles on public roads.
- Track-out is assumed to affect roads up to 100 m from the site entrance.

Table 9.7 presents the identified discrete sensitive receptors, with the corresponding estimated screening distances as compared to the screening criteria.

Table 9.7. Construction phase impact screening criteria distances.

Rec	Location	Land Use	Screening Distance (m approx.)		
			Boundary (350m)	Site Entrance (500m)	Const. route (50m)
R1	242 Debenham Road South, Somersby	Residential	35	125	20
R2	10 Acacia Road, Somersby	Residential	80	190	20
R3	32 Acacia Road, Somersby	Residential	20	420	280
R4	198 Debenham Road South, Somersby	Residential	420	520	20
R5	252 Debenham Road South, Somersby	Residential	260	350	20
R6	10 Singleton Point Road, Clare	Residential	>1,000	>1,000	250
R7	26 Old Mount Penang Road, Kariong	Residential	>1,000	>1,000	255
R8	95 Mitchell Drive, Kariong	Residential	>1,000	>1,000	190
I1	244 Debenham Road North, Somersby	Industrial	500	500	20
I2	58 Gindurra Road, Somersby	Industrial	190	290	20
I3	44 Gindurra Road, Somersby	Industrial	260	440	140
I4	2 Wella Way, Somersby	Industrial	105	440	290
I5	33 Kangoo Road, Somersby	Industrial	105	640	540
I6	3 Central Coast Highway, Kariong	Correctional Centre	150	>1,000	40
I7	3 Central Coast Highway, Kariong	Education	55	>1,000	680

Rec	Location	Land Use	Screening Distance (m approx.)		
			Boundary (350m)	Site Entrance (500m)	Const. route (50m)
I8	1A Central Coast Highway, Kariong	Education	175	>1,000	660
I9	3 Central Coast Highway, Kariong	Correctional Centre	600	>1,000	750
I10	1A Central Coast Highway, Kariong	Education	600	>1,000	470
I11	1A Central Coast Highway, Kariong	Education	640	>1,000	490
I12	10 Festival Drive, Kariong	Education	>1,000	>1,000	180
I13	1A Central Coast Highway, Kariong	Education	600	>1,000	340

With reference to Table 9.7 , a number of sensitive receptors are noted to be within the screening distance boundaries and therefore require further assessment as summarised in Table 9.8.

Table 9.8. Application of Step 1 screening.

Construction Impact	Screening Criteria	Step 1 Screening	Comments
Demolition	350 m from boundary 500 m from site entrance	Screened	Demolition to occur in Stage 1 – not relevant to this AQIA
Earthworks	350 m from boundary 500 m from site entrance	Not screened	Receptors identified within the screening distance
Construction	350 m from boundary 500 m from site entrance	Not screened	
Track-out	100 m from site entrance	Screened	No receptors identified within the screening distance
Construction Traffic	50 m from roadside	Not screened	Receptors identified within the screening distance

9.5.1.2 Step 2: Risk from Construction Activities

Based upon the above assumptions and the assessment criteria presented in Appendix D of the AQIA, the dust emission magnitudes are as presented in Table 9.9**.**

Table 9.9. Construction phase impact categorisation of dust emission magnitude.

Activity	Detail	Dust Emission Magnitude
Demolition	*screened at Step 1*	*screened at Step 1*
Earthworks and enabling works	>10,000 m^2 earthworks area	large
Construction	<25,000 m3 building volume[(a)]	small
Track-out	*screened at Step 1*	*screened at Step 1*
Construction traffic routes	>10,000 m2 earthworks area	large

Note (a) Includes construction of noise barrier, material storage bins, 3-sided tip and spread shed, and crusher and grinder enclosures. Secondary Processing Warehouse will be re-purposed and requires minor fit-out only.

9.5.1.3 Step 3: Sensitivity of an Area

Land Use Value

Based on the criteria listed in Appendix D of the AQIA, the land use value of the area surrounding the site is concluded to be *high* for health impacts and for dust soiling, based upon the following assumption:

- The receptor locations include residential properties where people may reasonably be expected to be present for eight to 24-hours.

Medium land use values are also identified in the area immediately surrounding the site in locations where people are anticipated to be employed (as opposed to residing).

Given that the highest sensitivity land uses would tend to define the level of control required to minimise impacts, it is considered that these sensitivity land uses are appropriately considered for both health and dust soiling effects. This value is used to derive *the sensitivity of the area*.

Sensitivity of an Area

Using the classifications shown in Appendix D of the AQIA, the sensitivity of the surrounding area to

(i) health effects and

(ii) dust soiling may be identified.

The assumed existing background annual average PM_{10} concentrations (as measured at Wyong in 2015) are reported in Section 9.3.2**.** As presented in Table 9.5 the annual average PM_{10} concentration as measured at Wyong in 2015 was 14.9 µg/m^3, which provides the sensitivity of the area as *low* for dust health impacts.

The sensitivity of the area to dust soiling effects is assessed as a function of land use value, number of receptors and the distance to the site boundary. For this assessment, the sensitivity to dust soiling effects is assessed as being *high*, which seems intuitive given the proximity of receptors to the site boundary.

9.5.1.4 Step 4: Risk (Pre-Mitigation)

Given the dust emission magnitudes for the various construction phase activities as shown in section 9.5.1.2 (Step 2) and the sensitivity of the identified receptors as determined in section 9.5.1.3 (Step 3), the resulting risk of air quality impacts (without mitigation) is as presented in Table 9.10.

Table 9.10. Risk of air quality impacts from construction activities.

Impact	Sensitivity of Area	Dust Emission Magnitude					Preliminary Risk				
		Demolition	Earthworks	Construction	Track-out	Const. Traffic	Demolition	Earthworks	Construction	Track-out	Const. Traffic
Human Health	low	n/a	large	small	n/a	large	n/a	low	negl	n/a	low
Dust Soiling	high	n/a	large	small	n/a	large	n/a	high	low	n/a	high

The preliminary risk assessment summarised in Table 9.10 indicates that with no mitigation measures there is a *low risk* of human health effects associated with construction phase activities. These are associated with emissions from earthworks and from construction traffic.

Table 9.9 indicates that there is a *high risk* of adverse dust soiling (amenity) impacts if no mitigation measures were to be applied to control emissions, in relation to earthworks and construction traffic. There is also a low impact associated with construction.

This preliminary risk assessment is used to identify appropriate construction-phase mitigation controls to be applied to those activities during the construction phase.

9.5.1.5 Step 5: Identified Mitigation

Table 9.11 lists the relevant mitigation measures identified, and have been presented as follows:

- **N** = not required (although they may be implemented voluntarily).
- **D** = desirable (to be considered as part of the CEMP, but may be discounted if justification is provided).
- **H** = highly recommended (to be implemented as part of the CEMP, and should only be discounted if site-specific conditions render the requirement invalid or otherwise undesirable).

The following measures are recommended as *highly recommended* (H) or *desirable* (D) by the IAQM methodology for a *low* risk site for earthworks, construction and construction traffic. A detailed review of the recommendations would be performed once details of the construction phase are available.

For clarity, these management measures are associated with construction activities. Specific mitigation and management measures to reduce particulate matter emissions during operations are outlined in the sections below.

Table 9.11. Site-Specific Management Measures.

Recommended Mitigation Measure		Risk & Recommendation
1	**Communications**	**High**
1.1	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	**H** to be implemented

Recommended Mitigation Measure		Risk & Recommendation
1.1	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	**H** to be implemented
1.2	Display the head or regional office contact information.	**H** to be implemented
1.3	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the relevant regulatory bodies.	**H** to be implemented
2	**Site Management**	**High**
2.1	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	**H** to be implemented
2.2	Make the complaints log available to the local authority when asked.	**H** to be implemented
2.3	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.	**H** to be implemented
2.4	Hold regular liaison meetings with other high-risk construction sites within 500 m of the site boundary, to ensure plans are coordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	**H** to be implemented
3	**Monitoring**	**High**
3.1	Undertake daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary.	**H** to be implemented
3.2	Carry out regular site inspections to monitor compliance with the dust management plan / CEMP, record inspection results, and make an inspection log available to the local authority when asked.	**H** to be implemented
3.3	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	**H** to be implemented
3.4	Agree dust deposition, dust flux, or real-time continuous monitoring locations with the relevant regulatory bodies. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before workon a phase commences.	**H** to be implemented

Recommended Mitigation Measure		Risk & Recommendation
4	**Preparing and Maintaining the Site**	**High**
4.1	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	**H** to be implemented
4.2	Erect solid screens or barriers around dusty activities or the site boundary that they are at least as high as any stockpiles on site.	**H** to be implemented
4.3	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	**H** to be implemented
4.4	Avoid site runoff of water or mud.	**H** to be implemented
4.5	Keep site fencing, barriers and scaffolding clean using wet methods.	**H** to be implemented
4.6	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below	**H** to be implemented
4.7	Cover, seed or fence stockpiles to prevent wind erosion	**H** to be implemented
4.8	Conduct regular sweeping of paved areas to reduce soiling and potential for dust generation on hot, dry windy days	**H** to be implemented
4.9	Apply surface moisture / water to all paved areas on dry, hot windy days to avoid dust generation	**H** to be implemented
5	**Operating Vehicle/Machinery and Sustainable Travel**	**High**
5.1	Ensure all on-road vehicles comply with relevant vehicle emission standards, where applicable	**H** to be implemented
5.2	Ensure all vehicles switch off engines when stationary - no idling vehicles	**H** to be implemented
5.3	Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable	**H** to be implemented
5.4	Impose and signpost a maximum-speed-limit of 25 km·h-1 on surfaced and 15 km·h-1 on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate	**H** to be implemented

Recommended Mitigation Measure		Risk & Recommendation
5.4	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	**H** to be implemented
5.5	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	**H** to be implemented
6	**Operations**	**High**
6.1	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems	**H** to be implemented
6.2	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate	**H** to be implemented
6.3	Use enclosed chutes and conveyors and covered skips	**H** to be implemented
6.4	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate	**H** to be implemented
6.5	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	**H** to be implemented
7	**Waste Management**	**High**
7.1	Avoid bonfires and burning of waste materials.	**H** to be implemented
8	**Measures Specific to Demolition**	**n/a**
9	**Measures Specific to Construction**	**Low**
9.1	Avoid scabbling (roughening of concrete surfaces) if possible	**D** to be considered
9.2	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place	**D** to be considered
10	**Measures Specific to Track-Out**	**n/a**
11	**Specific Measures to Construction Traffic (adapted)**	**High**
11.1	Ensure all on-road vehicles comply with relevant vehicle emission standards, where applicable	**H** to be implemented

Recommended Mitigation Measure		Risk & Recommendation
11.2	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	**H** to be implemented
11.3	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	**H** to be implemented
11.4	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	**H** to be implemented
11.5	Record all inspections of haul routes and any subsequent action in a site log book.	**H** to be implemented

Notes D = desirable (to be considered), H = highly recommended (to be implemented), N = not required (although can be voluntarily implemented)

9.5.1.6 Step 6: Risk (Post-Mitigation)

For almost all construction activity, the adapted methodology notes that the aim should be to prevent significant effects on receptors through the use of effective mitigation and experience shows that this is normally possible.

Given the limited size of the site, residual impacts associated with fugitive dust emissions from the project construction activities would be anticipated to be '*low*' or '*not significant*'.

9.5.2 Operational Phase

This section presents the results of the dispersion modelling assessment and uses the following terminology:

- Incremental impact – relates to the concentrations predicted as a result of the operation of the project in isolation.
- Cumulative impact – relates to the concentrations predicted as a result of the operation of the project PLUS the background air quality concentrations discussed in Section 9.3.

The results are presented in this manner to allow examination of the likely impact of the project in isolation and the contribution to air quality impacts in a broader sense.

The dispersion modelling results presented in the following sections indicate that the proposed project will meet all NSW EPA air quality standards and goals, even under worst case scenario conditions.

In the presentation of results, the tables included shaded cells which represent the following:

Model prediction	Pollutant concentration / deposition rate less than the relevant criterion	**Pollutant concentration / deposition rate equal to, or greater than the relevant criterion**

9.5.2.1 Particulate Matter - Annual Average TSP, PM_{10}, $PM_{2.5}$ and silica

The predicted annual average particulate matter concentrations (as TSP, PM_{10} and $PM_{2.5}$) resulting from the proposed operations at the project site are presented in Table 9.12.

In the interests of transparency, the change in predicted concentrations at each receptor when compared to those presented in the previous AQIA is presented in Appendix E of the AQIA.

The results indicate that predicted incremental concentrations of TSP, PM_{10} and $PM_{2.5}$ at receptor locations are low (<5% of the annual average TSP criterion, <5% of the annual average PM_{10} criterion and <6% of the $PM_{2.5}$ criterion).

The addition of existing background concentrations (refer Section 9.3) results in predicted concentrations of annual average TSP being less than 42%, annual average PM_{10} being less than 65% and annual average $PM_{2.5}$ being less than 71% of the relevant criteria at the nearest receptors.

Adjustment of the annual average $PM_{2.5}$ modelling results to account for the potential worst-case silica content of processed materials (67%, refer section 9.2.3) results in a predicted incremental RCS concentration at the worst affected receptor of 0.28 $\mu g \cdot m^{-3}$ (0.4 µg·m-3 x 67%) which represents >10 % of the criterion. Even with the addition of a background concentration of 0.7 µg·m-3, the maximum RCS concentration is less than one third of the Victorian EPA and the California EPA Office for Environmental Health Hazard Assessment annual average criterion of 3 $\mu g \cdot m^{-3}$. These results clearly indicate that the project will not negatively impact on the health of the community, even at the closest residential receptor.

The predicted concentrations presented above are shown to be minor and even with the addition of a contribution from the Gosford Quarries operation next door (which is likely to be approximately 26% of those emitted by the project), cumulative impacts would still be well below the respective annual average criteria.

Table 9.12. Predicted annual average TSP, PM10 and PM2.5 concentrations.

Receptor	Annual Average Concentration (µg/m³)								
	TSP			PM_{10}			$PM_{2.5}$		
	Incremental Impact	Background	Cumulative Impact	Incremental Impact	Background	Cumulative Impact	Incremental Impact	Background	Cumulative Impact
R1	3.7	32.8	36.5	1.0	14.9	15.9	0.4	5.2	5.6
R2	4.3	32.8	37.1	1.2	14.9	16.1	0.4	5.2	5.6
R3	2.1	32.8	34.9	0.7	14.9	15.6	0.2	5.2	5.4
R4	1.3	32.8	34.1	0.3	14.9	15.2	0.1	5.2	5.3
R5	2.1	32.8	34.9	0.6	14.9	15.5	0.2	5.2	5.4
R6	0.1	32.8	32.9	<0.1	14.9	15.0	<0.1	5.2	5.3
R7	0.2	32.8	33.0	<0.1	14.9	15.0	<0.1	5.2	5.3
R8	0.2	32.8	33.0	<0.1	14.9	15.0	<0.1	5.2	5.3
I1	0.4	32.8	33.2	0.1	14.9	15.0	<0.1	5.2	5.3
I2	1.2	32.8	34.0	0.4	14.9	15.3	0.1	5.2	5.3
I3	1.1	32.8	33.9	0.3	14.9	15.2	0.1	5.2	5.3
I4	2.0	32.8	34.8	0.7	14.9	15.6	0.2	5.2	5.4

Receptor	Annual Average Concentration (µg/m³)								
	TSP			PM_{10}			$PM_{2.5}$		
	Incremental Impact	Background	Cumulative Impact	Incremental Impact	Background	Cumulative Impact	Incremental Impact	Background	Cumulative Impact
I5	1.3	32.8	34.1	0.4	14.9	15.3	0.1	5.2	5.3
I6	0.9	32.8	33.7	0.3	14.9	15.2	0.1	5.2	5.3
I7	0.8	32.8	33.6	0.2	14.9	15.1	0.1	5.2	5.3
I8	0.6	32.8	33.4	0.2	14.9	15.1	0.1	5.2	5.3
I9	0.3	32.8	33.1	0.1	14.9	15.0	<0.1	5.2	5.3
I10	0.3	32.8	33.1	0.1	14.9	15.0	<0.1	5.2	5.3
I11	0.3	32.8	33.1	0.1	14.9	15.0	<0.1	5.2	5.3
I12	0.2	32.8	33.0	0.1	14.9	15.0	<0.1	5.2	5.3
I13	0.3	32.8	33.1	0.1	14.9	15.0	<0.1	5.2	5.3
Criterion	-	90		-	25		-	8	

No contour plots of annual average TSP, PM_{10} or $PM_{2.5}$ are presented, given the minor predicted contribution from the operations at the project site at the nearest relevant sensitive receptors.

9.5.2.2 Particulate Matter – Annual Average Dust Deposition Rates

Table 9.13 presents the annual average dust deposition predicted as a result of the operations at the project site.

In the interests of transparency, the change in predicted concentrations at each receptor when compared to those presented in the previous AQIA is presented in Appendix E of the AQIA.

Table 9.13. Predicted annual average dust deposition.

Receptor	Annual Average Dust Deposition (g/m²/month)		
	Incremental Impact	Background	Cumulative Impact
R1	0.3	2.0	2.3
R2	0.3	2.0	2.3
R3	0.2	2.0	2.2
R4	0.1	2.0	2.1
R5	0.1	2.0	2.1
R6	<0.1	2.0	2.1
R7	<0.1	2.0	2.1
R8	<0.1	2.0	2.1

Receptor	Annual Average Dust Deposition (g/m²/month)		
	Incremental Impact	Background	Cumulative Impact
I1	<0.1	2.0	2.1
I2	0.1	2.0	2.1
I3	0.1	2.0	2.1
I4	0.2	2.0	2.2
I5	0.1	2.0	2.1
I6	0.1	2.0	2.1
I7	<0.1	2.0	2.1
I8	<0.1	2.0	2.1
I9	<0.1	2.0	2.1
I10	<0.1	2.0	2.1
I11	<0.1	2.0	2.1
I12	<0.1	2.0	2.1
I13	<0.1	2.0	2.1
Criterion	2.0	-	4.0

An assumed background dust deposition of 2 $g \cdot m^{-2} \cdot month^{-1}$ is presented in Table 9.13 although comparison of the incremental concentration with the incremental criterion of 2 $g \cdot m^{-2} \cdot month^{-1}$ is also valid (as discussed within section 9.2). In either case, the resulting conclusions drawn are identical. Annual average dust deposition is predicted to meet the criteria at all receptors surrounding the project site where the predicted impacts are 15 % of the incremental criterion at receptor locations. The addition of a minor increment associated with the Gosford Quarries operation would not alter this conclusion, and the impact is likely to be represented by the adopted background deposition level of 2 $g \cdot m^{-2} \cdot month^{-1}$.

No contour plot of annual average dust deposition is presented, given the minor predicted contribution from the operations at the project site at the nearest sensitive receptors.

9.5.2.3 Particulate Matter - Maximum 24-hour Average

Table 9.14 presents the maximum 24-hour average PM_{10} and $PM_{2.5}$ concentrations predicted to occur at the nearest residential receptors as a result of the operations at the project site only. No background concentrations are included within this table.

In the interests of transparency, the change in predicted concentrations at each receptor when compared to those presented in the previous AQIA is presented in Appendix E of the updated AQIA provided at Appendix M.

Table 9.14. Predicted maximum incremental 24-hour PM_{10} and $PM_{2.5}$ concentrations.

Receptor	Maximum incremental 24-hour average concentration (g/m^3)	
	PM_{10}	PM2.5
R1	9.8	2.9
R2	9.2	2.7
R3	13.0	2.8
R4	4.6	1.3
R5	5.7	1.4
R6	1.8	0.4
R7	2.5	0.7
R8	2.1	0.5
I1	2.5	0.5
I2	9.4	1.8
I3	4.6	1.1
I4	9.8	2.4
I5	9.7	1.8
I6	11.7	2.2
I7	6.5	1.4
I8	6.0	1.2
I9	3.0	0.6
I10	2.8	0.8
I11	4.5	0.9
I12	2.1	0.6
I13	3.1	0.9

At the receptor where the maximum impact is expected to occur (for PM_{10} - receptor R3, 32 Acacia Road, Somersby, and for $PM_{2.5}$ – receptor R1, 242 Debenham Road South, Somersby) operation of the project would contribute up to 26% of the 24-hour PM_{10} criterion and up to 12% of the 24-hour $PM_{2.5}$ criterion.

The predicted maximum 24-hour average PM_{10} and $PM_{2.5}$ concentrations resulting from the operation of the project, with background included are presented in Table 9.15 and Table 9.16 respectively.

Results are presented for the receptor at which the highest incremental impacts have been predicted (receptor R3 for PM_{10} and receptor R1 – 242 Debenham Road South, Somersby, refer Table 9.14**)**. The left side of the tables show the predicted concentration on days with the highest background, and the right side shows the total predicted concentration on days with the highest predicted incremental concentrations.

Table 9.15. Summary of contemporaneous impact and background – PM10 Receptor R3.

Date	24-hour average PM_{10} concentration (g/m^3)			Date	24-hour average PM_{10} concentration (g/m^3)		
	Incremental Impact	Background	Cumulative Impact		Incremental Impact	Background	Cumulative Impact
06/05/2015	1.4	58.6	60.0	16/07/2015	13.0	8.8	21.8
26/11/2015	3.2	41.7	44.9	02/06/205	10.6	11.4	22.0
17/10/2015	0.6	36.8	37.4	05/06/2015	10.0	10.3	20.3
06/10/2015	0.5	34.3	34.8	05/07/2015	7.6	10.8	18.4
27/11/2015	<0.1	33.7	33.8	27/05/2015	6.5	10.3	16.8
02/01/2015	0.4	33.2	33.6	26/05/2015	6.1	11.0	17.1
19/11/2015	0.2	33.1	33.3	11/05/2015	5.7	12.6	18.3
25/11/2015	0.3	32.9	33.2	09/05/2015	5.0	10.2	15.2
12/12/2015	<0.1	32.9	33.0	12/06/2015	4.9	0.0	4.9
07/10/2015	0.3	32.6	32.9	31/05/2015	4.8	7.6	12.4
These data represent the highest Cumulative Impact 24-hour PM_{10} predictions (outlined in red) as a result of the operation of the project.				**These data represent the highest Incremental Impact 24-hour PM_{10} predictions (outlined in blue) as a result of the operation of the project.**			

One exceedance of the 24-hour average impact assessment criterion for PM_{10} is predicted although **no additional exceedances** are shown to eventuate because of the operation of the project. The predicted exceedance (highlighted in Table 9.15 is driven by the background air quality (i.e. existing sources) and is not contributed to by the proposed operations at the project site.

No exceedance of the 24-hour average $PM_{2.5}$ impact assessment criterion is predicted as a result of the project operations.

Addition of an appropriate increment associated with the Gosford Quarry operation is difficult, although assuming that maximum 24-hr emissions would also be 26% of the project site (as assumed for annual average emissions), and also assuming coincidental maximum impacts, the addition of approximately 3.4 $\mu g \cdot m^{-3}$ of PM_{10} (13.0 $\mu g \cdot m^{-3}$ x 26%) or 0.7 $\mu g \cdot m^{-3}$ of $PM_{2.5}$ (2.9 $\mu g \cdot m^{-3}$ x 26%) is unlikely to result in significant cumulative impacts which would result in additional exceedances occurring.

Table 9.16. Summary of contemporaneous impact and background – PM2.5 Receptor R1.

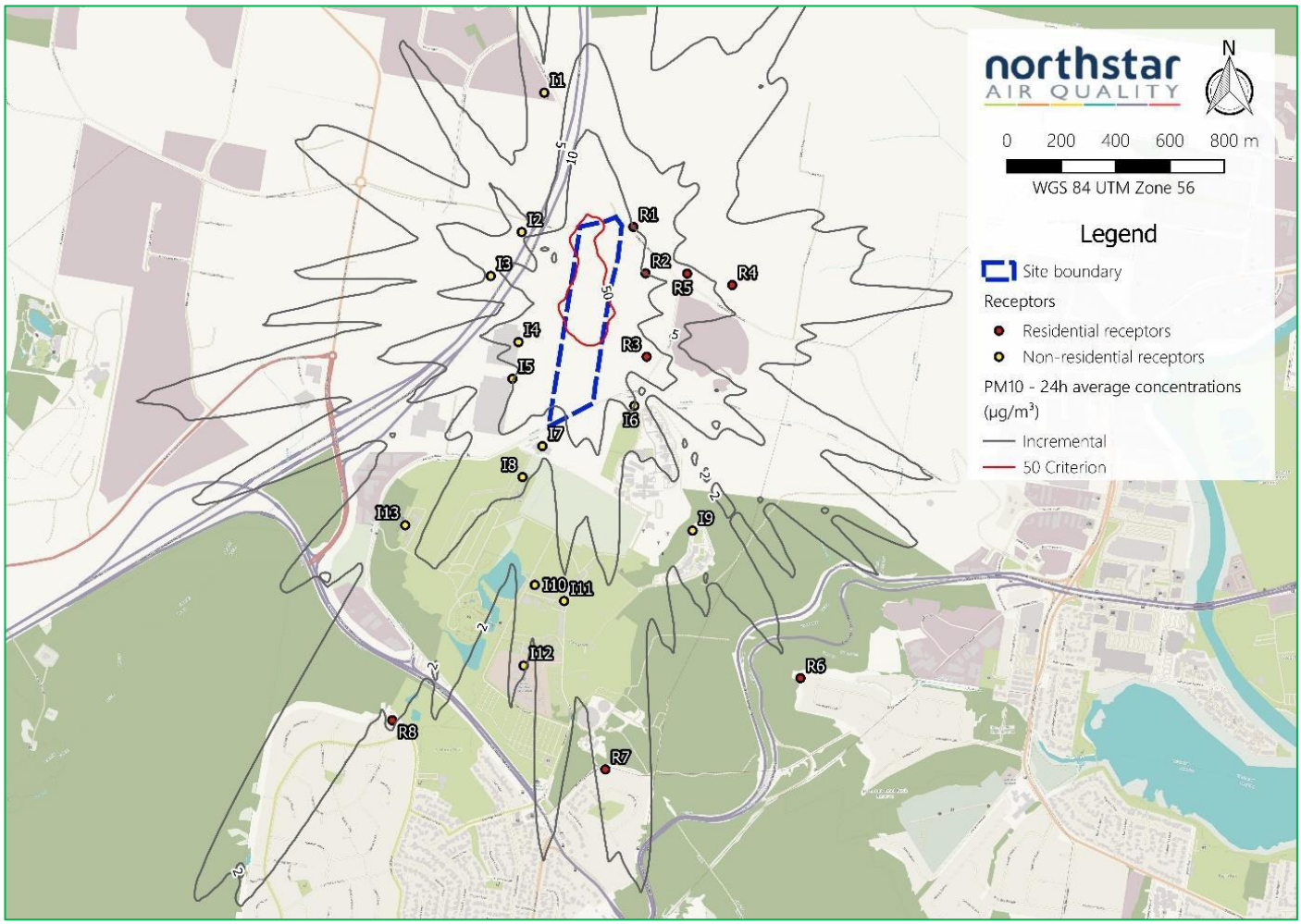
Date	24-hour average $PM_{2.5}$ concentration (g/m^3)			Date	24-hour average $PM_{2.5}$ concentration (g/m^3)		
	Incremental Impact	Background	Cumulative Impact		Incremental Impact	Background	Cumulative Impact
09/03/2015	0.5	13.2	13.7	17/05/2015	2.9	4.1	7.0

Date	24-hour average $PM_{2.5}$ concentration (g/m^3)			Date	24-hour average $PM_{2.5}$ concentration (g/m^3)		
	Incremental Impact	Background	Cumulative Impact		Incremental Impact	Background	Cumulative Impact
20/11/2015	0.2	13.1	13.3	10/06/2015	2.5	6.6	9.1
12/03/2015	0.2	12.1	12.3	20/06/2015	2.0	4.8	6.8
21/08/2015	<0.1	11.7	11.8	16/05/2015	2.0	4.5	6.5
01/01/2015	0.1	11.2	11.3	07/07/2015	1.9	4.5	6.4
07/10/2015	<0.1	10.8	10.9	10/07/2015	1.9	5.1	7.0
10/03/2015	0.3	10.6	10.9	14/06/2015	1.9	7.4	9.3
17/10/2015	0.4	10.4	10.8	26/06/2015	1.7	4.8	6.5
20/12/2015	<0.1	10.6	10.7	24/05/2015	1.6	5.4	7.0
14/12/2015	0.1	10.4	10.5	13/06/2015	1.6	2.7	4.3
These data represent the highest Cumulative Impact 24- hour PM_{10} predictions (outlined in red) as a result of the operation of the project.				**These data represent the highest Incremental Impact 24-hour PM_{10} predictions (outlined in blue) as a result of the operation of the project.**			

Contour plots of the incremental contribution of the proposed operations at the project site to the 24-hour average PM_{10} and $PM_{2.5}$ concentrations are presented in

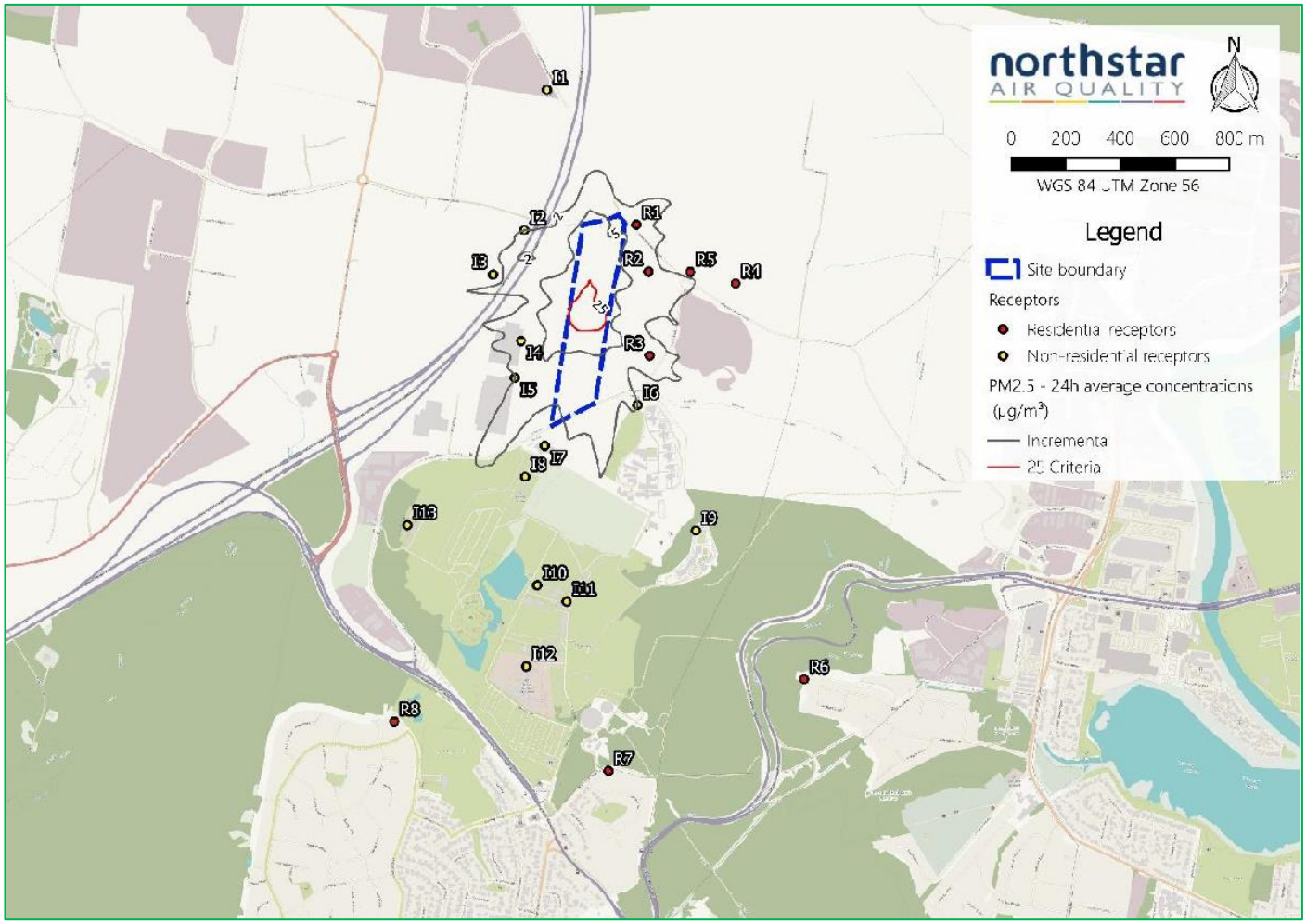
Figure 9.4 and Figure 9.5.

Figure 9.4. Incremental 24-hour PM10 concentrations.



Note 1: Criterion = 50 µg·m^{-3} (cumulative)

Figure 9.5. Incremental 24-hour PM2.5 concentrations.



Note 1: Criterion = 25 µg·m^{-3} (cumulative)

9.6 Mitigation measures

9.6.1 Construction Phase

Based on the findings of the construction phase air quality assessment, even with no mitigation measures there is a low risk of human health effects associated with construction phase activities. These are associated with emissions from earthworks and from construction traffic.

There is a high risk of adverse dust soiling (amenity) impacts if no mitigation measures were to be applied to control emissions, in relation to earthworks and construction traffic. There is also a low impact associated with construction.

A range of mitigation and management measures are presented in Section 9.5.1.5, which would result in the risks associated with construction to be reduced to 'low' or 'not significant'.

9.6.2 Operational Phase

Based on the findings of the operational phase air quality impact assessment, it is considered that the particulate control measures proposed to be implemented will be sufficient to ensure that exceedances of all particulate criteria would not be experienced as a result of the project operation.

It is noted that since the provision of the previous AQIA, the proponent has proposed a range of further particulate control measures including:

- The construction and use of enclosures on crushing and grinding/shredding operations with accompanying water sprays for dust suppression; and,
- The construction and use of a three-sided shed in which all materials would be tipped and sorted. This shed also incorporates the use of misting sprays to further mitigate particulate generation and wind erosion.

No additional exceedances of the 24-hour $PM_{2.5}$ or PM_{10} criteria are predicted as a result of the proposed activities at the project site. While dispersion modelling predicts that one exceedance of the 24-hour PM_{10} criterion is likely at nearby residential locations, on that instance the incremental impact from the project operation resulting in the exceedance is very low with the background (non-project) concentration of 58.6 $\mu g \cdot m^{-3}$ already in exceedance of the 50 $\mu g \cdot m^{-3}$ criterion. The operations at the project site would not have contributed significantly during that day of exceedance.

A number of mitigation measures are proposed to be implemented as part of the project. Where defensible quantification of the control efficiencies afforded by these measures can be determined, these have been applied within the assessment. Additional measures may also be applied during certain wind conditions and although these measures have not been included within dispersion modelling (apart from stockpile watering during the assessment of maximum 24-hr impacts), they would act to further reduce the generation of particulate.

It is important to note that this assessment does not rely on unquantified emissions control efficiencies to achieve compliance with the environmental objectives, rather these unquantified emissions control efficiencies would act to further reduce impacts and provide further assurances that the objectives will be complied with.

The mitigation measures which will be used as part of the project operation are summarised in Table 9.4 below.

Table 9.4. Summary of emission reduction methods adopted as part of project operation.

Emission control method	Control efficiency (%)
Road Haulage	
Vehicle restrictions that limit the speed of vehicles on the road.	Not quantified
Surface improvement by paving	Assessed through emission factor
Surface treatment - watering	30
Materials Handling	
Enclosure of the tipping and spreading area	70
Minimising the drop height from vehicles	30
Application of water	50
Ceasing crushing, screening and grinding activities (and loading) when wind speeds >25 km/hr	Not quantified
Loading materials to a 3-sided enclosure	30
Covering loads with a tarpaulin	Not quantified
Limit load sizes to ensure material is not above the level of truck sidewalls	Not quantified
Minimising travel speeds and distances	Not quantified
Keep travel routes and materials moist	50
Materials Processing	
Application of water	91.6 (screen); 77.7 (crush); 50 (shred)
Enclosure of the tipping and spreading area	70
Ceasing crushing, screening and grinding activities (and loading) when wind speeds >25 km/hr	Not quantified

Emission control method	Control efficiency (%)
Wind Erosion	
Application of water	50
Stockpiles limited in height	30
3-sided enclosures around stockpiles	75
Ceasing crushing, screening and grinding activities (and loading) when wind speeds >25 km/hr	Not quantified

Results of the dispersion modelling exercise indicate that all air quality criteria can be achieved at all surrounding residential and non-residential land uses with the controls adopted, which are considered to represent best practice.

9.6.3 Monitoring

The predictions presented in this AQIA indicate that there would be no additional exceedances of the adopted air quality criteria due to project operation. However, based on the level of community concern associated with the project, it is recommended that a campaign of air quality monitoring is performed, to provide the EPA and community with assurance that the site can be operated with the best practice measures outlined in the report without giving rise to unacceptable air quality impacts.

The design of the air quality monitoring programme would be fully documented within the AQMP for the project site, the development of which is likely to be a condition of consent for the project. In the interests of providing sufficient information at this time to provide a broad structure of an air quality monitoring programme the following is noted:

- Continuous air quality monitoring would be performed at an appropriate location surrounding the project site before and during the project operation;
- As a minimum, measurements of PM_{10} would be made;
- A meteorological monitoring station would be installed to allow assessment of particulate concentrations and wind speeds/directions to assist in the assessment of any complaints received by the site;
- The meteorological monitoring would also assist in the refinement of site controls (e.g. application of water sprays, progressive cessation of operations);
- Review of the data obtained pre-development would allow a 'baseline' to be determined and would allow and concentrations measured post-development to be placed into context.

As part of this recommendation, an air quality validation assessment can be considered to ensure the facility is complying with conditions of consent prior to increasing production above 100,000 tpa, and furthermore, once the facility increases production over 150,000 tpa. This measure will provide the community and regulatory authorities with confidence that the facility is being operated in a manner consistent with the predictions in this study, and the health of the community and the environment is protected at all times.

9.7 Conclusions

Northstar Air Quality Pty Ltd has performed an air quality impact assessment for the proposed development of a designated State Significant Development (SSD8860), namely Kariong Sand and Soil Supplies site (the project) located at 90 Gindurra Road, Somersby NSW (the project site).

A previous version of the air quality impact assessment was submitted to support the Environmental Impact Statement for the project. Following a number of submissions from NSW Environment Protection Authority, NSW Department of

Health, and the community, an updated air quality impact assessment has been prepared to respond to those submissions. The revised air quality impact assessment is presented within this document.

In summary, submissions on the previous air quality impact assessment indicated that stakeholders were concerned about the following:

- The cumulative impacts associated with the project and other sources of particulate matter in the area;
- The assessment of potential maximum daily discharges of particulate matter based on maximum achievable production rates;
- The requirement for additional information / clarification to justify the calculated emission rates;
- Further analysis of modelled meteorological conditions;
- The employment of best practice particulate control measures to minimise emissions;
- The requirement for air quality monitoring as part of the project;
- Potential health impacts of silica dust; and
- Potential impacts of odour from stockpiled waste materials.

A full and detailed response to each of the issues above is presented within this report. Importantly, and in summary:

- The potential impacts associated with existing and proposed developments in the immediate area have been addressed;
- An updated dispersion modelling scenario, reflecting maximum potential daily material processing rates and the associated increase in vehicle movements has been subject to assessment;
- Additional information / clarification has been provided in the report to allow replication of emission rate calculations;
- An updated meteorological modelling assessment adopting observational data has been performed, and a subsequent updated dispersion modelling approach adopted to assess the impact of emissions on the surrounding environment;
- Additional particulate control measures have been adopted by the proponent in response to community concerns regarding dust. These additional control measures include:
- The construction of buildings around crushing and grinding/mulching operations with water sprays to suppress dust; and,
- The construction of a building to enclose the tip and spread area on three sides and the inclusion of water misting sprays to reduce dust emissions further.
- The additional measures have been included in the updated dispersion modelling assessment.
- An air quality monitoring program incorporating continuous measurement of particulate matter is proposed;
- An assessment of the impacts of respirable crystalline silica indicate that increases due to the project may be up to 10 % of the relevant criterion as an absolute maximum, based on worst case assumptions; and
- Impacts associated with odour will not be an issue as the project will not accept odorous materials.

A range of emissions control measures (including those additional measures adopted and outlined above) would be implemented as part of the project operation and these are discussed in detail in the main body of the report. It is considered that the measures adopted represent best practice dust control, including:

- Sorting and processing operations are conducted within a controlled environment in the Secondary Sorting Warehouse, with accompanying misting systems for dust control;
- Enclosure of the tipping and spreading bays, with misting systems for dust control during tipping;
- Enclosure of the grinding and mulching operations, with accompanying misting systems to avoid dust generation;
- Misting systems on outdoor storage bays for landscaping and civil supply materials to avoid dust being generated;
- Additional management controls to cease operations on the site on windy days;
- Sweeping, watering down and maintenance of all hard surfaces and roadways to keep surfaces clean to avoid dust being generated on dry, hot days.

The control measures which are adopted have been demonstrated to ensure that the environmental objectives are achieved. These measures would be implemented through an Air Quality Management and Monitoring Plan and in line with environmental best practice.

A risk-based assessment of the potential construction phase air quality impacts indicates that the implementation of a range of mitigation measures would be required to ensure that the risks (both health and amenity) to the surrounding community would be low or not significant.

The updated air quality impact assessment has considered worst case operational parameters, including material processing rates at absolute maximum throughout, and an increase in vehicle traffic bringing materials to site.

The results of the assessment, with the incorporation of a range of particulate matter control measures, indicate that all adopted air quality criteria will be achieved at all surrounding sensitive receptor locations.

One exceedance of the 24 hr PM_{10} criterion is noted, although this was due to an 'exceptional' event (a dust storm which affected PM_{10} concentrations at the Wyong site and in a wider area, from Albury to Sydney and to Tamworth). Significantly, the project is demonstrated not to contribute to any additional exceedances of the air quality criteria.

It is recommended that air quality monitoring is performed to provide the community and EPA with assurance that the site can be operated with the best practice measures outlined in the report and without giving rise to unacceptable air quality impacts, implemented through an Air Quality Management and Monitoring Plan. As part of this recommendation, an air quality validation assessment can be considered to ensure the facility is complying with conditions of consent prior to increasing production above 100,000 tonnes per annum, and furthermore, once the facility increases production over 150,000 tonnes per annum. This measure will provide the community and regulatory authorities with confidence that the facility is being operated in a manner consistent with the predictions in this study, and the health of the community and the environment is protected at all times.

The results of the air quality impact assessment indicate that the granting of Development Consent for the project should not be rejected on the grounds of air quality.

10 Traffic and Transport

10.1 Introduction

Seca Solution Pty Ltd undertook the traffic impact assessment to support the proposal for the upgrading and increasing the processing capacity at the existing Kariong Sand and Soil Supplies facility located at 90 Gindurra Road, Somersby. As heavy vehicle movements to and from the site will impact on the regional and state road network the application will also be reviewed by Roads and Maritime Services (RMS) and their concurrence will be required.

The full traffic and transport impact assessment is given in Appendix N of the EIS. The main findings and recommendations from the investigation are given in this chapter of the EIS.

10.2 Legislative requirements

In preparing this document, the following guides and publications were used:

- RMS Guide to Traffic Generating Developments, Version 2.2 Dated October 2002;
- RMS Technical Direction TDT 2013/ 04a Updated traffic surveys;
- Council Development Control Plan 2015;
- Australian / New Zealand Standard – Parking Facilities Part 1: Off-street car parking (AS2890.1:2004).

10.3 Baseline conditions

The subject site is located at 90 Gindurra Road Somersby. The surrounding land use consists primarily of light industrial and rural residential properties.

The main road through the locality is the Central Coast Highway (A49) which lies to the south of the subject site. This road provides a major link between the M1 Pacific Motorway to Gosford and through to the Central Coast. In the vicinity of the subject site it provides 2 lanes of travel in each direction with additional lanes provided at intersections to maintain capacity. Being an arterial road, the Central Coast Highway carries over 40,000 vehicles per day.

Wisemans Ferry Road is a regional road connecting the Central Coast Highway with the Pacific Highway, Somersby Industrial Area and the rural residential and agricultural areas of the Somersby plateau, Mangrove Mountain, Mangrove Creek and through to Wisemans Ferry on the Hawkesbury River. At its southern end Wisemans Ferry Road connects with the Central Coast Highway via a signalised intersection at the start of the southbound on ramp to the M1 Pacific Motorway. Between the Central Coast Highway and the Pacific Highway, it passes under the M1 and connects with the southbound off ramp and the northbound on ramp. This section has a four-lane divided formation and the Pacific Highway intersection is a two-lane roundabout. North of the Pacific Highway the formation becomes two-lane divided standard up to the Gindurra Road / Somersby Falls Road intersection which is also under roundabout control. North of this intersection Wisemans Ferry Road reverts to a two-lane rural road formation. The whole section between the Central Coast Highway and Gindurra Road is designed to cater for heavy vehicles accessing the businesses within the Somersby Industrial Area. The posted speed limit is 70km/h.

Gindurra Road is a local road providing access to businesses within the eastern section of the Somersby Industrial Area including the subject site. At its eastern end it connects with Debenham Road South which provides access to primarily rural residential properties and a few scattered light industrial developments as well as providing an alternative light traffic connection with Dyer Crescent at West Gosford. Gindurra Road was upgraded about 2 years ago to provide a 10-metre- wide asphalt pavement to cater for heavy vehicle access to the industrial developments in this area. This pavement width provides a single lane of travel in each direction with sufficient space for kerb side parking to both sides, however there is little demand for on-street parking. There are no pedestrian footpaths provided along Gindurra

Road, although the grass verges on each side are wide enough to provide for pedestrian access. The posted speed limit is 50 km/hr.

Kangoo Road is a local road that provides a connection between the Central Coast Highway and Debenham Road. It lies generally to the south-east of Gindurra Road and connects with Debenham Road about 330 metres south of Gindurra Road. It provides access primarily to light industrial businesses as well as Mount Penang Parklands and several rural residential properties. It also forms the southern boundary of the subject site, however, there is no existing access to the site from Kangoo Road. About 450 metres before it connects with Debenham Road the road name changes to Acacia Road. For a length of 1km from the Central Coast Highway, Kangoo Road has kerb and gutter along its eastern side and a pavement that varies between 9 to 10 metres wide, which is suitable for heavy vehicles servicing the adjacent industrial developments. Past this point and along the frontage of the subject site to Debenham Road, Kangoo Road narrows to a typical two-lane rural road standard with a pavement width of 6 metres and narrow gravel shoulders. The posted speed limit is 50km/h.

The section of Debenham Road between Gindurra Road and Acacia Road (Kangoo Road) is a two-lane rural road with a 7-metre-wide sealed pavement and narrow gravel shoulders. The posted speed limit is 50km/h.

Pedestrian and cycling facilities are provided along the Central Coast Highway and a short section of Wisemans Ferry Road in the form of shared paths and on-road cycle lanes. There is no direct connection between these facilities and the subject site.

A regular bus service is provided between Gosford and Somersby by Busways with the route including Central Coast Highway, Kangoo Road, Debenham Road, Gindurra Road, Somersby Falls Road and Pile Road.

As part of the project work Seca Solution collected traffic data at the intersection of Central Coast Highway and Kangoo Road during typical weekday morning and afternoon peak periods. This survey was completed on Thursday 30 November 2017 from 6.00am to 8.00am and from 3.00pm to 6.00pm, with the peak hours determined as 7.00am to 8.00am and 4.45pm to 5.45pm (Appendix D).

Peak hour volumes typically represent around 10% of the daily traffic volumes. During the morning peak hour, the two-way traffic volumes along Central Coast Highway (west of Kangoo Road) were in the order of 3,900 vehicles per hour whilst in the afternoon peak volumes were 4,300 vehicles per hour. Daily volumes could therefore be in the order of 41,000 vehicles per day, reflecting both local demand as well as through traffic in this location.

Peak hour volumes along Kangoo Road were significantly lower with two-way volumes averaging 340 vehicles per hour. This would give daily flows in the order of 3,500 vehicles per day.

Traffic surveys were also conducted at the intersection of Central Coast Highway and Wisemans Ferry Road on Thursday 7 December 2017 from 6.00am to 8.00am and 4.00pm to 6.00pm, with the peak hours determined as 6.15am to 7.15am and 5.00pm to 6.00pm.

During the morning peak hour, the two-way traffic volumes along Wisemans Ferry Road were 1,000 vehicles per hour whilst in the afternoon peak volumes were in the order of 1,300 vehicles per hour. Daily volumes could therefore be in the order of 11,500 vehicles per day. Traffic flows along the Central Coast Highway were lower in this location.

Traffic surveys were previously conducted at the Wisemans Ferry Road / Gindurra Road intersection in December 2015. During the morning peak hour (6.15am to 7.15am) the two-way traffic volumes along Wisemans Ferry Road (south) were 427 vehicles per hour and in the afternoon peak (3.30pm to 4.30pm) volumes were 545 vehicles per hour (average 486). Daily volumes along Wisemans Ferry Road in this location could therefore be in the order of 4,900 vehicles per day.

Peak hour volumes along Gindurra Road (east) were slightly lower with two-way volumes of 329 vehicles per hour in the AM and 433 vehicles per hour in the PM (average 381). This would give daily flows in the order of 3,800 vehicles per day.

A spot check of current traffic volumes was conducted at the Wisemans Ferry Road / Gindurra Road intersection on Thursday 23 November 2017 from 6.15am to 7.15am. During the morning peak hour, the two-way traffic volumes along Wisemans Ferry Road (south) were 490 vehicles per hour. The 2015 data found afternoon flows were 27.6% higher than morning flows. On this basis, afternoon flows in 2017 would be in the order of 625 vehicles. This would give daily flows in the order of 5,600 vehicles per day.

During the morning the two-way peak hour volumes along Gindurra Road (east) were 417 vehicles per hour. The 2015 data found afternoon flows were 31.6% higher than morning flows. On this basis, afternoon flows in 2017 would be in the order of 549 vehicles. This would give daily flows in the order of 4,800 vehicles per day volumes along Wisemans Ferry Road could therefore be in the order of 5,600 vehicles per day.

The traffic surveys conducted for this assessment indicate that there is a priority movement of 65% total traffic towards the M1 Motorway in the AM Peak and the reverse in the PM Peak.

During the peak hour traffic surveys, heavy vehicle volumes accounted for around 16% of total volumes in Wisemans Ferry Road and 10% in Gindurra Road. This equates to around 800 heavy vehicle movements per day on Wisemans Ferry Road and 400 per day on Gindurra Road.

Observations on site during the morning and afternoon peak periods show that the road network in the vicinity of the subject site operates well, with low delays and congestion for drivers.

The RMS Guide to Traffic Generating Developments, Section 4 (Table 4.4) provides guidance as to the operating level of service for urban roads at various ranges of mid-block traffic volumes (NSW RTA, 2002). According to the Guide, the roads surrounding the subject site are currently operating at the following levels of service during peak periods:

- Wisemans Ferry Road (2017 AM-surveyed): 1 lane each direction, 273vph – LoS B;
- Wisemans Ferry Road (2017 PM-adjusted): 1 lane each direction, 431vph – LoS C;
- Gindurra Road (2017 AM-surveyed): 1 lane each direction, 249vph – LoS B;
- Gindurra Road (2017 PM-adjusted): 1 lane each direction, 299vph – LoS B;
- Kangoo Road (2017 AM): 1 lane each direction, 228 vehicles per hour – LoS B;
- Kangoo Road (2017 PM): 1 lane each direction, 215 vehicles per hour – LoS B.

Crash data provided by Roads and Maritime Services show that there have been 38 recorded crashes along the roads within the study area since January 2012. 29 of these crashes occurred along the Central Coast Highway between Kangoo Road and Wisemans Ferry Road, 5 were at the intersections of Wisemans Ferry Road and the M1 Motorway ramps, 2 were on Wisemans Ferry Road between the Pacific Highway and Gindurra Road, one on Kangoo Road 200 metres north of the Central Coast Highway and one was at the Acacia Road / Debenham Road intersection. Almost half of the crashes were rear-end crashes associated with queueing along the Central Coast Highway.

None of these crashes resulted in a fatality, however, 21 were injury crashes with the remaining 17 being non-injury crashes.

The crash rate along the Central Coast Highway averages at just under 5 per year over the last 6 years of recorded data which indicates a reasonably high level of safety considering the high volume of traffic travelling along this route each day. The other roads in the study area, particularly Wisemans Ferry Road, Gindurra Road and Kangoo Road are

operating at a high level of safety and it is important to note that there have been no recorded crashes in the vicinity of the subject site.

The available sight distance at the existing access to the site on Gindurra Road exceeds the Austroads requirements of 90 metres in each direction so it is reasonable to assume that, the current level of safety along Gindurra Road will continue following the development of the site.

There is limited potential for further developments within the Somersby Industrial area but primarily to the west of Wisemans Ferry Road. Any future developments in this area will contribute traffic to the Wisemans Ferry Road / Somersby Falls Road / Gindurra Road intersection but will have only a minor impact on the operation of the subject site.

10.4 Proposed development

The subject site is located at 90 Gindurra Road, Somersby. The surrounding land use consists primarily of light industrial and rural residential properties.

The site is currently used for storing and screening soil and sand, which is sold for landscaping. It was originally approved as a Sand and Metal Recycling Facility on 28/02/1992 (DA 15337). As part of the original approval, only the front section of the site was approved for this use. The site's current development approval and infrastructure limits the amount of material that can be accepted and processed (screened and sorted) at the site.

The project allows for the upgrade of onsite facilities to accommodate an increase in throughput from the current 6,000 tonnes per annum (processing limit is imposed by the need for a EPA licence under Schedule 1 of the *Protection of the Environment Operations Act* 1997) to a proposed 200,000 tonnes per annum and the expansion into a best-practice recycling plant that can process a range of sand, soil and building materials. We have reviewed the SEARs that have been issued and note the requirements of the Roads and Maritime Services (RMS) for the project.

The operational analysis for the proposed development has been provided by Kariong Sand and Soil Supplies which includes traffic volumes that will be generated at various stages of the development.

At full development (expected to be in 2025) the site will be capable of receiving, processing and storing up to 200,000 tonnes per annum of soil, sand and building materials. It is also expected to supply and deliver up to 10,000 tonnes per annum of landscape supplies.

This level of operation is estimated to generate up to 164 vehicle trips per day (82 inbound and 82 outbound) consisting of:

- Staff operational vehicles x 20;
- 12 tonne tippers x 77;
- 32 tonne truck and dog or semi-trailers x 41;
- 40 tonne B-Doubles x 14; and
- Landscaping x 12.

Advice from the study team of a similar development has allowed however for the calculation of the hourly trip distribution as shown in Table 10.1.

Table 10.1. Distribution of development traffic across a typical working day.

Time	% daily traffic	Hourly movements
7-8 am	7%	12
8-9 am	9%	15

Time	% daily traffic	Hourly movements
9-10 am	11%	18
10-11 am	14%	23
11 am -12 noon	11%	18
12-1 pm	14%	23
1 -2 pm	9%	15
2-3 pm	11%	18
3-4 pm	8%	13
4-5 pm	5%	9
5-6 pm	0%	0

It can be seen that the majority of vehicle movements for this type of facility occur outside of the local road network peak, with flows being highest through the middle of the working day. The traffic to be generated by the development has been assessed during the AM and PM road peaks, with significantly lower flows on the local road network noted outside of these periods.

A conservative approach has allowed for 10% of daily flows to occur in the AM peak hour, with 5% in the PM, noting that the road peak for the key intersections was determined to be across the period from 4:45pm – 6pm when it is expected there will be minimal movements associated with the development. This gives peak hour flows of:

- AM Peak = 17 trips per hour (9 in / 8 out);
- PM Peak = 9 trips per hour (4 in / 5 out).

Vehicular access will be provided off Gindurra Road, with a new driveway located 14 metres west of the existing access driveway to ensure safe sight distance in each direction. The upgraded layout for the site access, including a suitable right turn treatment is provided in Appendix B of the TIA (see Appendix N). Access to the site shall be controlled by a secure gate which will be located a sufficient distance within the property so that a single vehicle can store without interrupting traffic flows in Gindurra Road. This gate shall remain open during the day when the site is operational to ensure unrestricted access for heavy vehicles associated with general operations.

It is proposed to adjust the existing centreline in Gindurra Road to provide a right turn lane for vehicles entering the site. No Stopping signs will be provided along the length of this turning lane. The design of the access point will ensure vehicles can enter the site with minimal delays to other road users with the access gate open when the site is operational to ensure unrestricted entry for heavy vehicles associated with general operations.

The internal layout of the site will allow at least 2 trucks to queue on-site between the access and the entrance boom gate / weigh bridge. The expected hourly vehicle movements are outlined further in Section 4, with an upper limit of 23 vehicles expected to access the site in any 1 hour. This could see up to 12 vehicles inbound, or 1 vehicle every 5 minutes on average. As such, the demand for queuing of heavy vehicles is not expected to exceed 1 vehicle at any time, with the site layout allowing for 2 being sufficient to ensure all queuing can be contained within the site, thereby having no impact upon the external road network.

All vehicles will be able to enter and exit the site in a forward direction, with the internal parking layout to be designed at the detailed design stage of the development in accordance with Council requirements and AS/NZS 2890.1:2004 Parking facilities Off-street Parking.

The internal roads will allow heavy vehicles to circulate within the site to load or unload and exit onto Gindurra Road in a forward direction. A weighbridge shall be located adjacent to the recycling plant with boom gate controls and traffic signals on each approach to control traffic movements across the weighbridge. Two waiting bays shall be

provided within the site for vehicles to queue while waiting to use the weighbridge. The predicted site flows of up to 12 inbound trucks in an hour, (Sec 4) equates to an average of one truck every five minutes. Two waiting bays is therefore sufficient to provide for the holding of trucks within the site.

Swept paths have been prepared to confirm the ability of large trucks, up to a B-Double combination, to enter and exit onto Gindurra Road in a forward direction (see Appendix E).

10.5 Impact assessment

Kariong Sand and Soil Supplies has provided details of their operational analysis for the proposed development of the site which includes estimates of the traffic volumes that will be generated at various stages of development. A copy of the traffic generation analysis is included at Appendix N.

10.5.1 Construction phase

Most of the construction work will be contained within the site so minimal impact is expected upon the external road network. There will be a requirement for construction machinery and traffic associated with workers to access the site. A Traffic Management Plan will be required for work on site and to provide access controls. This will be completed as part of the design process by the contractor on site.

During the construction of the site access there will be a need to manage traffic flows along Gindurra Road. The Traffic Control Plan for this work will be prepared as part of the detailed design stage of the project.

10.5.2 Operational phase

Vehicles accessing and egressing the site at Gindurra Road will travel to and from the Central Coast Highway and M1 Motorway via Wisemans Ferry Road and Gindurra Road. According to the operational details provided these vehicles will be distributed to the network as follows:

- M1 Motorway south – 40 trips per day (20 inbound, 20 outbound);
    - Inbound Route: M1 Motorway northbound off-ramp, Central Coast Highway, Wisemans Ferry Road, Gindurra Road; and
    - Outbound Route: Gindurra Road, Wisemans Ferry Road, Central Coast Highway, M1 southbound on-ramp.
- M1 Motorway north – 62 trips per day (31 inbound, 31 outbound).
    - Inbound Route: M1 Motorway southbound off-ramp, Wisemans Ferry Road, Gindurra Road
    - Outbound Route: Gindurra Road, Wisemans Ferry Road, M1 Motorway northbound on- ramp.
- Central Coast Highway – 62 trips per day (31 inbound, 31 outbound).
    - Inbound Route: Central Coast Highway, Wisemans Ferry Road, Gindurra Road;
    - Outbound Route: Gindurra Road, Wisemans Ferry Road, Central Coast Highway.

The distribution of trips is shown diagrammatically in Figure 2 of Appendix N.

The major impact of the development will be increased traffic movements along Gindurra Road and Wisemans Ferry Road. Due to the low volumes of additional traffic that will be generated from this development and the low incidence of crashes it is considered that the additional traffic movements at this intersection will have a minimal impact upon road safety.

Current daily traffic volumes in the other major roads in the network area:

- Central Coast Highway – 41,000 vehicles per day;
- Wisemans Ferry Road - 5,600 vehicles per day;
- Gindurra Road – 4,700 vehicles per day; and
- Kangoo Road - 3,500 vehicles per day.

The intersections at Central Coast Highway / Wisemans Ferry Road and Wisemans Ferry Road / Gindurra Road have been modelled using Sidra Intersection 8 software to assess their existing operational performance during the morning and afternoon peak. The results of the modelling are shown below (AM/PM).

Table 10.2. Results of Sidra Modelling for Central Coast Hwy / Wisemans Ferry Rd Intersection.

Intersection		Level of Service	Average Delay (s)	95% Queue (m)
Central Coast Hwy / Wisemans Ferry Rd				
Central Coast Hwy (westbound)	Through	B / A	17.7 / 14.2	302.5 / 65.3
	Right Turn	E / E	64.4 / 58.6	97.9 / 152.6
Wisemans Ferry Road	Right Turn	F / E	72.3 / 70.2	48.8 / 20.2
Central Coast Hwy (eastbound)	Through	A / B	10.1 / 23.6	53.8 / 313.0
Overall		**B / C**	**26.4 / 31.6**	**302.5 / 313.0**

Table 10.3. Results of Sidra Modelling for the Wisemans Ferry Rd / Gindurra Rd Intersection.

Intersection		Level of Service	Average Delay (s)	95% Queue (m)
Wisemans Ferry Rd / Gindurra Rd				
Wisemans Ferry Road (northbound)	Right Turn	A / A	10.0 / 9.8	11.1 / 9.9
Gindurra Road	Right Turn	A / A	9.6 / 10.4	9.6 / 12.5
Wisemans Ferry Road (southbound)	Right Turn	A / A	10.4 / 11.7	4.0 / 7.2
Somersby Falls Road	Right Turn	A / A	11.2 / 10.6	3.1 / 8.2
Overall		**A / A**	**6.3 / 6.7**	**11.1 / 12.5**

Note: PM flows from the 2015 survey data were factored up for each movement consistent with the observed increase in the 2015 – 2017 AM movements, to achieve 2017 PM volumes.

The results indicate that, overall, these intersections are currently operating at a satisfactory level of service, particularly the roundabout at Wisemans Ferry Road / Gindurra Road. Some of the movements at the Central Coast Highway intersection are experiencing low levels of service but these are the minor movements turning right to and

from Wisemans Ferry Road. However, the queue lengths are acceptable and do not exceed the available lengths of the right turn lanes.

Furthermore, the major through movements on the Central Coast Highway are operating at LoS A or B and the queue lengths do not block adjacent intersections as there is at least 500 metre separation between Woy Woy Road, Kangoo Road and Wisemans Ferry Road.

Sidra modelling has also been completed for the intersection of the Central Coast Highway and Wisemans Ferry Road allowing for the additional traffic generated by the development. The results of this are provided below.

Table 10.4. Results of Sidra Modelling for Central Coast Hwy / Wisemans Ferry Rd Intersection with additional traffic flow from the development.

Intersection		Level of Service	Average Delay (s)	95% Queue (m)
Central Coast Hwy / Wisemans Ferry Rd				
Central Coast Hwy (westbound)	Through	B / A	19.2 / 14.2	314.1 / 65.3
	Right Turn	E / E	61.6 / 59.0	96.7 / 154.2
Wisemans Ferry Road	Right Turn	E / F	73.9 / 70.4	51.3 / 21.1
Central Coast Hwy (eastbound)	Through	A / B	10.6 / 23.7	55.1 / 313.4
Overall		**B / C**	**27.0 / 31.7**	**314.1 / 313.4**

The above results indicate that the additional trips that will be generated by the development will have a negligible impact upon the operation of this intersection during the peak hours with very minimal increase to the average delays or queueing on each approach.

The intersection of Wisemans Ferry Road / Gindurra Road / Somersby Falls Road currently operates well within the acceptable levels of service and has sufficient spare capacity to cater for the additional 17 AM trips and 9 PM trips per hour generated by the development.

10.6 Mitigation measures

All vehicles shall be able to enter and exit in a forward direction. Access and internal circulation are to be designed in accordance with AS2890 and Council's DCP.

Vehicular access will be provided off Gindurra Road via a secure gate located a sufficient distance within the property so that vehicles up to the size of a B-Double will be able to store without interrupting traffic flow in Gindurra Road. Internal roadways will allow vehicles to circulate within the site to load or unload and exit via Gindurra Road in a forward direction.

The posted speed limit along Gindurra Road is 50 km/h. According to Austroads Guide to Road Design the sight distance requirement to approaching vehicles for a left turning driver is 69 metres at an approach speed of 50km/h.

We note that development consent for Stage 1 development works for the site was provided by Central Coast Council on 17/11/2017 under DA52541/2017, specifically for construction of a 'New Shed with Offices, Amenities and Driveway'. Under Condition 2.8a of DA52541/2017, it is noted that Central Coast Council requires that the "…vehicle crossing shall be located approximately 14m west of the existing vehicle crossing to achieve the minimum sight distance of 69m in accordance with Figure 3.3 of AS 2890.22002". Seca Solution has reviewed this advice, and it is recommended the proposed entrance design and location is satisfactory for the SSD proposal, with a sight distance of 55m, and is compliant with AD2890.22002. This sight distance is satisfactory given vehicle speeds approaching the site from the east are likely to be travelling less than 40 km/hr, given the right angle turn from Debenham Road.

Service vehicle access will be available via the main entry / exit off Gindurra Road.

It is proposed to adjust the existing centreline in Gindurra Road to provide a right turn lane for vehicles entering the site. No Stopping signs will be provided along the length of this turning lane. The design of the access point will ensure vehicles can enter the site with minimal delays to other road users with the access gate open when the site is operational to ensure unrestricted entry for heavy vehicles associated with general operations.

The internal layout of the site will allow at least 2 trucks to queue on-site between the access and the entrance boom gate / weigh bridge. The expected hourly vehicle movements are outlined further in Section 4, with an upper limit of 23 vehicles expected to access the site in any 1 hour. This could see up to 12 vehicles inbound, or 1 vehicle every 5 minutes on average. As such, the demand for queuing of heavy vehicles is not expected to exceed 1 vehicle at any time, with the site layout allowing for 2 being sufficient to ensure all queuing can be contained within the site, thereby having no impact upon the external road network.

The existing access to the site will be modified to ensure that heavy vehicles up to a B-Double can enter and exit safely. The access to the site has been designed to be relocated fourteen metres west of the existing site access to provide appropriate sight lines and to enable the safe entry and exit of heavy vehicles up to a B-Doubles. The entrance/exit has been designed such that vehicles can only exit the site with a left-hand turn. This will improve safety on Gindurra Rd and decrease the amount of heavy traffic on Debenham Road South.

Figure 10.1. New Entrance Design for the Facility.

Local bus services are available from a bus stop in Gindurra Road about 500 metres to the south of the site. This service provides access to and from Gosford railway station. All vehicles will be able to enter and exit the site in a forward direction, with the internal parking layout to be designed at the detailed design stage in accordance with Council requirements and AS/NZS 2890.1:2004 Parking facilities Off-street car parking.

The accesses, internal roads and parking aisles will be designed in accordance with AS/NZS 2890.1:2004 Parking facilities Off-street car parking. The aisle width requirement is 5.8 metres.

As the site will not be open to the public it is proposed to provide 10 parking spaces on site for employees only. A parking area for heavy vehicles is also proposed within the site near the main entrance off Gindurra Road.

Neither the Gosford DCP nor the RMS guidelines provide parking requirements for this type of development. The parking layout shall be designed in accordance with AS/NZS 2890.1:2004 Parking facilities Off-street car parking. Parking Class: 1A (residential, staff).

- Bay lengths: 5.4 metres;
- Bay widths: 2.5 metres; and
- Aisle widths: 5.8 metres.

It is proposed to provide 18 parking spaces on site, which will accommodate the parking demands for employees.

A parking area for heavy vehicles will be located within the site near the main entrance off Gindurra Road.

To facilitate the right turn movement into the site it is recommended that the existing centre line marking in Gindurra Road be relocated a minimum of 3 metres south (towards the site) to provide sufficient width for a right turn lane into the site. The right turn lane should be a minimum of 60 metres in length to provide sufficient storage for two B-Doubles. The site access should be designed to ensure that the largest vehicle entering or exiting the site is able to do so without encroaching on the opposite lane in Gindurra Road. No Stopping signs would need to be installed on both sides of Gindurra Road for the full length of the right turn lane.

10.7 Conclusions

The Kariong Sand and Soil supplies site is located at 90 Gindurra Road, Somersby (Lot 4 DP 227279) and is currently used for storing and screening soil and sand, which is sold for landscaping. It is proposed to develop the site over the next 6 years to receive, process and store up to 200,000 tonnes per annum of soil, sand and building materials with all materials then being exported from the site.

This level of operation, by 2025, is estimated to generate up to 164 vehicle trips per day consisting of staff operational vehicles, 12 tonne tippers, 32 tonne truck and dog or semi-trailers and 40 tonne B-Doubles. The peak hour movements were calculated based on the operation of a similar development, with a review of the typical movements across a day for this type of facility showing that peak truck movements for the site do not coincide with the road network peak periods. An allowance for 17 vehicles in the AM peak and 9 vehicles in the PM peak has been made based on the data provided. It is noted that the road network between Wisemans Ferry Road and 90 Gindurra Road is an approved B-Double route by the National Heavy Vehicle Regulator.

The site operator is anticipating that 25% of materials entering the site will come from Sydney while the remainder will be sourced locally on the Central Coast. It is expected that 100% of the products leaving the site will be used in the local area. These will be bulk loads transported in the various heavy vehicle classes. There will be no sales direct to the public.

The existing road network and major intersections are currently operating at a good level of service with spare capacity and the traffic generated by the proposed development will be distributed to the road network across the working day. The additional traffic is expected to have only a minor impact on the LoS of each of these roads and they will still be operating within their existing capacity.

From the route nominated these additional trips will not have any significant impact on the operational performance of the intersections at Central Coast Highway / Kangoo Road. The intersections of the Central Coast Highway / Wisemans Ferry Road and Wisemans Ferry Road / Gindurra Road have been assessed and as each of these intersections is currently operating at acceptable levels of service with sufficient spare capacity to cater for the additional traffic generated by this proposed development, the impact of the future development is acceptable.

The existing access has been reviewed on site and is to be relocated 14 metres west in accordance with Council's recommendation to satisfy the sight distance. A concrete kerb is recommended on the exit to the site to ensure vehicles only exit to the left on Gindurra Road and do not proceed into rural and residential areas to the east. A no right turn sign will also be installed at the exit to the site.

To facilitate the right turn movement into the site modifications have been designed to provide a right turn treatment as shown in Attachment B. The right turn lane shall provide sufficient storage to allow for two B-Double with No Stopping signs also installed.

It is therefore recommended that allowing for the minor works at the access, the proposed development be approved given the acceptable impact on traffic, access and safety.

11 Noise and Vibration Impact Assessment

11.1 Introduction

Waves Acoustic Consulting (Waves Consulting) were engaged to prepare a Noise and Vibration Impact Assessment (NVIA) to demonstrate the noise and vibration impacts associated with the proposed development.

A full copy of the Noise and Vibration Impact Assessment is provided at Appendix O.

11.2 Legislative requirements

The SEARs (SSD 8660) identifies the following requirements for noise and vibration:

- Comprehensive background noise monitoring assessment at all nearby noise sensitive receivers;
- Operational noise modelling and assessment in accordance with the NSW Industrial Noise Policy (INP) to include spectral data of proposed plant, noise modification factors and weather impacts on noise propagation;
- Operational traffic noise analysis in accordance with the NSW Road Noise Policy (RNP);
- Operational vibration modelling and analysis in accordance with the NSW EPA's Assessing Vibration: A Technical Guideline;
- Construction Noise and Vibration Assessment in accordance with the Interim Construction Noise Guidelines (ICNG).

The assessment report covers all requirements of the SEARs. However, please note that the SEARs request the use of the ECRTN for road traffic noise assessment, which has since been rescinded and replaced by the RNP. In addition, the NSW INP has recently been replaced by the Noise Policy for Industry (NPI).

11.3 Baseline conditions

The existing site is large (>110,000 m^2) with several buildings and sheds to the north of the site. Mixed materials receival, sorting and crushing is currently undertaken towards the middle of the site.

The site is situated at an interface between industrial zoned land / buildings and rural residential dwellings. The nearest industrial buildings are approximately 130m to the west. The industrial zone to the west is large and extends for over 1000m. The Pacific Hwy is located approximately 150m to the west of the site and cuts through the industrial zone with an overpass above Gindurra Rd.

Rural residential zones with residential dwellings are located along the north-eastern, eastern and south-eastern boundaries of the site. The closet residential dwellings are located within 50m (north-east), 160m (east) and 190m (south-east). The Kariong Correctional Facility is located 170m south-east of the site boundary. The nearest commercial facility is the Central Coast Riding for the Disabled, which is located 100m south of the site boundary.

To characterize the existing acoustic environment in the area, a survey of environmental noise levels was conducted during October 2017. The noise logger was installed adjacent to the residential property at 12 Acacia Rd, Somersby.

Table 11.1. Unattended noise monitoring results (from Table 4 in NVIA at Appendix O).

Date	L_{AF90} Background Noise Levels			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Wednesday 11 October 2017		47			54	
Thursday 12 October 2017	46	43	46	60	52	56
Friday 13 October 2017	45	47	37	51	52	50
Saturday 14 October 2017			33			47

Date	L_{AF90} Background Noise Levels			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Sunday 15 October 2017		42	44		48	57
Monday 16 October 2017	43	44	46	50	52	56
Tuesday 17 October 2017	45	46	43	51	51	52
RBL	45	46	44	-	-	-
Log Average				55	52	54

It was noted that the evening and night-time noise levels were similar to the daytime noise levels, which is atypical. The logger data indicates that industrial noise throughout the evening and night-time is primarily responsible for this noise trend. During weekdays the industrial noise rises steadily throughout the evening and night-time. The overall noise level rises sharply each weekday between 04:00 and 07:00. This is most likely a combination of local industrial activities preparing for shipping and transport and a rise in traffic noise on the nearby Pacific Hwy. The noise environment surrounding the proposed site is dominated by a combination of local industrial noise sources and traffic noise along the Pacific Hwy.

Attended measurement of ambient noise were taken at several representative locations on 19 October 2017. These have been used to determine the various noise sources that influence the existing noise environment.

Table 11.2. Attended noise monitoring results (from Table 5 in NVIA at Appendix O).

Measurement location	Measured Noise Levels (dB re 20 µPa)			Character of the Ambient Noise
	LAeq	LAFMax	LAF90	
Logger Location as per Figure 1 of NVIP (on eastern boundary of site)	48	61	45	Traffic noise from the Pacific Hwy, local industrial noise / reversing beepers, and flora and fauna noise.
Adjacent to 242 Debenham Rd, Somersby	67	83	45	Local traffic movements, traffic noise from the Pacific Hwy, industrial noise, and flora and fauna noise.
Acacia Rd opposite Kariong Correctional Facility	60	78	47	Local traffic movements, traffic noise from the Pacific Hwy, industrial noise, and flora and fauna noise.

The environmental noise in the area is typically dominated by industrial noise and traffic on the nearby Pacific Hwy and surrounding local roads. Flora and fauna noise were also found to be contributing sources of noise in the environment.

11.4 Proposed development

The proposed development consists of the redevelopment of the existing industrial facilities at the site. KSSS proposes to demolish existing industrial buildings and to upgrade the site to handle a proposed capacity of up to 200,000 tpa of material per year by 2025. The noise generating activities will be conducted during both the construction and operational phases of the development.

11.4.1 Operational phase

The proposed operational hours for the facility are summarized in Table 11.3. A summary of the expected additional vehicle movements is provided in Table 11.4.

Table 11.3. Opening hours of new facility.

Operational activity	Hours
Opening hours (staffed)	0700 to 1800 Mon – Fri, 0800 to 1600 Sat. Closed Sunday
Waste deliveries	0700 to 1800 Mon – Fri, 0800 to 1600 Sat. Closed Sunday
Waste processing (sorting, crushing, grinding, screening)	0800 to 1700 Mon – Fri
Product sales	0700 to 1800 Mon – Fri, 0800 to 1600 Sat. Closed Sunday

At full development (expected to be in 2027) the site will be capable of receiving, processing and storing up to 200,000 tonnes per annum of soil, sand and building materials. It is also expected to supply and deliver up to 10,000 tonnes per annum of landscape supplies.

This level of operation is estimated to generate up to 164 vehicle trips per day (82 inbound and 82 outbound) consisting of:

- Staff operational vehicles x 20.
- tonne tippers x 77.
- 32 tonne truck and dog or semi-trailers x 41.
- 40 tonne B-Doubles x 14.
- Landscaping x 12.

Averaged over an 8-hour working day this equates to 21 trips per hour. The hourly distribution (based on vehicle movements recorded at similar facilities) is provided in .

Table 11.4. Distribution of development of traffic across a typical working day.

Time	% Daily Traffic	Hourly Movements
0700 to 0800	7%	12
0800 to 0900	9%	15
0900 to 1000	11%	19
1000 to 1100	14%	23
1100 to 1200	11%	18
1200 to 1300	14%	23
1300 to 1400	9%	15
1400 to 1500	11%	18
1500 to 1600	8%	13
1600 to 1700	5%	9
1700 to 1800	0%	0

Maximum hourly traffic flows of 23 vehicles are predicted in the traffic report.

The main noise and vibration sources from the proposed facility will include:

- Offsite vehicle movements on the nearby road network;
- Onsite vehicle movements – mainly delivery trucks, excavator and loader;
- Concrete and building material processing / crushing;
- Screening and sorting of materials;
- Stockpiling of refined products; and
- Mechanical services and maintenance activities associated with the new heavy-vehicle maintenance building.

Potential noise impacts from operation of the proposed development, which are assessed in the NVIA, include:

- Noise emission from the fixed noise sources associated with the development to any nearby sensitive receivers, i.e. the crushing and mulching operations in the main processing area, and the sorting and screening operations inside the Secondary Sorting Warehouse;
- Noise emission from vehicle movements on site to any nearby sensitive receivers, i.e. delivery trucks, excavator and loader movements;
- Additional noise emission from vehicle movements on the adjacent roads to any nearby sensitive receivers.

11.4.2 Construction phase

For this project, the construction works would be undertaken in accordance with the Interim Construction Noise Guidelines and would typically occur during the standard working hours between:

- 07:00 to 18:00 hrs Monday to Friday; and
- 08:00 to 13:00 hrs Saturday.

There would generally be no construction works on Sundays or public holidays.

In general, the majority of the construction phase will focus on earth works to prepare the site for future operations. The earthworks will be required to remove the large existing stockpiles of material and process / crush these for use elsewhere on site or for removal.

Chapter 8 of the NVIA (Appendix O: Noise and Vibration Impact Assessment) provides a summary of the equipment to be used and the associated power sound levels. The expected construction traffic volumes are an additional 4 B-double trucks per day.

Potential noise impacts from construction of the proposed development, which are assessed in the NVIA, include:

- Noise emission from the fixed noise sources associated with the development to any nearby sensitive receivers, i.e. the outdoor crushing / screening plant used to process existing stockpiles;
- Noise emission from vehicle movements on site to any nearby sensitive receivers, i.e. delivery trucks, excavators, bulldozers and loaders;
- Additional noise from construction vehicle movements on the adjacent roads to any nearby sensitive receivers.

11.5 Impact assessment

Noise modelling of the fixed and mobile noise sources has been used to predict the noise from the typical operation of the facility to the surrounding sensitive receivers.

11.5.1 Operational phase

With no noise mitigation, several of the nearby residential receivers demonstrated exceedances of the Project Noise Trigger Levels (PNTLs) during the day time operations when the crusher and screening plant are operational. In

addition, delivery trucks and onsite vehicle movements were found to exceed the PNTLs during the evening and night-time periods.

Enclosing the crushing and mulching operations, and installing noise barriers, were investigated as potential feasible and reasonable mitigation measures to satisfy the PNTLs. Noise modelling was undertaken to optimize the height and extents of noise barriers across the site to satisfy the PNTLs during all assessment periods. Figure 11.1 shows the optimized noise barriers across the site that are recommended to achieve compliance with the PNTLs. These barriers must be used in conjunction with the crushing and mulching operation sheds.

Figure 11.1. Recommended noise barrier locations, heights and extents to achieve compliance with the PNTLs.

A selection of the predicted worst-case operational noise levels due to onsite noise sources with the recommended noise barriers are summarised and compared against the NPI project noise trigger levels in Table 11.5.

In addition, noise contour maps for the day, evening and night-time periods are provided in Appendix B of the NVIA (see Appendix O). The noise contours presented are taken at 1.5 m elevation to simulate first storey receivers (ie typical residential receivers in the area). The noise contours show how the noise emission from the proposed development propagates into the surrounding environment.

The PNTLs at all nearby correctional, commercial and industrial receivers are also satisfied.

Table 11.5. Predicted Operational Noise Levels Compared to PNTLs.

Location	Worst-Case LAeq,15m			PNTLs Exceedance LAeq,15m			LAeq,15m Sleep Disturbance
	Day	Eve	Night	Day	Eve	Night	
Residential				**48**	**43**	**43**	**49**
5 Kowara Rd	24	≤20	≤20	0	0	0	0
9 Kowara Rd	26	≤20	≤20	0	0	0	0
31 Kowara Rd	23	≤20	≤20	0	0	0	0
41 Kowara Rd	27	≤20	≤20	0	0	0	0
51 Kowara Rd	26	≤20	≤20	0	0	0	0
10 Acacia Rd	43	33	30	0	0	0	0
12 Acacia Rd	41	32	29	0	0	0	0
16 Acacia Rd	38	29	26	0	0	0	0
32 Acacia Rd	38	30	27	0	0	0	0
125 Debenhams Rd Sth	≤20	≤20	≤20	0	0	0	0
127 Debenhams Rd Sth	22	≤20	≤20	0	0	0	0
129 Debenhams Rd Sth	≤20	≤20	≤20	0	0	0	0
184 Debenhams Rd Sth	≤20	≤20	≤20	0	0	0	0
198 Debenhams Rd Sth	28	≤20	≤20	0	0	0	0
214 Debenhams Rd Sth	34	≤20	≤20	0	0	0	0
223 Debenhams Rd Sth	33	27	24	0	0	0	0
242 Debenhams Rd Sth	47	37	33	0	0	0	0
252 Debenhams Rd Sth	39	33	20	0	0	0	0
Correctional / Residential				**48**	**43**	**43**	**49**
Frank Baxter Juvenile Justice Centre	38	30	26	0	0	0	0
Commercial / Active Recreation				**53**	**53**	**-**	**-**
Central Coast Riding for the Disabled	44	31	28	0	0	-	-
Industrial				**68**	**68**	**68**	
All Industrial sites	<50	<30	<30	0	0	0	-

Comparing the applicable RNP criteria to the measured traffic noise along Gindurra Road, we find that the RNP criteria are already likely to be exceeded. Based on this, the allowable increase in noise due to traffic from the proposed site must not exceed 2 dB as per the RNP requirements.

To calculate the traffic noise impacts generated by the operation of the development the existing road traffic volumes for Gindurra Road, Wisemans Ferry Road, Central Coast Highway and the M1 Motorway (nearest impacted roads) are required. Existing traffic data for Gindurra and Wisemans Ferry Roads was supplied via the traffic assessment report by SECA solution. Existing traffic data for the Central Coast Highway and the M1 Motorway was obtained from the Roads and Maritimes Services (RMS) website Traffic Volume Viewer.

Table 11.6 summarises the predicted increase in noise levels on the nearest affected roads due to the traffic generated by the proposed development site.

Table 11.6. Summary of Traffic Noise Increases on Surrounding Roads (from available traffic data).

Road	Existing Traffic		Increase in Traffic (due to site)		Increase in Noise Levels dB
	Volume per Day	Percentage Heavy Vehicles %	Volume per Day	Percentage Heavy Vehicles %	
Gindurra Road	4,800	16%	164	88%	0.6
Wisemans Ferry Road	5,600	23%			0.4
Central Coast Highway[1]	38,312	>10%			0.1
M1 Motorway[2]	65,912	14%			<0.1

Note: 1. 2010 data set taken 100 m south of Central Coast Highway.
2. 2018 data set taken 20 m east of Reeves Street.

Since the existing traffic noise levels on Gindurra Road and other impacted roads already likely exceed the RNP criteria, all new traffic noise increases must satisfy the 2 dB increase criteria. Table 11.6 shows that the proposed development generates negligible additional traffic noise. The RNP criteria are satisfied as a result.

The offset distances (in all directions) between the vibrationally intensive equipment and any sensitive receivers is large (>300m). The potential for vibration impacts due to the construction or operation of the development are effectively nil. All vibration criteria with respect to cosmetic damage to buildings and human comfort impacts will be satisfied as a result.

11.5.2 Construction phase

During standard construction hours, exceedances of the Noise Management Levels (NMLs) of up to 12 dB are predicted at the closest residential receivers on Acacia Rd and Debenham Rd South. Noise levels were not predicted to exceed 75 dB $L_{Aeq,\ 15m}$ at any receivers. Therefore, no receivers were found to be highly noise affected as per the ICNG.

The predicted increase in noise levels on Gindurra / Debenham Rd South due to construction traffic generation by the proposed development is <0.5 dB. Therefore, the proposed development generates negligible additional traffic noise. The RNP 2 dB increase criteria are satisfied as a result.

11.6 Mitigation measures

The following mitigation measures were included in the noise modelling. With these measures implemented, the noise levels are within acceptable levels.

- A 5m high noise barrier along the eastern site boundary, which decreases to 2m at the northern boundary;
- 3 m high noise barriers inside the site adjacent to the processing zone and storage zone per Figure 11.1;
- Processing building façade construction to provide a minimum airborne sound insulation performance of 35 dB Rw. This requirement will be reviewed and confirmed during the detailed building design;
- Processing building to have all doors and openings completely closed during noisy activities;
- Processing building mechanical equipment (AC units, etc.) should have a maximum aggregate sound power level of 80 dB L_{WA}. This requirement will be reviewed and confirmed during the detailed building design.

11.7 Conclusions

This chapter provides a summary of the investigation into noise management issues for the proposed development.

A noise and vibration assessment, including noise modelling, was conducted for the proposed development. The assessment found that the predicted noise emissions from the site to the surrounding environment are low. The proposed development satisfies the Project Noise Trigger Levels (PNTLs) of the NSW Noise Policy for Industry (NPI) of the NSW Environment Protection Authority during all the time periods, providing the following noise mitigation measures are included:

- A 5 m high noise barrier along the eastern site boundary. This noise barrier reduces to 2 m towards the North East corner of the site;
- 3m high noise barriers inside the site adjacent to the processing zone and landscaping storage zone;
- Office/warehouse building façade construction to provide sound insulation;
- Processing building to have all doors and openings completely closed during noisy activities; and
- Processing building mechanical equipment (AC units etc.) should have a maximum aggregate sound power level of 80 dB L_{WA}.

The sleep disturbance impacts from the operational noise events generated by the site where investigated in this assessment. The proposed development satisfies the sleep disturbance trigger levels at all nearby sensitive receivers.

The existing traffic noise levels on the nearby affected roads already likely exceed the RNP criteria. Therefore, all new traffic noise increases must satisfy the RNP 2 dB increase criteria. The assessment shows that the proposed development generates negligible additional traffic noise. The NSW Road Noise Policy (RNP) criteria are satisfied as a result.

The construction noise impacts have been assessed in accordance with the NSW Interim Construction Noise Guidelines (ICNG). During standard construction hours, exceedances of the NMLs of up to 12 dB are predicted at the closest residential receivers on Acacia Road and Debenhams Road South. No receivers were found to be 'highly noise affected' as per the ICNG. Standard noise mitigation measures have been recommended for the construction phase. In addition, the operational noise walls along the eastern boundary should be constructed as early as practicable to reduce construction noise impacts for the remainder of the construction period.

This assessment also recommends that construction noise monitoring is undertaken for the duration of the construction period with bi-monthly reporting of construction noise levels. This monitoring should be undertaken at the worst-affected receiver during construction, which this assessment identifies as 242 Debenhams Road South.

Construction traffic noise levels must satisfy the RNP 2 dB increase criteria. The NVIA shows that the construction traffic generates negligible additional traffic noise. The NSW Road Noise Policy (RNP) criteria are satisfied as a result.

The offset distances (in all directions) between the vibrationally intensive equipment and any sensitive receivers is large (> 300 m). The potential for vibration impacts due to the construction or operation of the development are effectively nil. All vibration criteria with respect to cosmetic damage to buildings and human comfort impacts will be satisfied as a result.

The study concluded that the proposed materials processing facility is a complying development with respect to noise and vibration impacts and is, therefore, suitable for construction and operation.

A full Noise and Vibration Impact Assessment is provided at Appendix O.

12 Biodiversity

This chapter provides a summary of the investigation into flora and fauna management issues for the proposed development. A full Biodiversity Assessment report is provided at Appendix P.

12.1 Introduction

Narla Environmental were engaged to prepare a Biodiversity Assessment Report meet the requirements of the SEARs and the *NSW Biodiversity Offsets Policy for Major Projects* (NSW OEH, 2014). A copy of the full report is provided as Appendix P.

12.2 Legislative requirements

The Biodiversity Assessment Report was conducted to assist the proponent meet their obligations under the *Biodiversity Conservation Act* 2016.

The *Biodiversity Conservation Act* 2016 and the supporting Regulations establish a modern and integrated legislative framework for land management and biodiversity conservation. Biodiversity elements include major innovations to offsetting and private land conservation, as well as improvements to threatened species conservation and how we manage human-wildlife interactions. The Act and its Regulations are administered by the Office of Environment and Heritage.

Consideration of the *Biodiversity Conservation Act* 2016 is required as part of the proposed development, given requirement for clearing of some native vegetation, which will generate the requirement for Biodiversity Offsets.

12.3 Baseline conditions

12.3.1 Site Description and Land-use History

The Subject Property is located between Gindurra Road and Kangoo Road and is situated approximately 120m east (at the closes point) of the Pacific Motorway.

The Subject Property covers an area of approximately 10.75 ha, which is currently zoned 'IN1 – General Industrial'. Land adjoining the subject site to the East is zoned 'RU1 – Primary Production', whilst a number of other surrounding properties to the south of the site are zoned for various types of infrastructure.

The Subject Site, which is 6.57 ha in size, has undergone extensive historical clearing, and is now highly infested by exotic weeds with natural regeneration of native vegetation along the western border of the subject site. Much of the weed infested and cleared land is currently occupied by large expanses of old stockpile materials, exotic grasslands, weed infestations and a number of abandoned caravans and site offices.

Native vegetation exists within a strip approximately 50m wide from the north of the subject site along the western border which extends down into the south of the Subject Site. This vegetation eventually leads into in-tact remnant native vegetation outside of the impact zone. Vegetation outside the impact zone was not assessed and therefore not considered part of this BAR.

The southern part of the Subject Property (outside of the Subject Site) is an area 4.1 ha in total. This area is completely vegetated with remnant vegetation including historically mapped Coastal Upland Swamp Endangered Ecological Community and habitat for threatened flora. The proponent has deliberately avoided clearing this area as part of this proposal, with all native vegetation being retained. Part of the southern portion of the Subject Property is currently a management zone under the Somersby Industrial Zone Plan of Management (Connell Wagner Pty Ltd, 2005) and

contains intact vegetation and habitat for a number of threatened species, including *Prostanthera junonis* and *Hibbertia procumbens*.

12.3.2 Soil Landscapes and Geology

The subject site is situated on the 'Sydney Town Soil Landscape', however is situated on the border of the 'Somersby Soil Landscape' (Chapman & Murphy, 1989).

The Sydney Town soil landscape is characterised by undulating to rolling low hills and moderately inclined slopes on quartz sandstone (Hawkesbury Sandstone and Terrigal Formation: Narrabeen Group) along the edge of the Somersby Plateau and as ridges and crests in the Macdonald Ranges and Watagan Mountains. Local relief to 80 m. Slope gradients 5–25%. Ridges and crests are moderately broad, slopes moderately inclined and drainage lines narrow. Occasional rock benches are present. This landscape is typically situated on Hawkesbury Sandstone—medium- to coarse-grained quartz sandstone with minor shale and laminite lenses; and Narrabeen Group—Gosford Subgroup—Terrigal Formation, lithic/quartz sandstone, siltstone and claystone. Field survey indicates the dominant lithology present is coarse quartz sandstones. The soils of Sydney Town are shallow to deep (150 cm) Yellow Earths, Earthy Sands and some Siliceous Sands on crests and slopes; shallow to moderately deep (150 cm) Siliceous Sands, Leached Sands and Grey Earths in poorly drained areas and drainage lines; moderately deep (100–150 cm) Yellow Podzolic Soils and Gleyed Podzolic Soils associated with shale lenses.

The Somersby soil landscape is characterised by gently undulating to rolling rises on deeply weathered Hawkesbury Sandstone plateau. Local relief to 40 m; slopes are long, and drainage lines are narrow. Extensively cleared low eucalypt open-woodland and scrubland. This landscape is typically situated on Hawkesbury Sandstone—medium- to coarse-grained quartz sandstone with minor shale and laminite lenses. Deep (10 m) weathering in many areas of the sandstone is widespread. Soils are moderately deep to deep (100–300 cm) Yellow Earths and Earthy Sandson crests and slopes with Grey Earths in poorly drained areas and Leached Sands and Siliceous Sands along drainage lines.

12.3.3 IBRA bioregions, IBRA subregions and Mitchell Landscapes

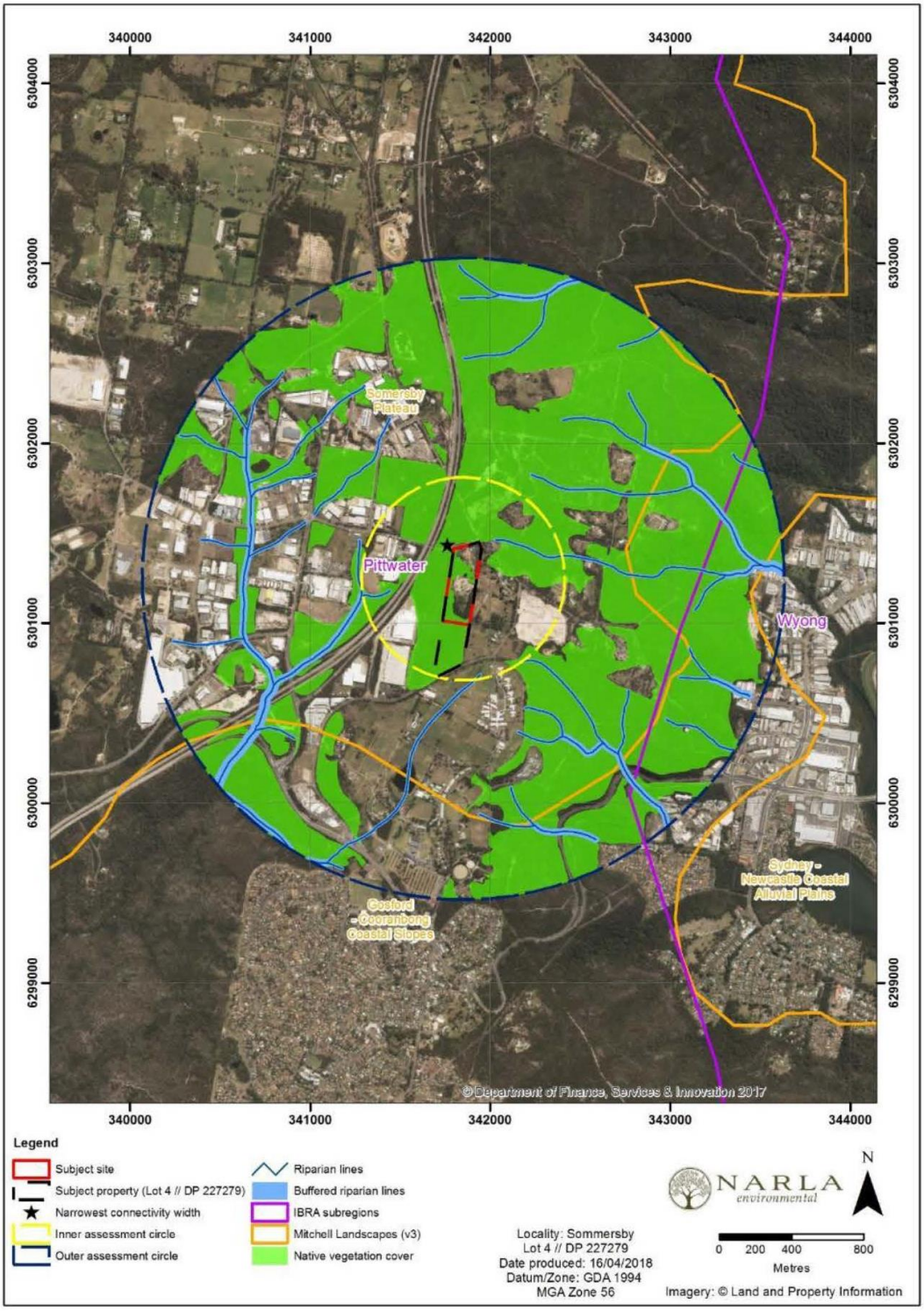
The subject site is within the NSW Sydney Basin IBRA region (version 7) and Pittwater IBRA subregion. The development site occurs entirely within one NSW Mitchell Landscape, 'Somersby Plateau' (Mitchell Landscapes V3.1).

12.3.4 Percentage of Native Vegetation Cover

The native vegetation cover is assessed at two scales, which for this assessment are a 100 ha circle and a 1,000 ha circle. The area of vegetation in each circle before development was mapped using the 'Greater Hunter Vegetation Mapping' (NSW OEH, 2013), with the extent of vegetation updated using imagery obtained from NSW LPI SIX Viewer Figure 12.1). Polygons tagged 'Non Native Vegetation' (MU000) were assumed to not contain native vegetation and were therefore excluded from this assessment.

The inner assessment circle (100ha) was assessed to have a native vegetation coverage of 49.5ha (46-50%). The outer assessment circle (1000ha) was assessed to have a native coverage of 564.4ha (56-60%).

Figure 12.1. Native vegetation coverage. Source: Biodiversity Assessment Report (Appendix P**).**



12.3.5 Description of the Native Vegetation on the Subject Site

Vegetation within the subject site had been historically mapped within the Gosford Mapping System (Bell 2004) within three vegetation communities, including:

- E29 - Hawkesbury Banksia Scrub – Woodland;

- E26 - Exposed Hawkesbury Woodland; and
- Xr - Disturbed - Canopy Only.

Greater Hunter Native Vegetation Mapping (Sivertsen, Roff, Somerville, Thonell, & Denholm, 2011) revealed that the subject site contained only one vegetation community: Scribbly Gum / Red Bloodwood / Old Man Banksia heathy woodland of southern Central Coast.

Figure 12.2. Native vegetation coverage of the site.

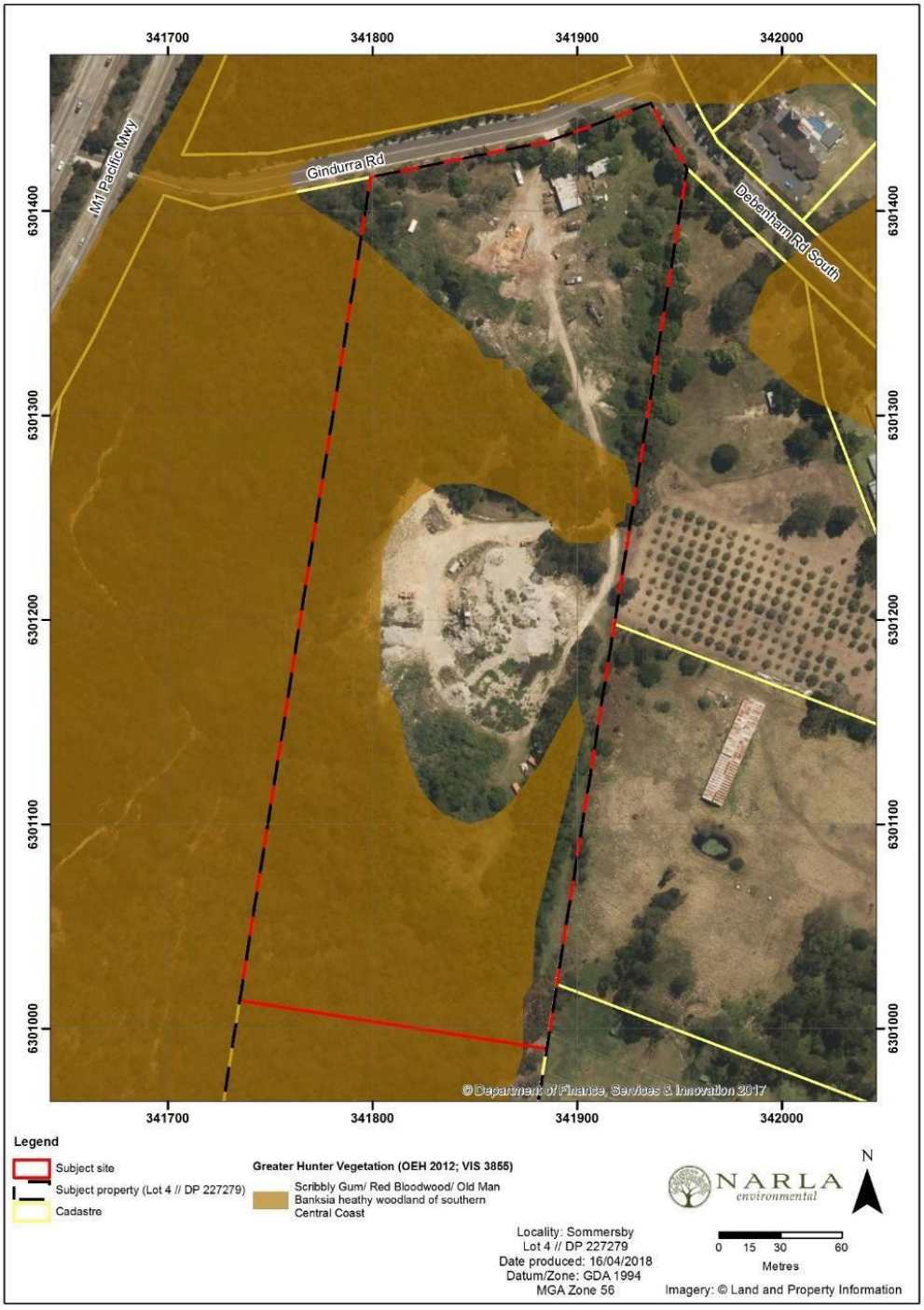
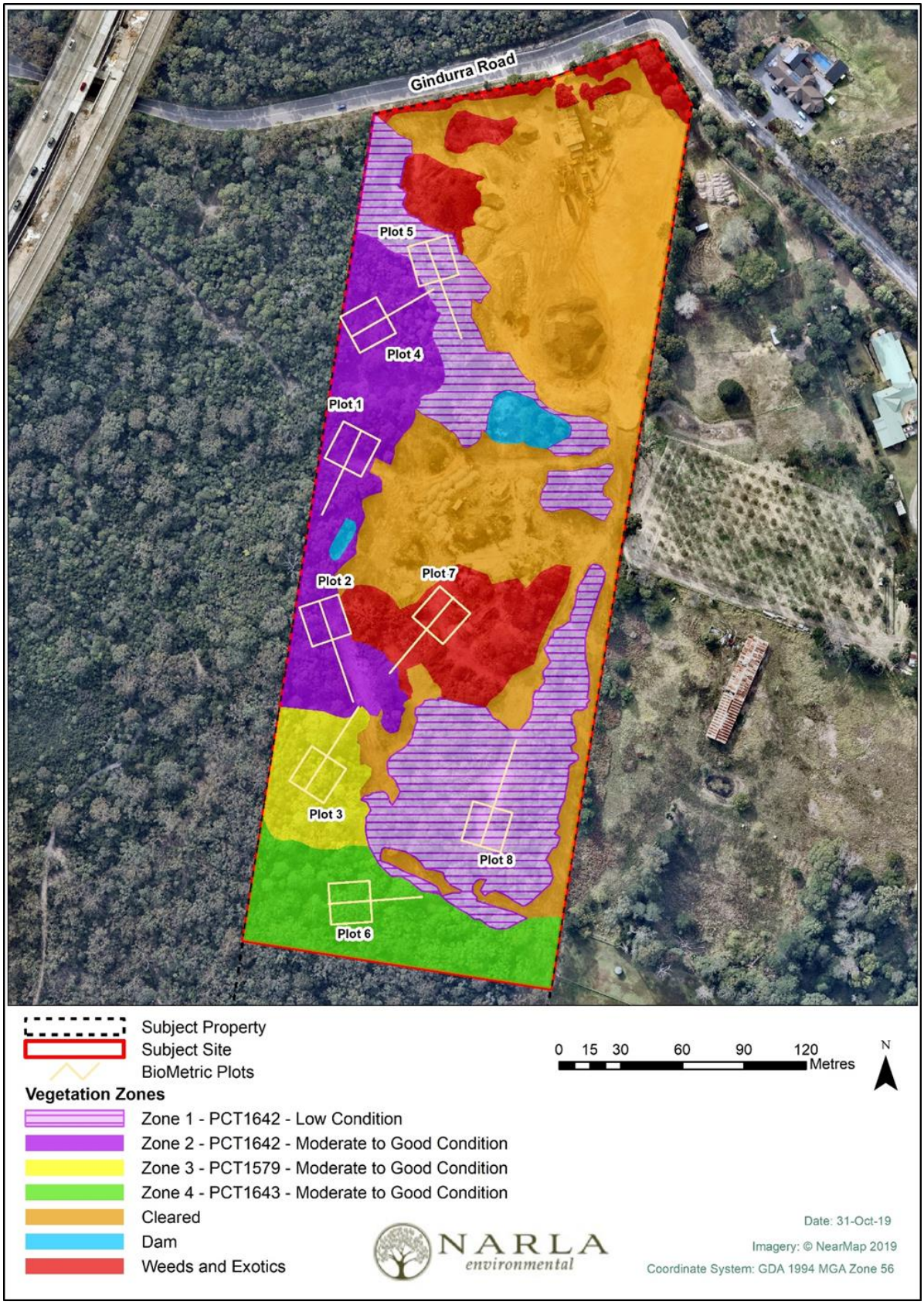


Table 12.1. All Plant Community Types (PCT) and other vegetation zones mapped across the Subject Site.

Plant Community Type / Biometric Vegetation Type	Equivalent Vegetation Map Unit (Sivertsen 2011)	Total area (ha)
PCT 1642 / HU856: Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast	MU124: Scribbly Gum / Red Bloodwood / Old Man Banksia heathy woodland of southern Central Coast	2.25
PCT 1643 / HU857: Red Bloodwood - Smooth-barked Apple - Scribbly Gum - Old Man Banksia heathy woodland on sandstone ranges of the Central Coast	MU125: Red Bloodwood/ Smooth-barked Apple/ Scribbly Gum/ Old Man Banksia heathy woodland on sandstone ranges of the Central Coast	0.63
PCT 1579 / HU793: Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast	MU061: Smooth-barked Apple/ Turpentine/ Blackbutt open forest on ranges of the Central Coast	0.30
Cleared land	N/A	2.6
Dams	N/A	0.09
Weeds and exotics	N/A	0.75
	Total area (ha)	**6.62**

Figure 12.3. Field Validated Plant Community Types and Plot Transect Locations.



12.3.6 Vegetation zones

Four (4) vegetation zones were identified based on the PCT classification described above and an assessment on condition consistent with the requirements of the FBA (NSW OEH, 2014) (Table 12.2).

A total of 0.06 ha of vegetation will be retained within the subject site, within the buffer area protected due to the presence of *Melaleuca biconvexa* individuals. This is in addition to the 4.1 ha of native vegetation within the subject property which has been avoided, which lies south of the subject site.

Table 12.2.Vegetation zones within the subject site.

Vegetation zone ID	PCT ID	PCT name	Condition	Area impacted (ha) - clearing
Zone 1: PCT 1642 – Low Condition	PCT 1642	Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast	Low	1.4
Zone 2: PCT 1642 – Moderate to Good Condition	PCT 1642	Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast	Moderate to Good	0.78
Zone 3: PCT 1579 – Moderate to Good Condition	PCT 1579	Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast	Moderate to Good	0.30
Zone 4: PCT 1643 – Moderate to Good Condition	PCT 1643	Red Bloodwood - Smooth-barked Apple - Scribbly Gum - Old Man Banksia heathy woodland on sandstone ranges of the Central Coast	Moderate to Good	0.63
			TOTAL	3.17

12.3.7 Biometric Plots and Transects

Eight (8) plots and transects were established within the Subject Site to best sample the natural variation of the vegetation across the Subject Site. The summarised results obtained from each plot are provided in Table 12.3. The (8) eight plot and transect locations are shown in Figure 12.3.

Table 12.3. Biometric plot and transect results.

Plot No.	1	2	3	4	5	6	7	8
Vegetation zone	Zone 2	Zone 2	Zone 3	Zone 2	Zone 1	Zone 4	Weeds and Exotics	Zone 1
Coordinates (Easting)	341792	341776	341765	341787	341822	341777	341839	341852
Coordinates (Northing)	6301262	6301176	6301086	6301307	6301355	6301031	6301183	6301062
Native Plant Species Richness (%)	29	29	18	23	6	39	0	4

Plot No.	1	2	3	4	5	6	7	8
Native Over-storey Cover (%)	24	20.5	20.5	5	1.1	43.5	0	0
Native Mid-storey Cover (%)	16.5	12.2	11.7	12	18.2	5.5	0	0
Native Ground Cover (Grasses) (%)	4	50	24	40	16	40	0	0
Native Ground Cover (Shrubs) (%)	18	32	14	6	6	18	0	2
Native Ground Cover (Other) (%)	56	8	2	2	4	6	0	0
Exotic Plant Cover (%)	16	12	0	49.6	88	0	92	72
Number of Trees with Hollows	0	3	0	0	1	18	0	0
Over-storey regeneration (score) (%)	1	1	0.66	1	0	1	0	0
Fallen Logs (m)	27	41	26	14	26	57	0	4

12.3.8 Candidate list for survey

12.3.8.1 Fauna species

Narla Environmental performed specialised surveys to target all potentially occurring threatened fauna. These targeted surveys were undertaken during the same period as the collection of the BioMetric Plot data, between 16th January 2018 to 10th April 2018. After answering the geographic and habitat questions the BCC produces a candidate species list for further consideration. Consistent with Section 6.5.1.3 of the FBA (NSW OEH, 2014), each species listed was reviewed and a habitat assessment conducted to determine if the species required further assessment, including targeted survey.

A list of 17 species credit fauna species were identified by the BCC and Bionet search (OEH 2017) as requiring further consideration (Table 20). All of these species were subject to targeted survey within the subject site utilising the described fauna detection methods (Table 18).

Eastern Pygmy Possum (*Cercartetus nanus*) was confirmed on the subject site through targeted surveys. The Eastern Pygmy Possum is a Species Credit species. No other Species Credit fauna species were identified within the Subject Site.

12.3.8.2 Flora species

A total of 32 threatened 'species credit' flora species were modelled as having potential to occur, or historically recorded within 10km of the subject site. These species were identified for 'further consideration'. Targeted surveys were conducted for each of these species by Narla Ecologists Emily Rix and Nathan Banks during the field assessment

on the 16th January 2018, 14th February 2018 and 10th April 2018. Additional targeted surveys were conducted by Narla Ecologists Emily Rix and Sarah Cardenzana on the 20th September 2019, 15th October 2019 and 1st of November 2019.

The *NSW Guide to Surveying Threatened Plants* (NSW OEH, 2016) was employed with maximum effort directed toward sampling areas likely to be directly affect by the proposal. The survey periods aligned with the flowering period (when the species are most conspicuous) of most flora species, thereby having the greatest chance of displaying key diagnostic features. Targeted surveys were conducted within Vegetation Zones 1-4 utilising the parallel field traverse technique (as directed by OEH 2016b). These transects are displayed in Figure 12.3. According to OEH (NSW OEH, 2016), "Only the potential habitat of the target species within the site needs to be surveyed".

Note that not all parts of Vegetation Zone 1 could not be completely penetrated due to dense thickets of Lantana camara and as such were not surveyed. Targeted surveys were not conducted within the vegetation zones 'Cleared' or 'Weeds and Exotics' as these were deemed as not containing suitable habitat for the persistence of the targeted threatened species. These areas of intense weed infestation were highly degraded, located on imported landfill and since the soil and vegetation was artificial, no suitable habitat for the targeted threatened flora species is expected to occur within.

Specific details have been provided to describe the targeted survey effort for the species that were cryptic/seasonal and/or were considered most likely to occur within the Subject Site.

During targeted surveys, Narla Ecologists identified the presence of one threatened flora species within the subject site, *Melaleuca biconvexa*, which is listed as Vulnerable under the TSC Act and EPBC Act. Fifteen (15) individual specimens were recorded on the subject site. The occurrence of *Melaleuca biconvexa* was restricted to the western boundary of the subject site, confined to a small patch of mature individuals with evidence of regeneration. This species will not be impacted by the proposed development, due to a 10m buffer being placed around the population and excluded from development. Please note that *Melaleuca biconvexa* was not initially identified by the BCC.

No other threatened flora species were identified within the subject site during site inspection.

Table 12.4. Identifying candidate fauna species for further assessment (species credit species).

Common name	Scientific name	TSC Act status	EPBC Act status	Further Assessment Required	Justification
Common Planigale	*Planigale maculata*	Endangered	Not Listed	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Eastern Chestnut Mouse	*Pseudomys gracilicaudatus*	Vulnerable	Not Listed	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Eastern Pygmy-possum	*Cercartetus nanus*	Vulnerable	Not Listed	Yes	Targeted surveys confirmed that this species is present within the subject site. Credit calculations have been determined and are discussed in Section 12.7.3.
Giant Burrowing Frog	*Heleioporus australiacus*	Vulnerable	Vulnerable	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.

Common name	Scientific name	TSC Act status	EPBC Act status	Further Assessment Required	Justification
Golden-tipped Bat	*Phoniscus papuensis*	Vulnerable	Not Listed	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Green and Golden Bell Frog	*Litoria aurea*	Endangered	Vulnerable	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Koala	*Phascolarctos cinereus*	Vulnerable	Vulnerable	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Pale-headed Snake	*Hoplocephalus bitorquatus*	Vulnerable	No	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Parma Wallaby	*Macropus parma*	Vulnerable	Not Listed	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Red-crowned Toadlet	*Pseudophryne australis*	Vulnerable	Not Listed	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Regent Honeyeater	*Anthochaera phrygia*	Critically Endangered	Critically Endangered	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Rosenberg's Goanna	*Varanus rosenbergi*	Vulnerable	Not Listed	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Southern Brown Bandicoot (eastern)	*Isoodon obesulus subsp. obesulus*	Endangered	Endangered	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Stephens' Banded Snake	*Hoplocephalus stephensii*	Vulnerable	Not Listed	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.
Squirrel Glider	*Petaurus norfolcensis*	Vulnerable	Not Listed	No	No individuals were recorded on the subject site during the site assessment.

Common name	Scientific name	TSC Act status	EPBC Act status	Further Assessment Required	Justification
					Targeted surveys and site assessment revealed that the subject site does not support the species.
Wallum Froglet	*Crinia tinnula*	Vulnerable	Not Listed	No	No individuals were recorded on the subject site during the site assessment. Targeted surveys and site assessment revealed that the subject site does not support the species.

12.3.9 Ecosystem Credit Species

Species that require ecosystem credits have a high likelihood of being present on the development site, based on the data entered into the BCC including PCT details, patch size and the location of the development.

Twenty-nine (29) ecosystem credit species were identified by the BCC (Table 12.5). A habitat assessment was conducted for each species to determine if the species should remain in the assessment or be removed consistent with Section 6.3.1.8 of the FBA (NSW OEH, 2014).

One ecosystem credit species Barking Owl (*Ninox connivens*) was confirmed on site, with potential habitat for the other 28 species also considered present. Therefore, all ecosystem species were maintained in the assessment.

Table 12.5. Identifying candidate species for further assessment (ecosystem credit species).

Common name	Scientific name	TSC Act status	EPBC Act status	Species present in vegetation zone?
Barking Owl	*Ninox connivens*	Vulnerable	-	Yes – Species Confirmed on Site
Black-chinned Honeyeater (eastern subspecies)	*Melithreptus gularis subsp. gularis*	Vulnerable	-	Potential
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus subsp. victoriae*	Vulnerable	-	Potential
Bush Stone-curlew	*Burhinus grallarius*	Endangered	-	Potential
Diamond Firetail	*Stagonopleura guttata*	Vulnerable	-	Potential
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	Vulnerable	-	Potential
Eastern Freetail-bat	*Mormopterus norfolkensis*	Vulnerable	-	Potential
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Vulnerable	-	Potential
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	Vulnerable	-	Potential
Greater Broad-nosed Bat	*Scoteanax rueppellii*	Vulnerable	-	Potential
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis subsp. temporalis*	Vulnerable	-	Potential
Little Eagle	*Hieraaetus morphnoides*	Vulnerable	-	Potential
Little Lorikeet	*Glossopsitta pusilla*	Vulnerable	-	Potential
Long-nosed Potoroo	*Potorous tridactylus*	Vulnerable	Vulnerable	Potential
Masked Owl	*Tyto novaehollandiae*	Vulnerable	-	Potential

Common name	Scientific name	TSC Act status	EPBC Act status	Species present in vegetation zone?
Painted Honeyeater	*Grantiella picta*	Vulnerable	Vulnerable	Potential
Powerful Owl	*Ninox strenua*	Vulnerable	-	Potential
Red-legged Pademelon	*Thylogale stigmatica*	Vulnerable	-	Potential
Scarlet Robin	*Petroica boodang*	Vulnerable	-	Potential
Sooty Owl	*Tyto tenebricosa*	Vulnerable	-	Potential
Speckled Warbler	*Chthonicola sagittata*	Vulnerable	-	Potential
Spotted-tailed Quoll	*Dasyurus maculatus*	Vulnerable	Endangered	Potential
Square-tailed Kite	*Lophoictinia isura*	Vulnerable	-	Potential
Squirrel Glider	*Petaurus norfolcensis*	Vulnerable	-	Potential
Swift Parrot	*Lathamus discolor*	Endangered	Critically Endangered	Potential
Turquoise Parrot	*Neophema pulchella*	Vulnerable	-	Potential
Varied Sittella	*Daphoenositta chrysoptera*	Vulnerable	-	Potential
Yellow-bellied Glider	*Petaurus australis*	Vulnerable	-	Potential
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	Vulnerable	-	Potential

12.3.10 Connectivity Value

There are no rivers, streams or estuaries identified within the subject site based on the topographic mapping available (1: 25,000 scale). The closest drainage feature lies approximately 90m to the east of the subject site and is an unnamed first order stream draining east to Narara Creek. The nearest estuary lies approximately 2km to the east of the subject site, being part of the Brisbane Water Estuary.

The absence of these features was confirmed during the field visit and the proposal is not expected to impact on rivers, streams or estuaries.

There are no local or important wetlands located within the subject site or within the 1,000 ha assessment circle.

The site does not incorporate a state or regional biodiversity link approved by the Chief Executive, OEH.

The site adjoins contiguous native vegetation to the west, between the subject site and the M1 Pacific Motorway. The vegetation, although narrow near the subject site, extends north for over 5km before being cut by the M1 Pacific Motorway. To the south of the subject site the connection is far more restricted, ending approximately 500m south of the subject site.

An assessment of the impact of the proposed development on both connectivity width and condition was conducted (Table 3). Although the development will impact on native vegetation within the subject site, the narrowest part of the link remains off-site, to the north-west of the subject site. The width of the connected link will therefore not be impacted by the proposed development. Due to the small amount of impact proposed within the subject site, and the overall good condition of the link, no reduction in average condition (for either over storey or mid storey) is expected from the development.

As no change in connectivity width or condition is anticipated a score of 0 is allocated for the connectivity score.

12.3.11 Regional Forest Agreements

The North East Regional Forest Agreement (RFA) is one of three RFAs in New South Wales and comprises two sub regions: Upper North East and Lower North East. The Australian and New South Wales governments signed the North East RFA on 31 March 2000, establishing the framework for the sustainable management of the forests in the North East RFA region (Commonwealth Department of Agriculture and Water Resources 2018).

This Regional Forest Agreement (RFA) establishes the framework for the management of the forests of the Upper North East and Lower North East regions. Parties are committed to ensuring the Agreement is durable and that the obligations and commitments that it contains are delivered to ensure effective conservation, forest management and forest industry outcomes.

The purpose of the RFA is to:

- identify areas in the region or regions that the Parties believe are required for the purposes of a Comprehensive, Adequate and Representative Reserve System, and provides for the conservation of those areas;
- provide for the ecologically sustainable management and use of forested areas in the regions;
- provide long-term stability of forests and forest industries; and
- have regard to studies and projects carried out in relation to all of the following matters that are relevant to the regions:
    - environmental values, including Old Growth, Wilderness, endangered species, National Estate Values and World Heritage Values;
    - Indigenous heritage values;
    - economic values of forested areas and forest industries;
    - social values (including community needs); and
    - principles of Ecologically Sustainable Forest Management.

The Subject Site is mapped as 'Other Tenure – Freehold Land, Crown Land and Other Tenures' within 'Map 1 (B) Lower North East Region' which displays land tenure and zoning including Comprehensive, Adequate and Representative (CAR) Reserve System.

As the Subject Site is not mapped within a CAR Reserve System, the RFA does not apply to the Subject Site.

The main objectives of the Regional Forest Agreements Act 2002 (RFA Act) are as follows:

- to give effect to certain obligations of the Commonwealth under Regional Forest Agreements;
- to give effect to certain aspects of the National Forest Policy Statement;
- to provide for the existence of the Forest and Wood Products Council.

The Subject Site is not covered under the Regional Forest Agreements Act 2002.

12.3.12 Groundwater dependent ecosystems

Groundwater plays an important role in sustaining aquatic and terrestrial ecosystems, such as springs, wetlands, rivers and vegetation. Understanding these groundwater-dependent ecosystems (GDEs) is essential for groundwater management and planning (Bureau of Meteorology 2018).

The Groundwater Dependent Ecosystems Atlas (GDE Atlas) was developed as a national dataset of Australian GDEs to inform groundwater planning and management. It is the first and only national inventory of GDEs in Australia (Bureau of Meteorology 2018).

The Atlas contains information about three types of ecosystems:

- Aquatic ecosystems that rely on the surface expression of groundwater–this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands and springs. Marine and estuarine ecosystems can also be groundwater dependent, but these are not mapped in the Atlas.
- Terrestrial ecosystems that rely on the subsurface presence of groundwater–this includes all vegetation ecosystems.
- Subterranean ecosystems–this includes cave and aquifer ecosystems.

Narla Environmental accessed the GDE Atlas on 23rd October 2018 which revealed that there are no GDEs within the Subject Site. The Narla Ecologists did not find any vegetation communities or other ecosystems that would meet the definition of GDE during the site assessment.

12.4 Proposed development

The proposed development requires considerable clearing of vegetation in the northern half of the site. Approximately 6.7 hectares will need to be cleared to facilitate the development.

A small dam in the centre of the site will be filled. All stormwater will be directed to a dam on the western boundary of the site. The water collected in this dam will be used for operations, such as dust suppression.

The southern half of the site, approximately 4.1ha, will be untouched by the development.

12.5 Impact assessment

12.5.1 Final project footprint and assessment of impacts

The proposed development is restricted to the northern sections of 90 Gindurra Road, Somersby NSW (Lot 4 / DP 227279). The total area of the Subject Property is 10.75 ha, with the Subject Site (area proposed for development) totalling approximately 6.7 ha. Total impacts to native vegetation total 2.50 ha, with the remainder of the Subject Site consisting of already cleared land or dominated by exotic vegetation.

For the purposes of this assessment all lands within the Subject Site are assessed for complete clearing, except for a 10 m buffer surrounding the *Melaleuca biconvexa* individuals recorded on site. Assuming complete clearing will provide the proponent with maximum flexibility during the development of the site. The final project impact is provided in Table 12.6 and the footprint is displayed in Figure 12.3.

Table 12.6.Total impact on native vegetation.

Vegetation zone ID	PCT ID	PCT name	Condition	Area impacted (ha) - clearing
Zone 1: PCT 1642 – Low Condition	PCT 1642	Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast	Low	1.4
Zone 2: PCT 1642 – Moderate to Good Condition	PCT 1642	Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast	Moderate to Good	0.78

Vegetation zone ID	PCT ID	PCT name	Condition	Area impacted (ha) - clearing
Zone 3: PCT 1579 – Moderate to Good Condition	PCT 1579	Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast	Moderate to Good	0.30
Zone 4:PCT 1643 – Moderate to Good Condition	PCT 1643	Red Bloodwood - Smooth-barked Apple - Scribbly Gum - Old Man Banksia heathy woodland on sandstone ranges of the Central Coast	Moderate to Good	0.63
			Total	**3.11**

Two species credit species have been confirmed on site:

1. Eastern Pygmy-possum, and
2. *Melaleuca biconvexa*

Impacts to Eastern Pygmy-possum are anticipated within vegetation zone 2 (*Red Bloodwood - Scribbly Gum / Old-man Banksia open forest on sandstone ridges of northern Sydney and the Central Coast in moderate to good condition*). A total impact of 1.41 ha to Eastern Pygmy-possum is calculated. Figure 12.5 contains the species polygon.

Fifteen (15) individuals of *Melaleuca biconvexa* have been identified on site. The population is restricted to the western edge of the Subject Site. As this area is to be excluded from development and will be protected within a 10 m buffer (Figure 12.6). Efforts will be made to reduce the impacts on the population of *Melaleuca biconvexa* which are discussed in Section 12.5.2.

The assessment found that no impacts are anticipated to this species as a result of the proposed development.

Figure 12.4. Development footprint and native vegetation extent.

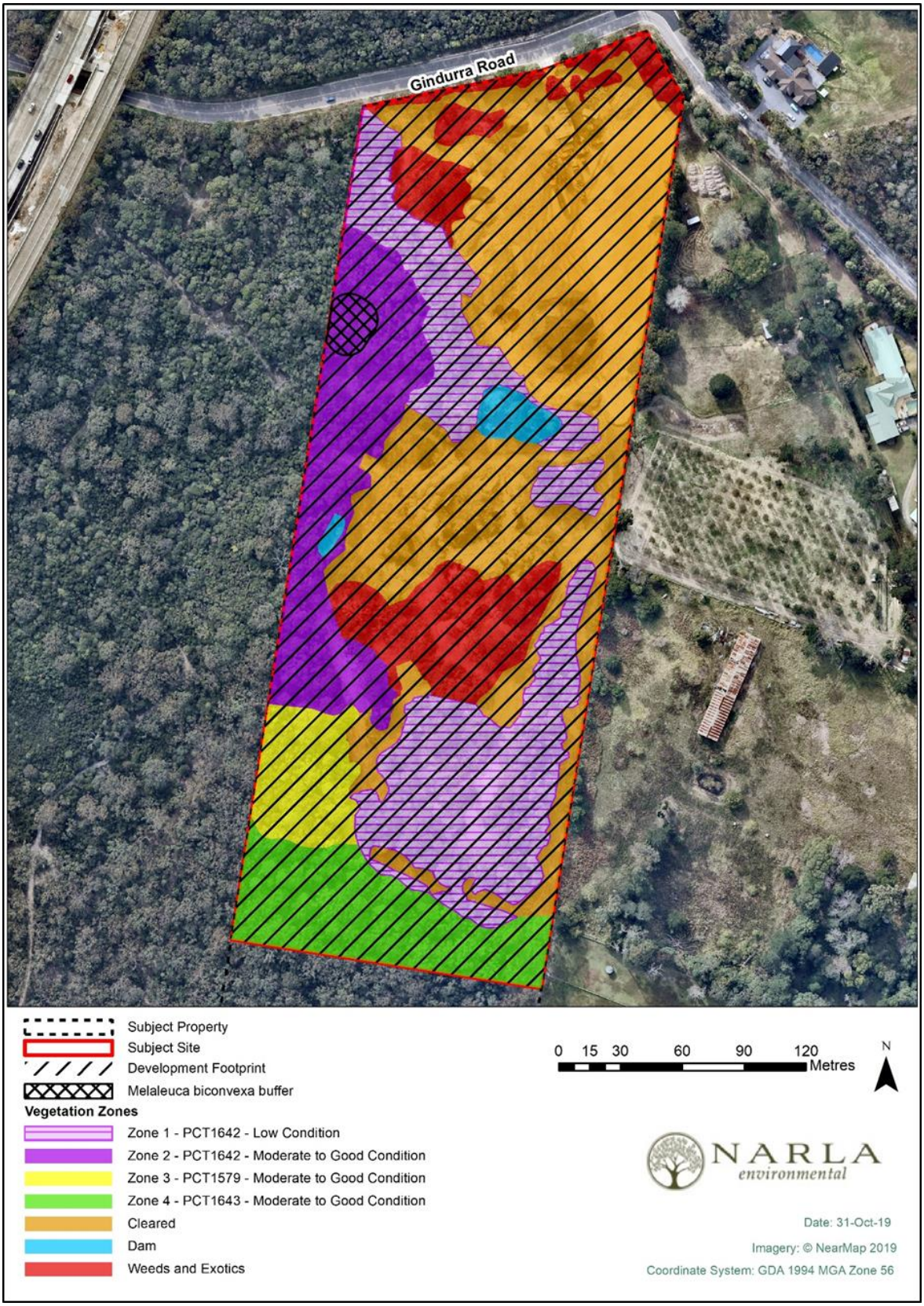


Figure 12.5. Eastern Pygmy-possum species polygon.

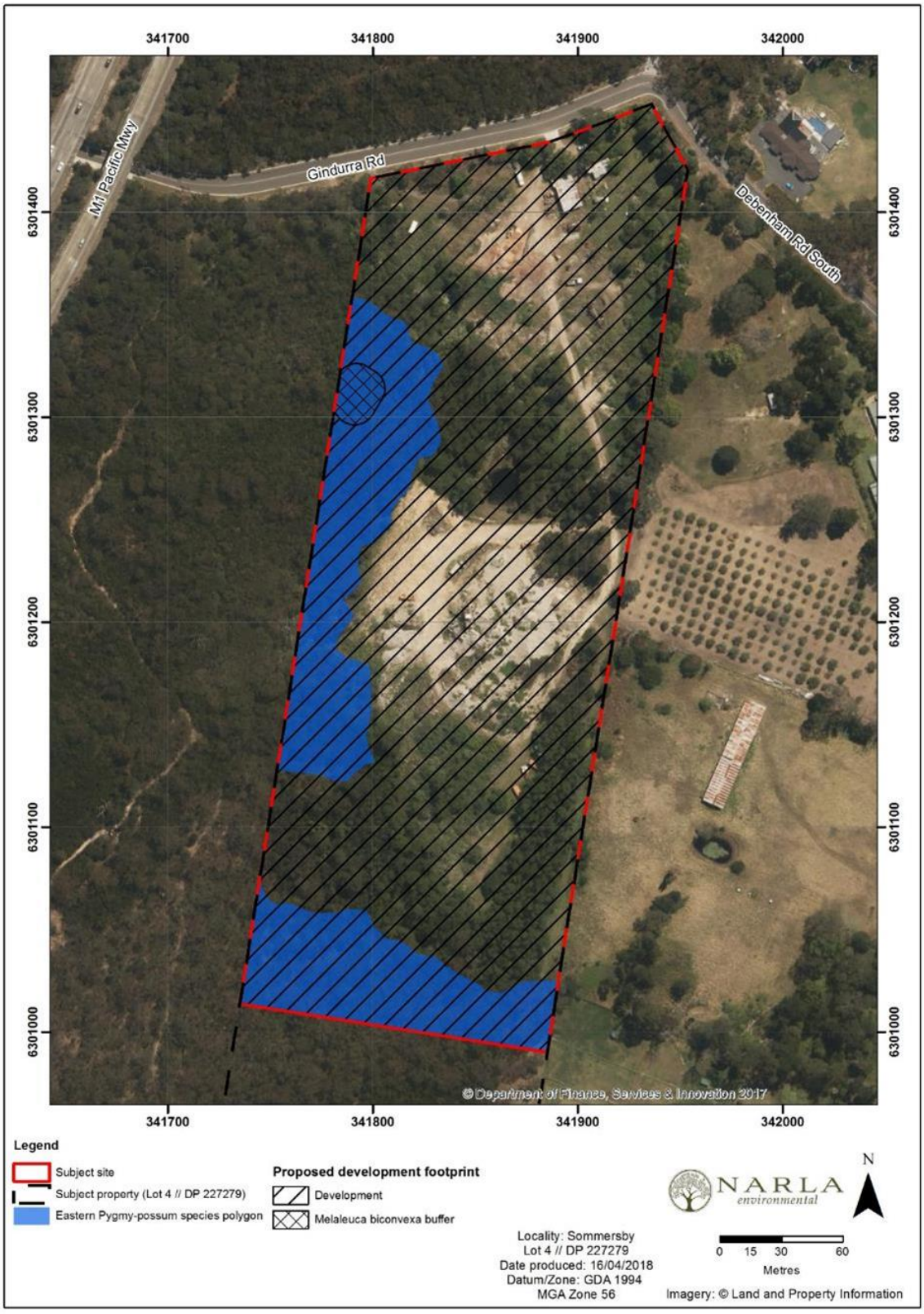
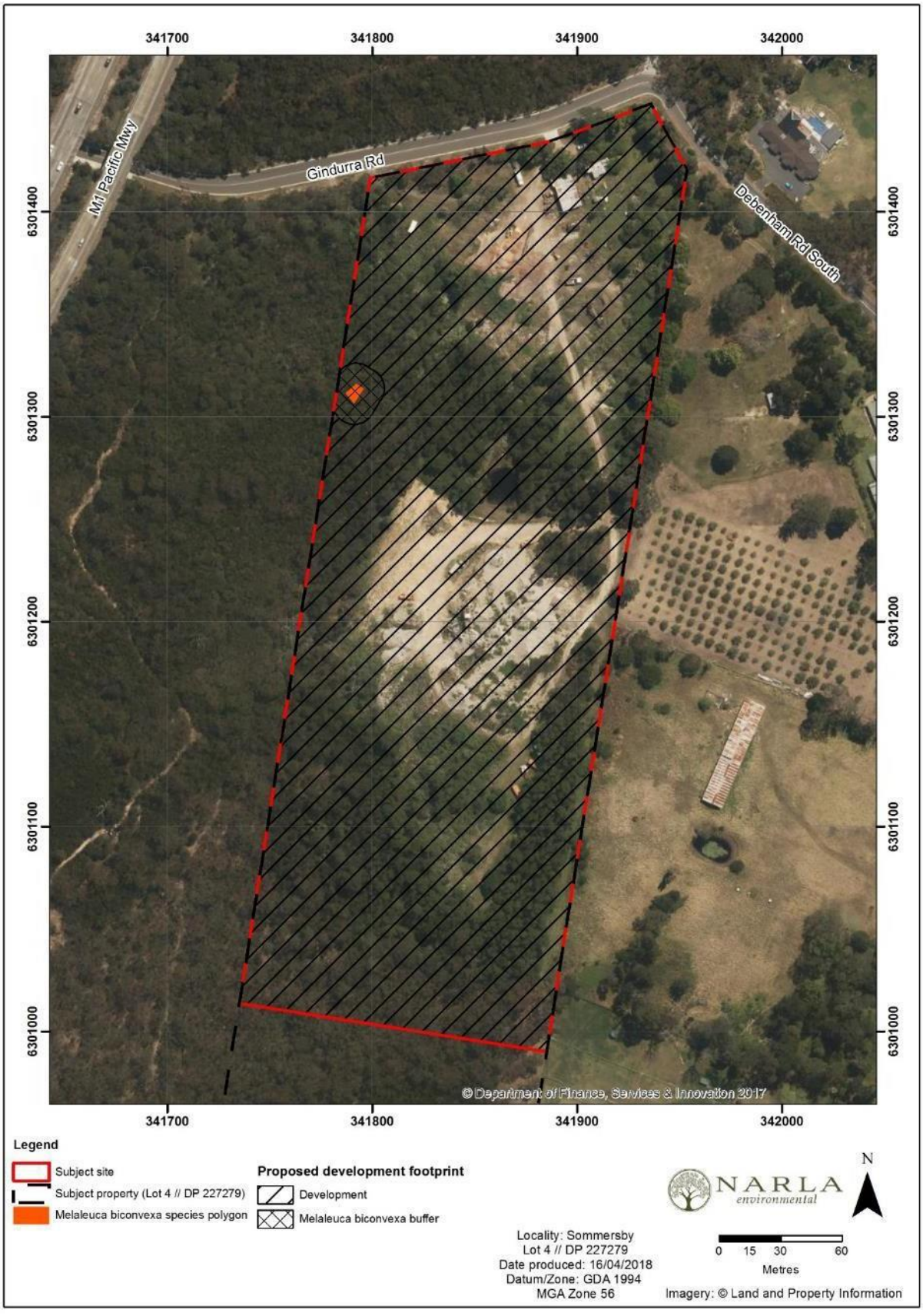


Figure 12.6. *Melaleuca biconvexa* species extent and buffer.



12.5.2 Impacts to Hydrology and Effects on Biodiversity

The *Melaleuca biconvexa* occurs in damp areas, often near watercourses, on alluvium soils over shale (Terrigal formation) (Benson & McDougall 1998). The species may form a dense stand in a narrow strip adjacent to a watercourse.

The vegetation communities in which the *Melaleuca biconvexa* generally occurs include 'Eucalypt open-forest' with Sydney Blue Gum (*Eucalyptus saligna*), Swamp Mahogany (*Eucalyptus robusta*) and Mountain Cedar Wattle (*Acacia elata*) and in 'Paperbark scrub' with Prickly-leaved Paperbark (*Melaleuca styphelioides*), Snow-in-summer (*Melaleuca linariifolia*), White Feather Honeymyrtle (*Melaleuca decora*), Sieber's Paperbark (*Melaleuca sieberi*) and *Melaleuca nodosa*.

The *Melaleuca biconvexa* population on the Subject Site is growing in soils that are not obviously waterlogged. Their location on a ridgetop with no proximal permanent flowing watercourse suggests that the plants at this location are more tolerant of drier soils than other populations of the species.

The impacts to hydrology and associated effects on biodiversity have been assessed, particularly in relation to the impacts on the *Melaleuca biconvexa* population within the Subject Site (see Appendix I: Water Cycle Impact Assessment and Soil and Water Management Plan). It is anticipated that the measures proposed below will reduce indirect impacts to biodiversity, including the population of *Melaleuca biconvexa*.

The following measures have been proposed:

- It is expected that the proposed development will reduce a small catchment flowing to the population of *Melaleuca biconvexa*. According to Sustainability Workshop Ltd (Appendix I), treated water from the proposed operations on the Subject Site will be used to irrigate land draining to this plant community aiming to supply the same average annual volume of water that would have flowed to this community under predevelopment conditions.
- The stormwater capture and treatment regime will see overflow rates from the OSD basin to near pre-European levels. The water quality is expected to be very high, with virtually all sediment and potential contaminants removed via a series of treatment measures.
- Once water is discharged from the site onto adjoining bushland, a 50m wide level spreader will spread the water out onto adjoining bushland to reduce erosion. The soils on this site are sandy soils with the likelihood that most flows would be absorbed and flow below the surface to form an important subsurface flow to sustain the downhill remnant vegetation (Appendix I: Water Cycle Impact Assessment and Soil and Water Management Plan).

12.5.3 On-going Operations

Narla Environmental have undertaken a comprehensive assessment of the cumulative impacts from all clearing activities and operations, associated edge effects and other direct impacts on biodiversity in accordance with the EP&A Act 1979. Provided these recommendations are followed, impacts to biodiversity will be reduced.

12.5.3.1 Stormwater

Prior to any construction, areas of the site will need to be cleared and contoured to provide adequate drainage to the existing stormwater detention pond. Civil site works will need to ensure that there is appropriate drainage and stormwater capture at the site. There is an existing stormwater dam on the subject site. This will be modified and enlarged as a point for stormwater capture (along the western boundary of the site). The two dams located in the centre of the site shall be filled. The captured stormwater would be used for operational purposes at the site.

This needs to be considered in the stormwater management system design. The design will consider best practice guidelines in:

- Landcom (2004). Managing Urban Stormwater – Soils and Construction. Published by the NSW Government.
- Department of Environment and Conservation (2006). Managing Urban Stormwater – Harvesting and Reuse. Published by the NSW Department of Environment and Conservation.

Provided these measures are taken, and all control measures are in line with the two above mentioned documents, there should be no significant impact on biodiversity within the subject site.

12.5.3.2 Noise

A 5m constructed noise barrier will be constructed along the eastern boundary of the site, as well as two internal 3m noise barriers within the site to mitigate against noise impacts. Noise is not likely to further impact upon any threatened species within the subject site, as the subject site is already situated within close proximity to a number of busy roads and motorways.

12.5.3.3 Sewerage

The site will be connected to the town sewerage system as part of the development approved under DA52541/2017.2.

12.5.4 Biosecurity Risk Assessment

Biosecurity risks have the potential to impact native biodiversity unless reasonable control measures have been identified and implemented. Narla has identified such biosecurity risks and provided recommended control measures for pre and post development (Table 12.7).

Table 12.7. Biosecurity Risk Assessment Analysis.

Identified Risk	Risk Analysis	Risk Rating Prior to Implementation of Control	Solution/ Control Measure	Residual Risk Rating Post Control
Pathogens	Infection by *Phytophthora cinnamomi* and *Puccinia psidii* (Myrtle Rust). These pathogens were not recorded within the subject site. Phytophthora and Myrtle Rust are pathogens which can be spread through infected soil, with potentially large detrimental impact.	High	Basic control principles include avoiding transport of sediment onto the vegetated areas of the property by cleaning all work clothing, gloves, tools and machinery that enter any protected, vegetated areas. In some cases, a solution of 70% ethanol or methylated spirits in 30% water may be sufficient to disinfect equipment prior to use. The report, 'Arrive Clean, Leave Clean' (Commonwealth of Australia 2015) provides further information and best practice methods to reduce spread of these pathogens between work Subject Sites.	Low
Pests	Vertebrate pests were recorded on the subject site, including *Oryctolagus cuniculus* (European Rabbit) and *Vulpes vulpes* (European Fox).	High	Vertebrate pests should be controlled on an annual basis (or more regularly as required). Control methods include 1080 fox baiting, trapping, den fumigation and shelter habitat removal.	Low

Identified Risk	Risk Analysis	Risk Rating Prior to Implementation of Control	Solution/ Control Measure	Residual Risk Rating Post Control
Weeds	The subject site (Development area) was heavily infested with environmental and priority weeds.	High	All environmental and priority weeds will be entirely eradicated from the subject site and then managed under a Vegetation Management Plan (VMP). The VMP will require an annual site visit by a team of qualified bush regenerators to ensure the control of weeds within the subject site.	Low

12.6 Mitigation measures

A total of 3.11 ha of native vegetation is proposed to be impacted by the project, with a further 3.35 ha of cleared land and exotic vegetation also to be impacted within the Subject Site. Although complete clearing has been used to calculate credits within the Subject Site, several avoidance measures have been implemented during project design. Several mitigation measures will also be implemented during development to reduce impacts as much as possible.

Avoidance and mitigation measures include:

- A 10m buffer surrounding *Melaleuca biconvexa* individuals to ensure the species is not impacted by the development.
- Preparation of a Vegetation Management Plan (VMP) to guide the on-going protection and management of the *Melaleuca biconvexa*.
- Treated water will be used to irrigate land draining to the population of Melaleuca biconvexa, aiming to supply the same average annual volume of water that would have flowed to this community under predevelopment conditions (Sustainability Workshop Ltd 2019).
- The stormwater capture and treatment regime will see overflow rates from the OSD basin to near pre-European levels. The water quality is expected to be very high, with virtually all sediment and potential contaminants removed via a series of treatment measures.
- Once water is discharged from the site onto adjoining bushland, a 50m wide level spreader will spread the water out onto adjoining bushland. The soils on this site are sandy soils with the likelihood that most flows would be absorbed and flow below the surface to form an important subsurface flow to sustain the downhill remnant vegetation (see Appendix I: Water Cycle Impact Assessment and Soil and Water Management Plan).
- Avoidance of the southern portion of the Subject Property, which totals 4.1 ha and contains habitat for *Prostanthera junonis* and *Hibbertia procumbens*. The area partially falls under Management Zone 1b and 1d of the Somersby Industrial Park Draft Plan of Management (Connell Wagner Pty Ltd, 2005) and the feasibility of entering into a Biodiversity Stewardship Agreement will be investigated.
- Assigning an Ecologist to undertake a pre-clearing survey of the vegetation prior to clearing and development. If any significant ecological values such as nests are found, clearing is to be delayed until the nest is vacated.
- Assigning an Ecologist to be present on site during the clearing events. The Ecologist will be able to guide works crews away from sensitive ecological features and will be on hand to capture and relocate displaced fauna.

Where possible the clearing of mature trees will be avoided if they can be accommodated into the development footprint.

- Assigning an Ecologist to undertake pre-clearing trapping of Eastern Pygmy-possum within the Subject Site. Fifty (50) Elliot Traps will be laid out within the Subject Site over seven days. Any Eastern Pygmy-possums or other fauna trapped will be relocated to suitable habitat within the south of the Subject Property that is outside of the clearing footprint.
- Assigning an Ecologist to be present on site during the clearing events. The Ecologist will be able to guide works crews away from sensitive ecological features and will be on hand to capture and relocate displaced fauna. Where possible the clearing of mature trees will be avoided if they can be accommodated into the development footprint.
- Preventing the inadvertent introduction of exotic flora propagules by following the DEP 'Arrive Clean, Leave Clean' Guidelines (Department of Environment, 2015).
- Ensuring appropriate erosion and sedimentation controls are maintained throughout the construction phase and the period immediately following as outlined in the 'Blue Book' (Landcom, 2004).

The unavoidable impact of clearing vegetation will be completely offset based on the credit calculations provided below.

12.7 Offset Credit Calculations

Section 9: Table 4 of the FBA (NSW OEH, 2014) provides thresholds for the assessment and offsetting for the unavoidable impacts of development. Four thresholds have been defined, including:

1. Impacts that require further consideration by consent authority
2. Impacts for which the assessor is required to determine an offset
3. Impacts for which the assessor is not required to determine an offset
4. Impacts that do not require further assessment by the assessor.

The proposed development meets the requirements of (2). Therefore, the credit requirements for the project has been calculated.

12.7.1 Ecosystem credits

Ecosystem credits were calculated based on the landscape value assessment, native vegetation assessment and threatened species assessment documented in this report.

In total 103 credits are required for the proposed impact of 3.11 ha of native vegetation and ecosystem species habitat. The ecosystem credit offset requirement is summarised in Table 12.8, and the final credit report is displayed in Appendix 4 of the Biodiversity Assessment report (Appendix P). The credit offset options are considerable, with many possible vegetation types available.

Table 12.8. Ecosystem credit requirement.

Plant community type	Condition	Area impacted (ha)	Credits required
Zone 1: PCT 1642 / HU856 (*Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast*)	Low	1.4	13
Zone 2: PCT 1642 / HU856 (*Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast*)	Moderate to Good	0.78	38
Zone 3: PCT 1579 / HU793 (*Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast*)	Moderate to Good	0.3	11
Zone 4: PCT 1643 / HU857 (*Red Bloodwood - Smooth-barked Apple - Scribbly Gum - Old Man Banksia heathy woodland on sandstone ranges of the Central Coast*)	Moderate to Good	0.63	41
	Total	**3.11**	**103**

12.7.2 Species credits

The impact to 1.41 ha of Eastern Pygmy-Possum habitat requires 28 species credits to be retired.

No other species credits will need to be retired to facilitate this project.

12.7.3 Biodiversity Offset Obligations

12.7.3.1 Retiring of Biobanking Credits

A total of 103 'Biobanking' ecosystem credits and 28 Eastern Pygmy-Possum 'Biobanking' species credits must be retired in order to offset the impacts of the proposed development.

A review of the credits currently available on the offsets market on 8th November 2019 revealed that no identical credits are available for the impacted PCTs within the Wyong subregion, however several alternative credits are available including BioMetric Vegetation Types HU833, HU838, HU839, HU850 and HU895.

As of 8th November 2019, Eastern Pygmy-Possum credits are also currently available from a number of sites in adequate numbers. The proponent will consider contacting credit holders and completing a Credits Wanted request for the required credits as the project proceeds.

Once the availability of matching credits is determined landholders Expression of Interest (EOIs) will also be reviewed. Should a match occur the landholders listed in the EOI register will be contacted to determine if interest to enter into a Biodiversity Stewardship Agreement still exists and, if still interested, the likely cost of the credits required to offset the project.

12.7.3.2 Alternative Options to Meet Offset Obligation

It should be noted that the proposal has assessed impacts to biodiversity values in accordance with the FBA which falls under the TSC Act (as per the SEARs requirements). As such, the proponent is required to retire 'BioBanking credits' in order to offset the residual impacts of the proposal.

The *Biodiversity Conservation Act 2016* together with the Biodiversity Conservation Regulation 2017 commenced on 25 August 2017. They replaced the TSC Act and associated regulation. The TSC Act had previously provided the framework for creation of biodiversity credits and biodiversity credit obligations (also called offset obligations). These are also known as BioBanking credits after the name of the program. The change in legislation also included a change in the method that was used to create biodiversity credits and to calculate offset obligations.

To ensure that credits and credit obligations created under the TSC Act could still be used or met within the newer credit market, The *Biodiversity Conservation (Savings and Transitional) Regulation 2017 (Savings and Transitions Regulation)* preserved these credits and credit obligations. The Savings and Transitions Regulation also provided the power for the Environment Agency Head (EAH) to determine reasonable equivalence of these credits or credit obligations, that is, to match older BioBanking credits or credit obligations to the new Biodiversity Offsets Scheme credit numbers and classes.

The proponent may apply for an 'assessment of reasonable equivalence' because, as a condition of approval of this SSD the proponent will:

- have a BioBanking credit obligation (calculated under the provisions of the TSC Act) and you wish to retire credits created under the BC Act to meet that obligation.
- have a BioBanking credit obligation (calculated under the provisions of the TSC Act) and you wish to discharge that obligation by payment into the Biodiversity Conservation Fund.

If the proponent chooses to undertake an 'assessment of reasonable equivalence' they will still be permitted to transfer and retire BioBanking credits that match BioBanking credit obligations.

Further investigations will be completed to determine the most efficient and effective offset approach for the project.

12.8 Conclusions

The proposed development has been assessed consistent with the FBA, including the preparation of a site scale vegetation map and completion of the eight (8) Biometric plots and transects. The results of the assessment found that:

- 103 ecosystem (BioBanking) credits are required
- 28 Eastern Pygmy-Possum species (BioBanking) credits are required.

The proponent has the option of:

- purchasing the above 'Biobanking' credits directly from holders of such credits from the market;
- alternatively, the proponent may request an 'assessment of reasonable equivalence'. This will result in the proponent being able to meet their offset obligation through the NSW Biodiversity Conservation Act 2016 Biodiversity Assessment Method (BAM). This option allows the proponent to either:
    - make a payment into the Biodiversity Conservation Fund (BCT); or
    - purchasing the equivalent 'BAM biodiversity offset credits' from the open market.

The proponent will now explore the generation of credits from an on-site Biodiversity Stewardship site, before considering other options such as the purchase of credits from the market or payment to the BCT.

13 Fire Safety Study

ACOR was engaged to conduct a fire safety study for the site. The full Fire Safety Study report is attached at Appendix Q.

13.1 Legislative requirements

The Fire Safety Study was prepared with consideration to:

- National Construction Code;
- Hazardous Industry Planning Advisory Paper (HIPAP) 2 – Fire Safety Study Guidelines;
- Fire and Rescue NSW's Fire Safety Guideline: Fire safety in waste facilities;

The proposed fire safety and firefighting systems have been designed to be consistent with these requirements.

13.2 Baseline conditions

Stage 1 of site's development (construction of the office and warehouse) has limited firefighting capacity, which only covers the building at the northern end of the site. This consists of one fire hydrant near the site entrance and two fire reels in the warehouse/office building.

Stage 2 is a much more extensive development. As such the firefighting capabilities also need to be substantially expanded.

13.3 Proposed development

The proposed development is described in detail in Chapter 2. The detailed provided in this section are those pertinent to fire safety.

The raw materials (refer to Table 13.1) and consumables (refer to Table 13.2) stored at the facility are classified as combustible materials according to NSW Planning – Storage and Handling of Dangerous Goods – Code of Practice 2005. 'Combustible material' is defined as 'any type of combustible material and includes without limitation C2 combustible liquids and empty combustible containers, such as paper bags, fibre board drums and boxes, plastic containers and liners for containers, and wooden boxes and barrels'.

Any material at the site that contains wood, paper, fibre, cardboard, plastic or organic material has been classified as 'Combustible material'. Combustible materials have the potential to ignite, burn, support combustion, or release flammable vapours.

Table 13.1. Waste materials.

Location	Material	Tonnes	Fire Load (GJ)	Burn time (min)*
Waste storage bay	timber	900	17,000	780
Waste storage bay	10% timber	80	1,500	680
Processing area	Feed	206	3,870	900
Processing area (per bay)	Finished mulch	221	4,110	660

Location	Material	Tonnes	Fire Load (GJ)	Burn time (min)*
Landscape storage (per bay)	wood mulch	221	4,160	1100
Secondary Sorting Warehouse	timber	2.5	50	180
	wood mulch	2.5	50	180
	paper	2.3	40	60
	plastics	1.8	60	210

*assumes no intervention by Fire and Rescue

Table 13.2. Consumables.

Chemical	Location reference	Packaging/ Storage type	Total Quantity	Fire Load (GJ)
Diesel fuel for plant and equipment	Secondary Sorting Warehouse	1 x 5,000 litre tank	5,000 litres	180
Hydraulic oils		28 x 200 litre drums	5,600 litres	220
Conveyor rubber		137 metres x 1.26m x 28mm	5,740 kilograms	290
LPG		3 x 18 kilogram cylinders	54 kilograms	4

A detailed hazard analysis was prepared and is provided at Appendix A. A high-level hazard identification summary is presented in Table 13.3. The table includes all identified occupational health and safety hazards that may present a risk to the public, employees and contractors working on the proposed development.

Table 13.3. Summary Hazard Analysis.

Item	Hazard	Causes	Consequences
1	LPG storage, outdoors	Cylinders knocked over causing valve damage, gas release	Vapour cloud explosion
		Encroaching fire causes gas venting through PRV	Jet fire
2	Diesel storage, indoors	5,000L tank damaged by mobile equipment	Fire – thermal radiation Toxic fumes Contaminated firewater
3	Hydraulic oil, indoors	Knock-on from encroaching fire	Fire – thermal radiation Toxic fumes Contaminated firewater

Item	Hazard	Causes	Consequences
4	Conveyor rubber, indoors	Ignition of combustible materials during crushing Bearing seizure (friction) Belt misalignment (friction) Fire transfer between belts Belt failure due to fire Inadequate maintenance	Fire – thermal radiation, conduction Toxic fumes Contaminated firewater
5	Plastics (PVC and LDPE) storage, indoors	Knock-on from encroaching fire Ignition during shredding	Fire – thermal radiation, conduction Toxic fumes Contaminated firewater
6	Paper storage, indoors	Knock-on from encroaching fire Inappropriate management of naked flames	Fire – thermal radiation Contaminated firewater
7	Solid wood storage, indoor bins	Knock-on from encroaching fire Inappropriate management of naked flames	Fire – thermal radiation Contaminated firewater
8	Shredded wood storage, indoor bins		Fire – thermal radiation Contaminated firewater
9	Solid wood storage, outdoors	Knock-on from encroaching fire Inappropriate management of naked flames	Fire – thermal radiation Contaminated firewater
10	Shredded wood storage, outdoors	Fire transfer from mobile equipment (brake fire, hydraulic oil fire). Due to inadequate maintenance	Fire – thermal radiation Contaminated firewater

13.4 Impact assessment

ACOR has undertaken modelling of each of the identified combustible materials under plausible event scenarios. Modelled combustion product dispersion contours (refer to Appendix B of the Fire Safety Study provided at Appendix Q of this report), thermal radiation contours (refer to Appendix C of the Fire Safety Study), and overpressure contours (refer to Appendix D of the Fire Safety Study), have been prepared under relevant climate and weather stability conditions (refer to Appendix I of the Fire Safety Study).

The contours indicate that:

- Injurious thermal radiation (30 seconds exposure) originating in the SSW will be blocked (shadowed) to an average distance of 13 metres beyond the site boundary (at ground level) to the east, by the five (5) metre high noise barriers, effectively negating impacts adjacent to the SSW;
- Injurious thermal radiation (after 30 seconds exposure) originating in the processing area will not extend beyond the boundary of the KSSS premises;

- Injurious thermal radiation (after 30 seconds exposure) originating in the central landscape storages will not extend beyond the boundary of the KSSS premises;
- Injurious thermal radiation (after 30 seconds exposure) originating in the waste storage bays will not extend beyond the boundary of the KSSS premises; and

An LPG vapour cloud explosion, involving the contents of two 18kg LPG cylinders should not cause injury beyond the western and northern boundaries of the site. On the eastern boundary, injurious overpressure with up to a 10 per cent probability of injury will extend approximately 15 metres into the adjoining property adjacent to the SSW.

An LPG vapour cloud explosion, involving the contents of two 18kg LPG cylinders (one LPG cylinder will cause the two other LPG cylinders to explode generating a maximum overpressure from two LPG cylinders) should not cause injury beyond the western and northern boundaries of the site. On the eastern boundary, injurious overpressure with up to a 10 per cent probability of injury will extend approximately 15 metres into the adjoining property.

The generation of smoke has been modelled for the conveyor system rubber, the largest fire load within the Secondary Sorting Warehouse. Smoke will fill the ceiling void to a depth of four (4) metres above the floor level within two (2) minutes of the fire reaching steady combustion. A single extraction fan, located on the ridgeline, will be capable of exhausting 410 cubic metres of contaminated air per second at the smoke temperature of 484K.

13.5 Mitigation measures

13.5.1 Prevention and Detection

The first element of fire safety is prevention. Suitable design and layout of the facility and operating procedures and arrangement are important aspects of fire prevention. KSSS plans to prevent fire at the proposed facility by:

- Eliminating ignition sources near dusts and combustible material;
- Prohibit smoking and naked flame to designated smoking areas (no smoking policy for employees and signage for visitors);
- Employee induction and education on fire prevention;
- Regular inspection of stockpiles;
- Sprinkler systems will be installed, in permanent locations, to control dust to the point where potential for fire is minimised;
- Site security (fencing, locked gates when facility is closed, gate houses for visitors);
- Plant maintenance;
- Keeping maintenance and activities that can produce sparks, such as welding, away from combustible material piles;
- Avoiding conditions that can lead to spontaneous combustion (e.g., moisture between 25 – 45 percent and temperatures above about 93ºC in stockpiles);
- Keeping stockpiles low and turning them when the temperature exceeds 60ºC;
- Management of vegetation and debris; and
- Designing the facility for access by firefighting equipment, including clear aisles among stockpiles and access to an adequate water supply.

13.5.2 Fire Suppression and Control

Fire suppression and control is an essential element of preventing escalation of the risks of combustible material. All fire protection and detection equipment should conform to appropriate Australian Standards.

Equipment, such as couplings, firefighting media, hose reels, hydrants and monitors should be selected and installed in consultation with the Emergency Services to ensure compatibility. Firefighting equipment at the premises should be capable of being used with the equipment used by the local fire brigade, without adaptation or modification (e.g. all fittings and couplings need to be compatible).

Sufficient spacing between stockpiles will be maintained to allow access, in case of emergency, and to help prevent the spread of fire. This spacing should at least be equal to the height of the stockpile or adequate for emergency vehicle access, whichever is the greater.

It is recommended KSSS provide an emergency tipping area, such as the aggregate storage bays, for waste loads identified to be on fire or otherwise deemed to be an immediate risk.

13.5.3 Smoke management

A single smoke extraction fan will be installed in the Secondary Sorting Warehouse, as recommended in the Fire Safety Study.

13.5.4 Portable Fire Extinguishers

Portable fire extinguishers should be installed around the facility near operating machinery and entry/ exit points to the site, processing areas and sheds. Fire extinguishers are to be installed and maintained in conformance with appropriate Australian Standards.

At least 1 x 2A 60B(E), dry chemical powder, 4.5kg fire extinguisher to be installed on each piece of mobile equipment.

Fire protection systems and equipment should be inspected, pressure tested, serviced and recharged as necessary at regular intervals to ensure that it is always fully operational.

13.5.5 Location

Fire extinguishers should be wall mounted on a hook or bracket, or an unlocked cabinet, at a suitable height and with signage. Where the extinguisher could be subject to unauthorised interference, the cabinet may be locked providing it has a glass panel that can be broken to remove the extinguisher in the event of a fire.

- Firefighting equipment should be located to achieve the following:
    - All personnel, storage areas (including sheds and processing zones), equipment and other items being protected can be directly reached by the firefighting medium;
    - It is readily accessible and unobstructed in the event of an incident, preferably adjacent to exit doors or on exit routes;
    - It is in a conspicuous position (all firefighting equipment should be clearly marked and labelled in conformity with the relevant Australian Standards);
- All mobile plant is fitted with an appropriate type and size fire extinguisher consistent with its operation;
- All vehicles are fitted with an appropriate type and size fire extinguisher consistent with its operation;
- It is protected from damage (e.g. from vehicle collision and deterioration from the weather); and
- All operators/ site fire crew are trained in the use of fire protection equipment.

13.5.6 Contaminated Firewater

13.5.6.1 Secondary Sorting Warehouse (SSW)

The 2,100m^2 floor area SSW may plausibly require four (4) hours of applied firefighting water from two (2) fire hydrants to quench an established fire, with a combined flow of 20 litres per second (288m^3 over 4 hours). Using the assumption

that 50% of the applied water will evaporate, the volume of contaminated firefighting water required to be captured within the bunded area is 144m^3. This requires a bund wall height of 70mm.

Each of the access doorways (personnel access and roller doors) will have a 70mm high rolled concrete bund wall installed to prevent overflow during a worst-case fire event.

Contaminated firewater will be analysed by a NATA accredited laboratory and then either treated on site and disposed under the stormwater disposal procedures or removed from site by third party licensed waste contractors.

13.5.6.2 Yard Storage

The developed facility will be contoured allowing downgradient overland flow of contaminated firewater to the western perimeter swale drains that then flow into the 5,000m^3 OSD pond.

ACOR has modelled the likely quenching time of a yard fire after the arrival of Fire and Rescue and the consequential water application and runoff. These results are shown in Table 13.4.

Table 13.4. Water Application and Contaminated Water Collection (% of OSD Pond).

Fire Source	Applied Quench Water (kL)	Contaminated Water (kL)
Waste Storage Bay (timber)	125	63 (1.3%)
Waste Storage bay (mixed)	75	38 (0.8%)
Processing Area (feed)	140	70 (1.4%)
Processing Area (finished mulch)	288	144 (2.9%)
Landscape Storage (central)	200	100 (2.0%)

Contaminated firefighting water originating from yard areas will be captured similarly to spill management and stormwater. The site will be graded from east to west to ensure that stormwater run- off is directed to the OSD pond. The grading and stormwater drainage design will ensure all surface runoff is contained on site and conveyed to the OSD pond."

Contaminated firewater will be analysed by a NATA accredited laboratory and then either treated on site and disposed under the stormwater disposal procedures or removed from site by 3rd party licensed waste contractors.

13.5.6.3 Security

Businesses can protect themselves from fire by:

- Maintaining site security, especially after work hours. Insecure, vacant or easily accessed premises may become a target for the opportunistic arsonist. An arsonist can be motivated by many factors including business rivalry, spite/revenge, vandalism, crime concealment or financial reward.
- Having a safety culture: Simple precautions can prevent many accidental fires. Accidents and neglect, poor housekeeping, discarded cigarettes, hot work equipment, chemicals or unsafe work practices can all have tragic consequences.
- Preparing and practicing an emergency evacuation plan: KSSS is near bushland. A bushfire hazard assessment has been completed and the recommendations will be implemented.

13.5.6.4 Detection and protection

Ensure that maximum quantities of stockpile stored in a given area, based on the specifications of the features (separation walls) of the area, are such that:

- For bays storing combustible materials, the maximum height of the stockpile is maintained at one meter below the height of the walls surrounding the stockpile; and
- For bays storing combustible materials, the length of the stockpile such that the walls surrounding the stockpiles extends two meters beyond the outermost edge of the stockpile.
- Ensure that all ignition sources are kept away from the stockpiles:
- Implement the movement of stockpiles as a part of the operational plan to allow flow of air it to maintain low temperatures of the stockpile;
- Ensure that all the equipment being used in this area are regularly inspected and maintained according to the OEM recommendations;
- Ensure that any hot works being carried out has work permits to do so and conduct all of the hot works as far as possible from the combustible materials;
- Train all the staff members, contractors and visitors about the designated smoking area and all the non-smoking areas; and
- Install control equipment that monitors the safety critical parameters of the stockpile such as the core temperature of the stockpile, the moisture content and volume/mass of the stockpile.

Ensure that all the staff, contractors, visitors are well trained and informed on the operational, housekeeping and safety procedures practiced on sites by:

- Implementing robust induction methods;
- Developing documentation for operational and safety procedures that are concise and provides correct instructions to the reader on their respective responsibilities without any ambiguity;
- Develop and implement a robust change management system that allows personnel to identify and implement any changes to the type of materials being stored, quantities, procedures being adapted to carry out tasks;
- Updating relevant documentation capturing any changes such that any discrepancies identified to the content of documentation provided to be communicated in an effective manner;
- Establish an effective communication or reporting system to raise any safety or operational related issues;
- Ensure security system is activated at all times i.e. during the work hours and non-working hours;
- Ensure fire prevention and detection strategies are maintained by; Install, inspect and maintain the right detection systems such as visual flame detectors, infrared detectors, smoke detectors;
- Installation of the alarm system with multiple layers of protection depending on its readings of the parameter;
- Having fire trained staff on site during all working hours and having the right equipment available to stop/prevent escalation of small fires;
- Audit the licenses and skills of the staff, contractors carrying out tasks; and
- Audit the operational, safety procedures, maintenance and inspection documents, any relevant checklists to make sure all changes are being captured.

Based on the location of the potentially combustible materials identified, there are four major fire compartments on the site which will require detection and protection to control and manage any fire hazards on site:

- Waste storage bays – Timber storage concrete bay;
- Landscape storage area – Mulch storage concrete bays;
- Tip and spread area – all the three concrete bays can potentially have combustible material as they are the first point of receival of the recyclables; and
- Recycling plant – the skip bins consisting of the plastics, paper, treated and untreated wood.

Detection of fire in these areas:

- Regular inspections of temperature of the stockpiles in these area with a probe and portable thermal cameras to detect high temperatures. This will be incorporated as a part of the operating procedures;
- Installation of the permanent thermal camera to identify hot spots in the tip and spread area to notice any high temperatures (i.e. > 60°C); and
- Relevant work instructions will be developed to be implemented upon identification and notification of temperature higher than normal (i.e. <60°C).

Protection:

- Based on reading from the ***Fire Safety guideline Fire safety in waste facilities*** According to section 7.5.3, table number 2: Minimum fire hydrants for non-sprinkled building and external storage;
- HIPAP 2 that determines that at 12.6 kJ/m^2 of heat radiation, the presence of any ignition source will start fire;
- The fire contours calculated and marked around the four major fire compartments on site 4.7 kJ/m^2.s – fire hydrant outside of this – HIPAP 4;
- 2 x 30m length of hose and 10 m throw – coverage; and
- The traffic flow as marked on the layout of the site

Based on AS2444, the following protection has been determined:

- Total of 4 hydrants will be installed (refer to Fire Study for location of these hydrants)
- 4 x fire hose reels – each with the length of 36m will be installed (refer to Fire Study for location of these fire hose reels)
- Manual sprinklers will be installed on top of the concrete block walls of the waste storage bays
- For Secondary Sorting Warehouse:
  - It will be installed with the automatic sprinkler system as it has a floor area greater than 1000m^2 and contains combustible material
  - If there is no provision of automatic sprinkler system, there will be a minimum of 3 hydrants and should have a dedicated quarantine area not less than four times the floor area of the largest internal stockpile to receive, breakdown and extinguish that stockpile.
  - Largest internal stockpile area = 18m^2, therefore quarantine area = 72 m^2

- Installation of fire alarm system will warn all the occupants to evacuate the facility
- Infrared detectors and visual alarms around noisy machinery will be installed
- Manual alarm points will be provided in clearly visible locations at all the exits
- The plant will be installed with an automatic smoke alarm hazard management system
- Provision of vent or exhaust smoke so that in at least 90% of the compartment the smoke layer does not descend below 4m above the floor level
- Any exhaust system will be capable of continuous operation of not less than two hours in a sprinkler fitted building or four hours in a non-sprinkler fitted building

- 2A 60B(E) 9 kg powder fire extinguishers will be installed on all the vehicles working in the vicinity of these four fire compartments
- 5 x 2A 60B(E) 9 kg powder fire extinguishers inside the recycling plant will be installed.

13.5.6.5 Water Supply and Demand

Additional fire protection will be required on site, as indicated in Appendix K -drawing PE190247_DG.06_A of the Fire Safety Study.

The additional 2 x dual fire hydrants will require a residual pressure of 150kPa at the most hydraulically disadvantaged hydrant, while all required hydrants are in use (minimum flow of 10 litres per second per hydrants).

ACOR propose that the southern hydrant identified in the Raybal Constructions hydraulic services drawing is moved further south to the location marked to avoid conflict with thermal radiation contours.

13.5.6.6 First Aid Fire Protection

First aid firefighting allows control of a fire events in its initial stages by using whatever means is readily available.

This could be as simple as shovelling dirt onto a small fire or using a blanket to smother a flame by reducing oxygen. A pile of burning wood can be pulled apart to diminish the intensity of the flame and the heat.

Employees are not expected to fight fires unless they have been trained to do so, and the circumstances are manageable. Small fires can often be put out quickly by a well-trained individual with a portable fire extinguisher. However, to do this safely, you must understand the use and limitation of a portable fire extinguisher and the hazards associated with fighting fires.

Do not attempt to extinguish any fire without calling for help. To extinguish a fire with a portable extinguisher, a person must have immediate access to the extinguisher, know how to actuate the unit, and know how to apply the agent effectively.

Attempting to extinguish even a small fire carries some risk. Fires can increase in size and intensity in seconds, blocking the exit path and creating a hazardous atmosphere. In addition, portable fire extinguishers contain a limited amount of extinguishing agent and can be discharged in a matter of seconds.

13.6 Conclusion

The Fire Safety Study recommended that KSSS:

- Provide an emergency tipping area, such as the plant storage area (remove all plant and equipment) for waste loads identified to be on fire or otherwise deemed to be an immediate risk. The aggregate storage area adjacent to the weighbridge likely poses the least risk of escalation;
- Use portable infrared detectors to check mulch stockpiles for thermal hotspots;
- Install fixed infrared cameras with audible alarm at tip and spread shed;
- Install fixed infrared cameras with audible alarm at recycling plant to view skip bins, concrete bays and conveyor belts;
- Install 3 x additional dual fire hydrants at locations as indicated in Appendix K -drawing PE190247_DG.06_A of the Fire Safety Study;
- Install 2 x additional fire hose reels at locations as indicated in Appendix K -drawing PE190247_DG.06_A of the Fire Safety Study;
- Install smoke exhaust fan in the Secondary sorting warehouse; and
- Install manually actuated sprinkler water spray system on top of Waste storage bays (holding wood) for use in controlling minor fire events.

It should be noted that a total of six (6) fire hydrants and six (6) fire hose reels will be installed on-site, once both Stage 1 and Stage 2 of the development are completed.

Three fire hydrants are to be installed under Stage 1 of the project (DA52541/2017). An additional three will be installed as part of Stage 2 of the project, which is the subject of this development application.

Two fire hose reels are to be installed under Stage 1 of the project (DA52541/2017). An additional four will be installed as part of Stage 2 of the project, which is the subject of this development application.

Two emergency quarantine areas to be established.

14 Bushfire Risk Assessment

14.1 Introduction

Bushfire Planning and Design has been engaged to undertake a bushfire hazard assessment at the subject site. The site is mapped as being bushfire prone under Section 146 of the *Environmental Planning and Assessment Act* 1979.

The development is captured under Section 4.14 of the *Environmental Planning and Assessment Act* 1979; Consultation and development consent – certain bush fire prone land. For the purpose of bushfire assessment, the development is considered infill development as described in the New South Wales Rural Fire Service document *Planning for Bushfire Protection* 2019. The site is currently used for storage and sorting of landscape materials and a Development Application is required to increase the permitted operational area to allow the design and construction of a recycling facility.

The proposed development relates to the proposed construction of internal roads, non-habitable storage bays, hardstands and earth works. The development is considered to be a Class 7 development (National Construction Code (NCC 2019) Classification). Class 7 developments are not required to comply with the NCC (2019) with regards to bushfire protection and as a consequence, nor are they required to comply with AS3959. The general fire safety provisions of the NCC are deemed to be adequate. The project is required to comply with the aims and objectives of *Planning for Bushfire Protection* 2006 with regards to access, water and services, emergency planning and landscaping/vegetation management.

The full Bushfire Hazard Assessment is given in Appendix R. The main findings and recommendations from the investigation are given in this chapter of the EIS.

14.2 Legislative requirements

The main legislation, planning instruments, development controls and guidelines that are related to this project are as follows:

Part 4 Division 4.3 Section 4.14 *Environmental Planning and Assessment Act*, 1979

Consultation and development consent— certain bush fire prone land

(1) Development consent cannot be granted for the carrying out of development for any purpose (other than a subdivision of land that could lawfully be used for residential or rural residential purposes or development for a special fire protection purpose) on bush fire prone land unless the consent authority:

(a) is satisfied that the development conforms to the specifications and requirements of the document entitled Planning for Bush Fire Protection, prepared by the NSW Rural Fire Service in co-operation with the Department of Planning (or, if another document is prescribed by the regulations for the purposes of this paragraph, that document) that are relevant to the development ("the relevant specifications and requirements"), or

(b) has been provided with a certificate by a person who is recognised by the NSW Rural Fire Service as a qualified consultant in bush fire risk assessment stating that the development conforms to the relevant specifications and requirements.

Although, it is noted that, under Part 4 Division 4.3 Section 4.14 Clause 1B, this section does not apply to State Significant Developments. However, a Bushfire Assessment was a requirement of the SEARs.

All new developments must comply with the Building Code of Australia (Volume 1 of the National Construction Code (NCC)). The NCC is a performance-based code which derives its statutory power from the *Environmental Planning and*

Assessment Act 1979. Compliance with the NCC can be achieved via a performance-based solution or a deemed-to-satisfy solution. The BCA contains both performance requirements and deemed-to-satisfy provisions for all aspects of building, including the construction of buildings in bush fire prone areas. Compliance with the performance requirements of the BCA is achieved by way of a deemed to satisfy solution which is satisfied by;

A	Complying with AS3959, the Australian Standard for the Construction of Buildings in Bushfire Prone Areas except as amended by Planning for Bush Fire Protection; and for Section 9 for Bushfire Attack Level FZ (BAL-FZ); or
B	Complying with the NASH Standard – Steel Framed Construction in Bushfire Areas except—as amended by Planning for Bush Fire Protection; and for buildings subject to Bushfire Attack Level FZ (BAL-FZ); or
C	The requirements above as modified by the development consent following consultation with the NSW Rural Fire Service under section 4.14 of the Environmental Planning and Assessment Act 1979 if required; or
D	The requirements above as modified by development consent with a bushfire safety authority issued under section 100B of the Rural Fires Act 1997 for the purposes of integrated development.

The EP&A Regulation requires a Certifying Authority, prior to issuing a construction certificate or complying development certificate, to be satisfied that the relevant requirements of the BCA will be met.

Per the requirements of PBP (2019) and the NCC (2019), the proposed development is not required to be constructed to any specific bushfire attack level (BAL). The proposed development is suitably separated from the adjoining bush land by 3-5m high concrete retraining walls. Each of the storage bays are open structures enclosed within moveable concrete block bays. Any potential fire that may occur within the storage areas will be contained within the concrete holding bays.

14.3 Baseline conditions

The site is located at 90 Gindurra Rd, Somersby (Lot4/DP227279) which is under the jurisdiction of the Central Coast Council. The land is zoned IN1 General Industrial and is accessed from Gindurra road on the northern boundary. Kangoo road borders the southern boundary. The site is currently used for storing and screening soil and sand, which is sold for landscaping. The majority of the site is bushland with approximately 14,000 m^2 cleared and currently used as a processing and sorting area. Bushland is located to the west of the site and to the north of Gindurra road. Managed land is located to the east and to the south of Kangoo road.

The study found that the vegetation within 100m of the site could significantly influence bushfire behavior. This includes Hawkesbury Banksia Scrub and Hawkesbury Woodland. The northern part of the site has been part cleared (approximately 14,000m^2) for its current land usage approved under a separated development application. Disturbed canopy, bare ground and patches of vegetation and regrowth are distributed around the northern part of the site (refer site photos in Appendix R). Vegetation and slopes associated with the site that influence Bushfire Attack Levels is given in Figure 13.1 (also see Figure 1a in Appendix R).

14.4 Proposed development

The proposed development will extend the existing facility towards the south. The vegetation to the south of the proposed works is a combination of Hawkesbury Banksia Scrub and Hawkesbury Woodland (Gosford Council

vegetation mapping). The land to the west of the proposed works is dominantly Hawkesbury Banksia Scrub and the land to the east is dominantly managed land.

The effective slope is 0-5° down-slope the west, east and south and up-slope to the north.

The proposed development is suitably separated from the adjoining bush land by 3-5m high concrete retraining walls. Each of the storage bays are open structures enclosed within moveable concrete block bays. Any potential fire that may occur within the storage areas will be contained within the concrete holding bays.

The separation of the storage areas from the adjoining lands by non-combustible retaining walls is deemed to be appropriate. As per the RFS recommendations, suitable internal access provisions allow RFS vehicular access to key structures within the site and unobstructed pedestrian access is provided to the rear of the property.

Figure 14.1. Vegetation and slopes associated with the subject site, and Bushfire Attack Levels (also see Figure 1a in Bushfire Assessment report).

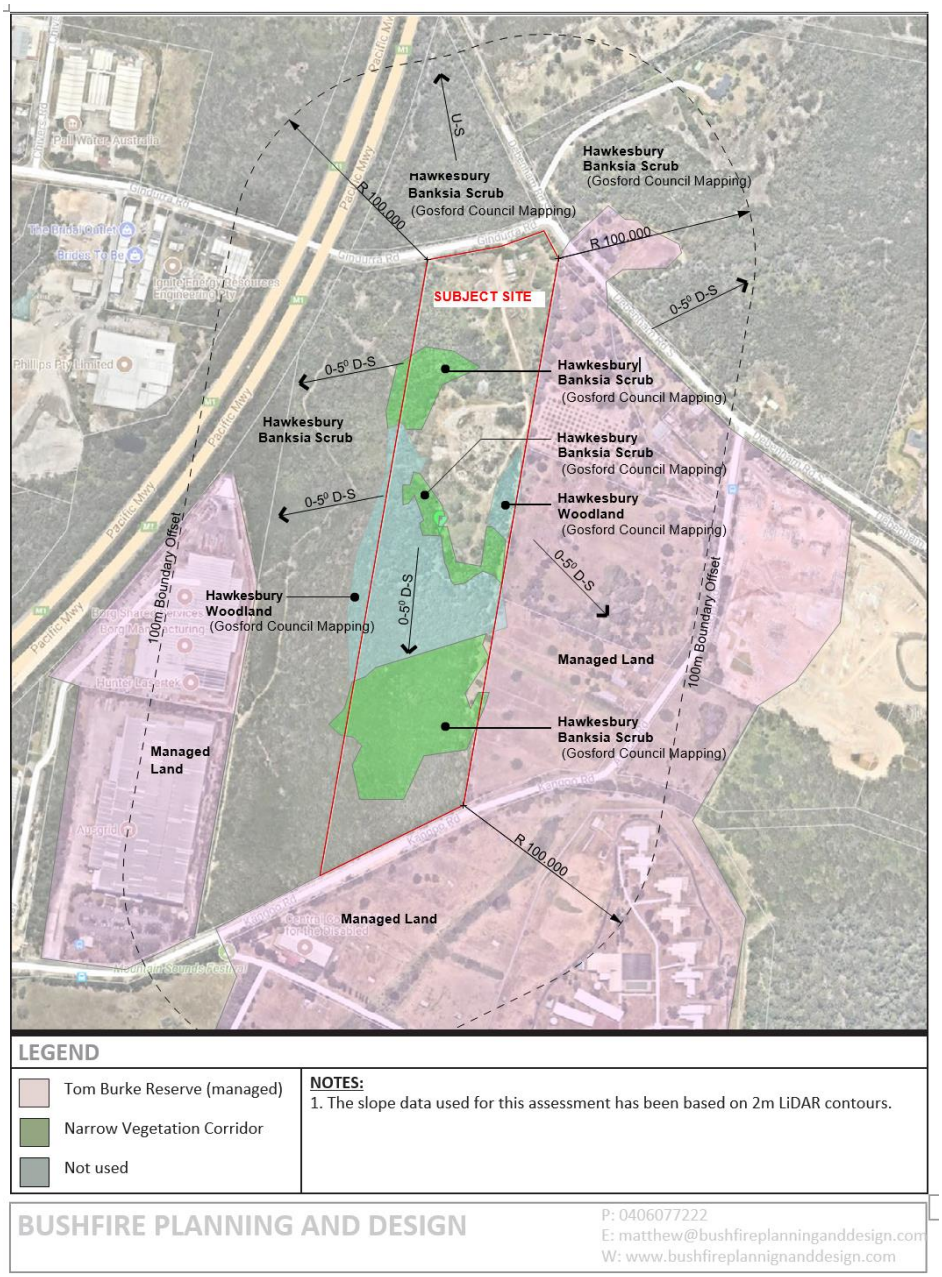
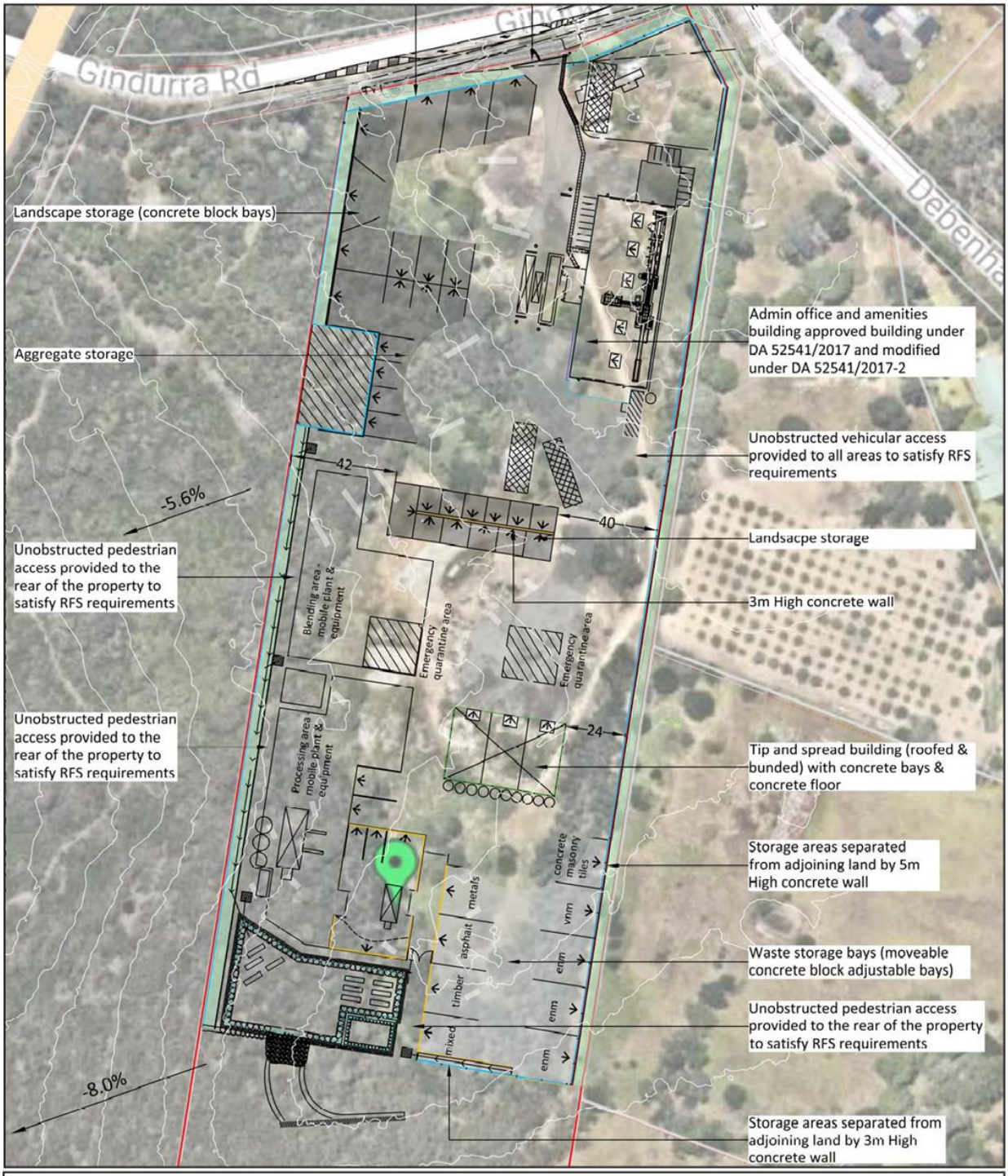


Figure 14.2. Site layout within context of bushfire risk (also see Figure 1b in Bushfire Assessment report).



14.5 Impact assessment

The proposed development can comply with the PBP (2019) with regards to water requirements. Reticulated water is provided however the hydrant sizing, spacing or pressures have not been tested. Fire hydrant spacing, sizing and pressures comply with the Australian Standard AS 2419.1. It is assumed that reticulated water services installed by Central Coast Council (Gosford City Council) have been installed in accordance with the Australian Standard. No additional water for the suppression of bushfire is required for the proposed development. The following points are to be adhered to for the life of the development.

The proposed development can comply with the PBP (2019) with regards to electricity and gas requirements. The following points are to be adhered to (where applicable) for the provision of electricity and gas services where applicable.

14.6 Mitigation measures

Section 4 and 5 of the full Bushfire Hazard Assessment describe the construction materials and requirements of the Asset Protection Zone to comply with Planning for Bushfire Protection (2019). Based on woodland (and scrub) with a maximum 0-5° down-slope, a minimum 18m APZ is recommended to be applied around key components of the development.

14.6.1 Asset Protection Zone requirements

The following points are to be adhered to for providing APZs.

- The Inner Asset Protection Area (IPA) is to have a tree canopy cover less than 15%;
- The Outer Asset Protection Area (OPA) is to have a tree canopy cover less than 30%;
- No trees are to be located within 2m of the building roof line;
- Garden beds with flammable shrubs are to be located a minimum 10m from the building;
- Tree limbs within 2m of the ground are to be removed; and
- Removal of ground fuels should be removed each year prior to the bushfire season (October-March).

14.6.2 Site access

Sufficient access is also required to comply with the Planning for Bushfire Protection (2019). These include:

- Minimum carriageway width of 4.5m (one way) or 8m (two way);
- Minimum vertical clearance of 4m to any overhanging obstructions;
- Curves have a minimum 6m inner radius;
- Minimum 6m between inner and outer curves;
- Crossfall is not more than 10°;
- Maximum grades for sealed roads is 15°;
- Maximum grades for unsealed roads is 10°;
- Some short constrictions in the access may be accepted where they are not less than 3.5m and extend for no more than 30m;
- For internal roads: roads are to be through roads. Maximum length of a dead end roads is 100m in from a through road. Dead end roads to be clearly sign posted.
- For internal roads: provide a minimum 12m outer radius turning circle for dead end roads.

14.6.3 Water requirements

All above ground water and gas service pipes and fittings external to the building are metal.

14.6.4 Electricity and gas requirements

The following points are to be adhered to (where applicable) for the provision of electricity and gas services where applicable:

- Where practicable place electrical transmission lines are underground or;
- If overhead electrical transmission lines are proposed, lines are installed with short pole spacing (30metres), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002);
- Reticulated or bottled gas is installed and maintained in accordance with AS 1596 and the requirements of relevant authorities;
- Metal piping is to be used;
- All fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10m and shielded on the hazard side of the installation;
- Release valves are directed away from the building and at least 2m away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are to be metal; and
- Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.

14.6.5 Landscaping and property maintenance

It is expected that the nominated APZs will be maintained by the owner of the land as part of the development. It is accepted practice that after construction of a dwelling, gardens will be established and landscaping of the grounds will be undertaken. The following principles should be applied for the establishment of gardens and property maintenance:

- Apply the principles for APZ and vegetation management as attached to the appendix of this report;
- Maintain short cropped grass less than 100mm adjacent to any building;
- Keep areas under fences, fence posts and gates and trees raked and cleared of fuel; and
- Utilising non-combustible fencing and retaining walls.

Prior to the bushfire season which runs from October to March the site should be maintained utilising the following guidelines from Appendix 5 of the Planning for Bushfire Protection (2019):

- Remove organic material from the roof and gutters and valleys;
- Check tiles and roof lines for broken tiles or dislodged roofing materials;
- Ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps;
- Doors are fitted with draught seals and well maintained;
- Mats are of non-combustible material or in areas of low potential exposure;
- Screens on windows and doors are in good condition without breaks or holes in fly screen material and frames are well fitting into sills and window frames;
- Where applicable, check pumps and water supplies are available and in working order;
- Where applicable, drenching or spray systems are tested before the fire season;
- Hoses and hose reels are not perished and fittings are tight and in good order; and
- Woodpiles, garden sheds and other combustible materials are located away from the house.

14.7 Conclusions

The proposed development has been assessed against the potential threat of bushfire. It is noted that the proposed works relate to the construction of four unenclosed, non-combustible and non-habitable structures (mulcher operation building, crusher operation building, aggregate storage bay, landscape storage bay, waste receival bay and waste storage bay). The proposed development is considered to be "Other Development" in the context of PBP (2019).

Building classifications 5-8 and Class 10 buildings not associated with a Class 1 structure are not required to comply with AS3959 (2018) with regards to the construction of a building in a bushfire prone area. The general fire safety construction provisions of the NCC (2020) are taken as acceptable solutions, but the aims and objectives of PBP (2019) apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management. All proposed built structures are non- combustible and suitably located. In the event of a bushfire it is our view that the proposed development will not influence bushfire behaviour and will not increase bushfire risk for any adjoining properties.

There are no specific asset protection zones required for this type of development. The RFS have requested that the entire development area be managed as an Inner APZ. In addition to managing the development area as an Inner APZ, all storage bays are bounded by concrete retaining walls that will prevent potential fire spreading from the subject site onto adjoining bush land and vice versa.

Unobstructed vehicular access is provided to all key areas within the development site and unobstructed pedestrian access is provided to the rear of the site consistent with the RFS recommendations.

Site access, including access via the public road system is suitable for emergency response vehicles. The development complies with Planning for Bushfire Protection (2019) with regards to the provision of water. The requirements for electricity and gas (if applicable) can also be complied with. A bushfire emergency evacuation plan has been prepared such that employees and visitors are informed about suitable egress routes away from the site in the event of bushfire.

The full Bushfire Hazard Assessment, with recommended mitigation actions, is provided at Appendix R of this EIS.

15 Heritage

15.1 Introduction

The historical and aboriginal heritage history of the site was investigated to determine whether the development would have any impact on any known historical or aboriginal sites or features at the site.

15.2 Legislative requirements

15.2.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Act* 1999 (EPBC Act) is the national Act protecting the natural and cultural environment. The EPBC Act is administered by the Department of Environment and Energy (DEE). The EPBC Act establishes two heritage lists for the management of the natural and cultural environment:

- The National Heritage List (NHL) contains items listed on the NHL that have been assessed to be of outstanding significance and define "critical moments in our development as a nation".3
- The Commonwealth Heritage List (CHL) contains items listed on the CHL that are natural and cultural heritage places that are on Commonwealth land, in Commonwealth waters or are owned or managed by the Commonwealth. A place or item on the CHL has been assessed as possessing "significant" heritage value.

15.2.2 NSW Heritage Act 1977

Heritage in NSW is principally protected by the *Heritage Act* 1977 (Heritage Act) (as amended) which was passed for the purpose of conserving items of environmental heritage of NSW. Environmental heritage is broadly defined under Section 4 of the Heritage Act as consisting of the following items: "those places, buildings, works, relics, moveable objects, and precincts, of State or Local heritage significance". The Act is administered by the NSW Heritage Council, under delegation by the Heritage Division, Office of Environment and Heritage. The Heritage Act is designed to protect both known heritage items (such as standing structures) and items that may not be immediately obvious (such as potential archaeological remains or 'relics'). Different parts of the Heritage Act deal with different situations and types of heritage and the Act provides a number of mechanisms by which items and places of heritage significance may be protected.

15.2.3 Gosford Local Environment Plan 2014

The *Gosford Local Environmental Plan* 2014 contains schedules of heritage items that are managed by the Council. As the project is being undertaken under Part 4 of the EP&A Act, the Council is responsible for approving controlled work via the development application system.

15.3 Baseline conditions

15.3.1 Historical Heritage

A search of the National Heritage List and Commonwealth Heritage List did not yield any results associated with the study area.

There are no items/conservation areas listed on the SHR within the study area. However, the following heritage item is in the vicinity of the study area:

- Mount Penang Parklands, (Item No. 1667), Pacific Highway, Somersby, NSW 2250, Lot 702, DP 1128417, Lots 10, 12 and 16, DP 1149050, Lot 1 DP 715442, Lots 601, 602, 603 and 607, DP 823147, Lot 475, DP 823714, located immediately south of the study area.

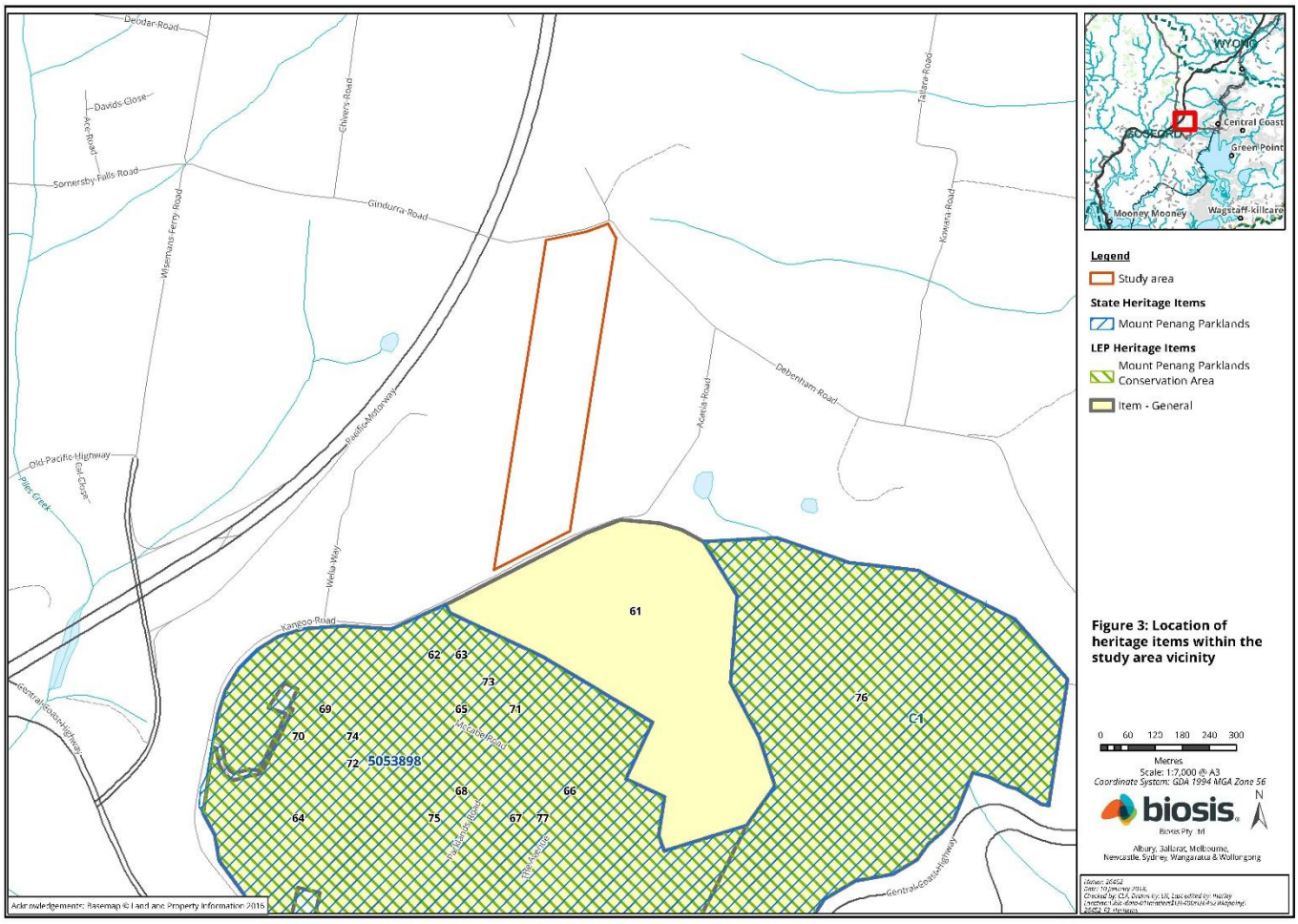
There are no items within or adjacent to the study area that are entered on a State government instrumentality Section 170 Register.

The study area is not listed as an item of local significance on the Gosford LEP 2014 Schedule 5. The study area is situated within the vicinity of the following heritage items and conservation area of local and state significance:

- Remnant farm buildings—the barn, storage shed and dairy (Item No. 61), Central Coast Highway, Somersby, NSW 2250, Lot 521, DP 1017539. Local heritage item, immediately south of the study area.
- Eastern bushland (Item No. 76), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. Local heritage item south east of the study area.
- Dormitories—"Carinya", "Sobraon", "Walpole", "Vernon" and "The Wood Building" (Item No. 62), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. State heritage item located in the Mt Penang Parklands south of the study area.
- Administration and service buildings—maintenance store, cultural centre, admissions/operations annexe and theatre, school house, Girrakool House, occasional child care, flats (Item No. 63), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. State heritage item located in the Mt Penang Parklands south of the study area.
- Residential buildings—six residential cottages, deputy superintendent's cottage (Item No. 64), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. State heritage item located in the Mt Penang Parklands south of the study area.
- Service and amenity buildings—art room and ablutions block, former officers' dining room, dining room, main kitchen and laundry (Item No. 65), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. Local heritage item located in the Mt Penang Parklands south of the study area.
- McCabe Complex—two cottages, McCabe Conference Centre (Item No. 66), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. State heritage item located in the Mt Penang Parklands south of the study area.
- Sports fields—three sports fields, sports oval (Item No. 67), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. State heritage item located in the Mt Penang Parklands south of the study area.
- Built landscape elements—gazebo, stone walls, sculpture park (Item No. 68), Central Coast Highway, Lot 10, DP 1149050. Local heritage item located in the Mt Penang Parklands south of the study area.
- Old pine tree group (Item No. 69), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. Local heritage item located in the Mt Penang Parklands south of the study area.
- Dam (Item No. 70), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. Local heritage item located in the Mt Penang Parklands south of the study area.
- White poplar avenue (Item No. 71), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. Local heritage item located in the Mt Penang Parklands south of the study area.
- Mature cultural plantings (Item No. 72), Central Coast Highway, Lot 10, DP 1149050, Lot 702, DP 1128417. Local heritage item located in the Mt Penang Parklands south of the study area.

- Mature cultural plantings, including coral trees, brush box, camphor laurels, white poplars, hoop pines, an oak and a larch (Item No. 73), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050, Lot 702, DP 1128417. Local heritage item located in the Mt Penang Parklands south of the study area.
- Two groups of scribbly gums (Item No. 74), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. Local heritage item located in the Mt Penang Parklands south of the study area.
- Sports field perimeter brush box and eucalypt plantings (Item No. 75), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. Local heritage item located in the Mt Penang Parklands south of the study area.
- Entry drive with perimeter brush box and eucalypt plantings (Item No. 77), Central Coast Highway, Somersby, NSW 2250, Lot 10, DP 1149050. State heritage item located in the Mt Penang Parklands south of the study area.
- Mount Penang Parklands Heritage Conservation Area (Item No. C1), Central Coast Highway, Somersby, NSW 2250, Lot 702, DP 1128417, Lots 10, 12 and 16, DP 1149050, Lot 1 DP 715442, Lots 601, 602, 603 and 607, DP 823147, Lot 475, DP 823714. State listing located immediately south of the study area.

Figure 15.1. Location of historical heritage items in the vicinity of the development site (extracted from Historical Heritage Assessment in Appendix T: Aboriginal Cultural Heritage Assessment).



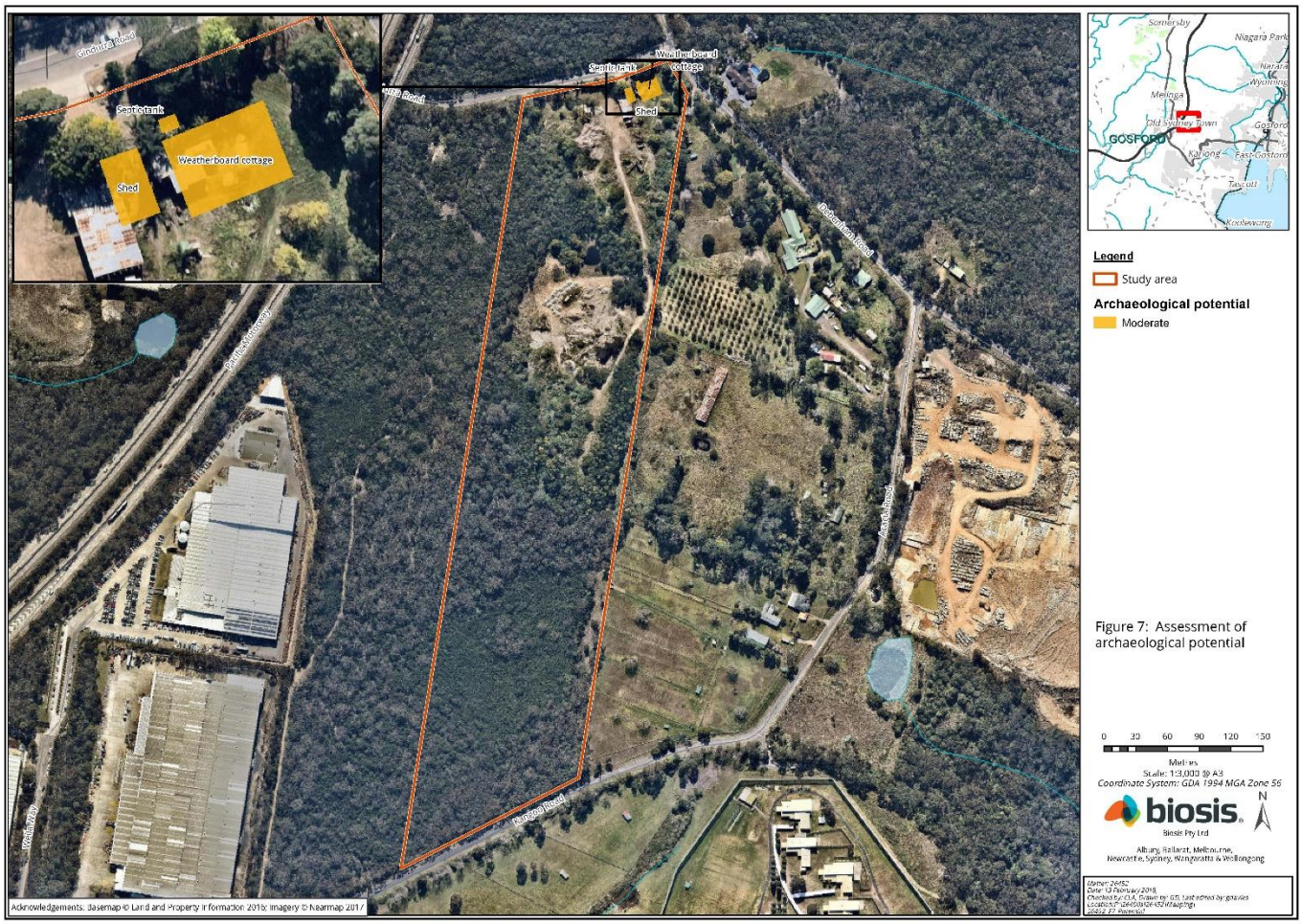
The study area contains limited built fabric in the northern section of the study area, including sheds, a demountable office building, and fence lines.

Historical research identified one residence in the north eastern corner of the property, at the junction of what is now Gindurra Road and Debenham Road South. It was built in the 1920s and was described as 'Weather Board, Iron roof, 9 Rooms, Hall, Kitchen, Offices, 8 foot verandah on 3 sides', was given the name 'Brayton', and was surrounded by orchards. The 1965 subdivision plan also showed the weatherboard cottage was still present, as well as the addition of a septic tank and shed. The physical inspection did not identify the 1920s, 9 bedroom, weatherboard residential building or septic tank in the study area nor any of the associated orchards.

Built fabric identified in the study areas consisted of a corrugated iron shed and storage area built in 1965, a small storage building with particle board walls and a corrugated iron gable roof built after 1965, and a flat roofed portable building on raised foundations, with a corrugated iron skillion roof protruding from the north facing wall.

The archaeological potential is assessed to be moderate, consisting of footings for the 1920s residential building and a septic tank. Figure 15.2 shows the likely location of the old residence at the site.

Figure 15.2. Archaeological potential at the development site (extracted from Historical Heritage Assessment at Appendix S).



The study area does not present with any fabric or possible archaeological features that would be considered significant, either at a local or state level. The former buildings date from the 1920s, a well-documented time frame for this region with much recorded on the small citrus farming industry. The potential archaeological remains would not therefore demonstrate any degree of rarity or aesthetic characteristics considered to be of high quality. Any artefactual material that may be present either within secure subfloor deposits or backfill from the septic tank would

not present any new or informative material that could present new information. Therefore, the study area is not considered to be significant at a local or state level.

15.3.2 Aboriginal heritage

According to (Tindale, 1974) the study area was traditionally inhabited by the Darkinjung, bordered closely by the Kuringai tribe who inhabited the land between them and the coastline. These two groups were on friendly terms, unlike the Awabakal groups that inhabited the region to the north.

The Darkinjung lands roughly extended from the Hawkesbury River northwards to Wollombi and the southern drainage of the Hunter River (Tindale, 1974). (Vinnecombe, 1980) places the Darkinjung people as living between the Hawkesbury and Hunter Rivers.

Information gathered by R.H Matthews provides a valuable insight into the lives of the Darkinjung people, although this information was recorded within an already disjointed and numerically decimated community. He stated that all members of the Darkinjung community were segregated into two moieties Dilbi and Kuparthin, and each moiety was further divided into two sections (Mathews, 1897). On the basis of these moieties and sections, totemic affiliation and marriage relations were determined. Totems consisted of animals or inanimate objects, such as plants, heavenly bodies, the elements or seasons.

It has been suggested that the Darkinjung would move to the coast, within Kuringai territory during summer months, to exploit the abundant coastal resources, and the reverse was true for the Kuringai who moved inland during winter months to participate in ritual kangaroo hunts (Vinnecombe, 1980). These two groups had a cordial relationship, with reciprocal visits and regular trading of resources.

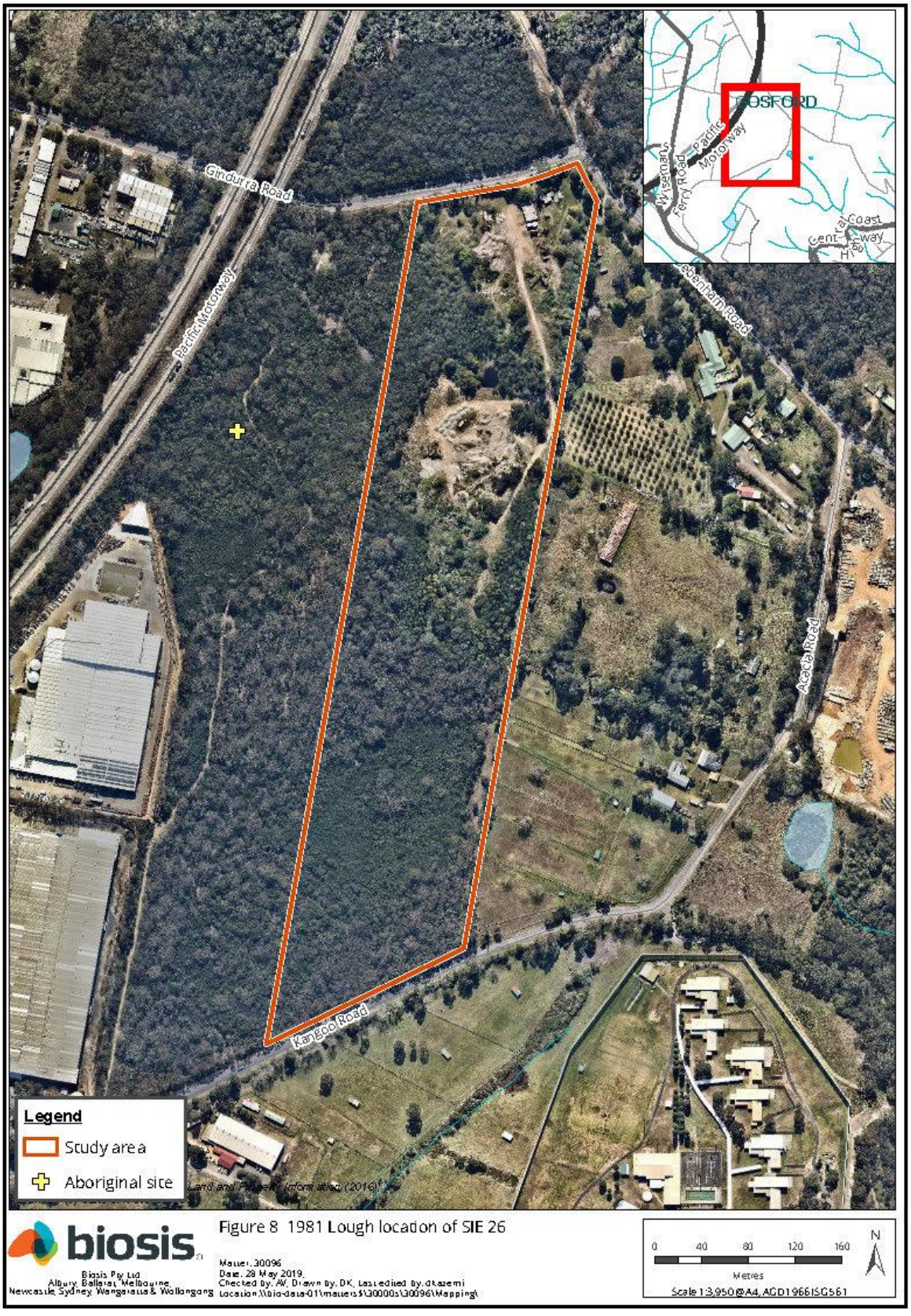
As identified in the background research for this assessment, and as detailed in Appendix 5 of the report (see Appendix T), there are 36 Aboriginal cultural heritage sites registered with the Aboriginal Heritage Information Management System (AHIMS) register in the vicinity of the study area, however there are no recorded sites located within the study area. Background research has identified that reports completed by, (J.C. Lough & Assoc., 1981) and (AMB, 2002), have identified an engraving site, SIE 26, as either being located within the study area (J.C. Lough & Assoc., 1981) or 50 metres to the west of the study area (AMBS 2002). SIE 26 has not been recorded on the AHIMS register. Biosis has checked the coordinates for this site, and through mapping has been able to confirm that this site is not located within the study area and is located approximately 120 metres to the west of the study area. The location of this site was also checked during the field investigation and was unable to be identified.

The study area consists of densely vegetated land with disturbance from the existing sand and soil recycling centre and is also situated within the Hawkesbury Sandstone geological unit. A review of previous assessments conducted within the Somersby region, along with AHIMS search results, indicates that Aboriginal sites are most likely to be present in close proximity to watercourses or drainage lines, or on sandstone outcropping or overhangs. Dominant site types include rock engravings, rock art, and axe grinding grooves. Locations such as level, well-drained topographies have the potential to contain subsurface deposits.

The soil landscape situated within the study area includes slopes, and the erosional processes of the Sydney Town soil landscape indicate that archaeological deposits, should they be present with the study area, may be highly weathered or disturbed. Therefore, Aboriginal site preservation may not be high, particularly upon slope landforms within the study area.

The study area is not located in close proximity to a perennial source of water, which reduces the likelihood of Aboriginal sites to be located within the study area.

Figure 15.3. Location of the closest identified Aboriginal Site in the area.



Background research has identified that the study area had been subjected to past vegetation clearance for agricultural use including orcharding and heavy disturbances from its use as a sand and soil recycling centre. In addition, the sloped nature of the landform pattern, the lack of proximity to any perennial source of water and the lack of suitable sandstone outcrops or overhangs for shelter, which are common elsewhere in the region, indicate the study area was not likely utilised by Aboriginal people for occupation.

15.4 Proposed development

The proposed development would involve clearing the northern half of the site. Any remnants of the former residence and septic tank would be either removed or covered with fill. It is intended that a car park is located in the area where the former residence is likely to have been located.

The area of the site marked for development is considered "disturbed", and unlikely to retain any sites of aboriginal significance. The remainder of the site is considered to have low potential for aboriginal heritage sites. This area, at the southern end of the site, will remain undisturbed by the proposed development.

15.5 Impact assessment

15.5.1 Historical heritage

Table 15.1 provides a summary of the assessment of the historical heritage of the site.

Table 15.1. Summary of historical heritage assessment

Heritage Item	Significance	Discussion	Assessment	Mitigation measures
Mount Penang Parklands, (Item No. 1667), Pacific Highway, Somersby, NSW 2250, Lot 702, DP 1128417, Lots 10, 12 and 16, DP 1149050, Lot 1 DP 715442, Lots 601, 602, 603 and 607, DP 823147, Lot 475, DP 823714,	State significance	No know items of heritage significance are located within the study area, however the Mount Penang Parklands listed as a conservation area on the NSW state heritage register, is located adjacent to the study area on its southern border. The heritage listing for the conservation area incorporates its natural setting and the significant views and vistas surrounding the parklands as part of its significance. Developments surrounding the conservation area should incorporate a curtilage of the natural bushland that is currently extant to minimise any loss of value to the heritage item. The proposed development will be confined to the northern portion of the study area with no plans to develop the southern portion, which currently consists of natural bushland. Built infrastructure proposed should not exceed current building heights within the study area as this will help minimise any visual impacts.	No impact	The southern portion of the study area should not be developed in the future.

The study area has been assessed as not containing any items of heritage significance. Therefore, the proposed project will not have any negative impacts upon items within the study area. The significance of the state listed Mount Penang Parklands incorporates many elements with notable aesthetic qualities associated with its site and the available views. The proposed development at 90 Gindurra Road is situated within the northern portion of the study area, with the southern portion being left undeveloped. As the development plans are confined to the northern portion of the study

area any views and vistas associated with the listed heritage item will not be impacted by the proposed usage of the study area.

15.5.2 Aboriginal heritage

15.5.2.1 Cultural (social significance) values

Cultural or social significance refers to the spiritual, traditional, historical and/or contemporary associations and values attached to a place or objects by Aboriginal people. Aboriginal cultural heritage is broadly valued by Aboriginal people as it is used to define their identity as both individuals and as part of a group (DECCW, 2010). More specifically it provides:

- A 'connection and sense of belonging to Country'.
- A link between the present and the past.
- A learning tool to teach Aboriginal culture to younger Aboriginal generations and the general public.
- Further evidence of Aboriginal occupation prior to European settlement for people who do not understand the magnitude to which Aboriginal people occupied the continent.

It is acknowledged that Aboriginal people are the primary determiners of the cultural significance of Aboriginal cultural heritage. No information has been provided by RAPs in regard to the cultural values of the study area to date.

15.5.2.2 Historic values

Historic significance refers to associations a place or object may have with a historically important person, event, phase or activity to the Aboriginal and other communities. The study area is not known to have any historic associations.

15.5.2.3 Archaeological (scientific significance) values

An archaeological scientific assessment was undertaken for the study area and is presented in detail as part of the attached Archaeological Report (Appendix 5). Review of background research and an archaeological survey have indicated that there is low archaeological value in the study area due to previous disturbance and the lack of suitable landforms to indicate Aboriginal occupation.

15.5.2.4 Aesthetic values

The study area is highly disturbed and a typical example of a slope landform. It is surrounded by rural dwellings and agricultural land to the east and dense vegetation to the west. It has low aesthetic value due to the range of disturbances present.

15.5.2.5 Statement of significance

The significance of sites was assessed in accordance with the following criteria:

- Requirements of the Code.
- The Burra Charter.
- Guide to Investigating and Reporting on Aboriginal Heritage (OEH 2011).

The combined use of these guidelines is widely considered to represent the best practice for assessments of Aboriginal cultural heritage. The identification and assessment of cultural heritage values includes the four values of the Burra Charter: social, historical, scientific and aesthetic values.

As there were no Aboriginal sites located during the survey and the study area was assessed as having low archaeological potential, there is therefore no archaeological significance in this area.

15.6 Mitigation measures

The following mitigation measures were identified to preserve the historical and aboriginal heritage of the site:

- The southern portion of the study area should not be developed in the future.
- If any suspected archaeological remains are discovered during the development, all activity must stop and an archaeologist consulted.
- If any suspected human remains are discovered during the development, all activity must stop and the find reported to the NSW Police and the Coroner.

Ideally, heritage management involves conservation of sites through the preservation and conservation of fabric and context within a framework of 'doing as much as necessary, as little as possible' (Australia ICOMOS, 2013). In cases where conservation is not practical, several options for management are available. For sites, management often involves the salvage of features or artefacts, retrieval of information through excavation or collection (especially where impact cannot be avoided) and interpretation.

Avoidance of impact to archaeological and cultural heritage sites through the design of the development is the primary mitigation and management strategy and should be implemented where practicable. The proposed works have been confined to areas that have been heavily disturbed from the sand and soil recycling centre and will avoid impacts to any known Aboriginal sites. As part of the management and mitigation measures for the proposed works, and Aboriginal cultural heritage assessment including archaeological survey and consultation with the Aboriginal community was undertaken. This was done to determine the presence and nature of any potential Aboriginal sites so that appropriate management could be undertaken. The survey did not identify the presence of any Aboriginal sites and the study area was assessed with low potential due to high levels of disturbances present. As a results of the assessment an unexpected finds protocol was also recommended which will help manage and mitigate potential impacts in the case of unexpected finds.

Strategies have been developed based on the archaeological significance of cultural heritage relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practice, widely considered to include:
  - Ethos of the Australia ICOMOS Burra Charter.
  - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

- Recommendation 1: No further archaeological investigation required

  No further archaeological investigation or works are required to be undertaken for the study area. The study area has been assessed as having low archaeological potential and no further investigations are required in this area. This recommendation is conditional upon Recommendations 2 to 6.

- Recommendation 2: Boundary fencing

Appropriate boundary fencing is recommended to be used in order to clearly outline the boundary of the study area and to ensure that the proposed works will not impact upon rock engraving SIE 26.

- Recommendation 3: Recording of SIE 26 on AHIMS

The engraving site, SIE26, is to be recorded on AHIMS. Further investigation and conservation efforts are to be conducted by either the landholder or EES.

- Recommendation 4: Discovery of unanticipated Aboriginal objects

All Aboriginal objects and places are protected under the National Parks and Wildlife Act 1974 (NPW Act). It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by EES. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal site or object the archaeologist will provide further recommendations. These may include notifying EES and Aboriginal stakeholders.

- Recommendation 5: Discovery of Aboriginal ancestral remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.

2. Notify the NSW Police and EES's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their locations.

3. Not recommence work at that location unless authorised in writing by EES.

- Recommendation 6: Continued consultation with the registered Aboriginal parties

As per consultation requirements it is recommended that the proponent provides a soft copy of this report to the Aboriginal stakeholders for comment. The proponent should continue to inform these groups about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project.

15.7 Conclusions

15.7.1 Historical heritage

The assessment has identified that the study area likely contains the archaeological remains of the 1920s cottage and associated buildings in the north eastern section. The significance assessment has identified that these archaeological remains do not contain any significant fabric or research potential and therefore does not require any management. The southern border of the study area is adjacent to a state listed conservation area, Mount Penang Parklands and as such required an assessment of possible impacts resulting from the proposed development. The works are confined to the northern section of the study area with no plans to use the southern section. The significance of the Mount Penang Parklands includes the visual relationship of the conservation area with its surrounds. Therefore, the southern portion of the study area should remain undeveloped to minimise any visual impacts. Built infrastructure within the study area should not exceed the height of extant buildings. It should also be mentioned that cumulative impacts of any future developments within the surrounds of Mount Penang Parklands will contribute the loss of the Parklands significance and should therefore be managed appropriately.

15.7.2 Aboriginal heritage

There are 36 Aboriginal cultural heritage sites registered with the Aboriginal Heritage Information Management System (AHIMS) register in the vicinity of the study area.

The Aboriginal community was consulted regarding the heritage management of the project throughout its lifespan. Consultation has been undertaken as per the process outlined in the DECCW document, Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, 2010). No responses were received commenting on the cultural significance of the study area therefore the outcome of the consultation process with the RAPs so far is that the study area currently has an unknown level of cultural significance. The results of the consultation process are included in this document.

An archaeological field investigation of the study area was undertaken by Mathew Smith (Project Archaeologist, Biosis) on 2 February 2018, with two representatives of the Darkinjung Local Aboriginal Land Council, Anthony Freeman and Timothy Oliver. A supplementary field investigation of the study area was conducted on Wednesday 11 September 2019 by Taryn Gooley (Team Leader – Heritage, Biosis), Tracey Howie (Awabakal & Guringai Pty Ltd) and Robert Pankhurst (Guringai Elder). No previously unrecorded Aboriginal cultural heritage sites were identified during the field investigation, and no areas of (archaeological) sensitivity were identified. Due to the high levels of disturbance identified in the northern section and the lack of sandstone exposures and overhangs suitable for rock, engravings, shelters and grinding grooves, there is a low potential for Aboriginal sites to be present within the study area.

The results of the assessment (Appendix T) indicated that the study area possessed low archaeological potential.

16 Visual Impact

16.1 Introduction

Moir Landscape Architecture was commissioned to prepare a Visual Impact Assessment (VIA) for the proposed development Kariong Sand and Soil Supplies development, including the operation for the expanded operational area for design and construction of a recycling facility (the Proposal) on Lot 4 DP227279, 90 Gindurra Road Somersby. The report has been developed with regard to the Secretary's Environmental Assessment Requirements (SEARs) SSD8660.

Survey work was undertaken during January 2018 using key viewpoints and locations with potential views towards the site. The report details the results of the field work, documents the assessment of the landscape character and visual setting, and assesses potential visual impacts associated with the proposal.

The report also provides an overview of the proposed landscape treatments which will assist in the mitigation of potential visual impacts. This information is provided to assist in understanding the likely impacts and how they may be managed to ensure that the positive character of the immediate area and surrounding visual landscape are not overly modified or diminished.

The full Visual Impact Assessment is given in Appendix U of the EIS. The main findings and recommendations from the investigation are given in this chapter of the EIS.

Landscape design will be important in reducing the visual impact of the development. A Landscape Design Plan is provided at Appendix F.

16.2 Legislative requirements

The purpose of this report is to provide a qualitative and quantitative assessment of the visibility and potential visual impacts of the proposal. In particular the 'additional impacts' from the development, which are principally the noise attenuation wall along the eastern side of the development. The VIA will support the Environmental Impact Statement (EIS) under Part 4 & Section 4.36 of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) for State significant development SSD8660.

16.3 Baseline conditions

The subject land, referred to as "the Site" is located at 90 Gindurra Road, Somersby, and occupies the lot known as Lot 4 in DP227279. With reference to Central Coast Council's *Gosford Local Environment Plan* (LEP) 2014, the Site is zoned IN1 (General Industrial) zone.

The Site is located on the southern side of Gindurra Road in the suburb of Somersby within the Central Coast Local Government Area (LGA). The Site covers an area of approximately 10.8 ha and sloping from the northern boundary at Gindurra Road in a south-easterly direction. The Site has been used for sand and metal recycling since 1992 and overtime has expanded its operational footprint (see Figure 15.1; see also Figure 3 of Appendix U).

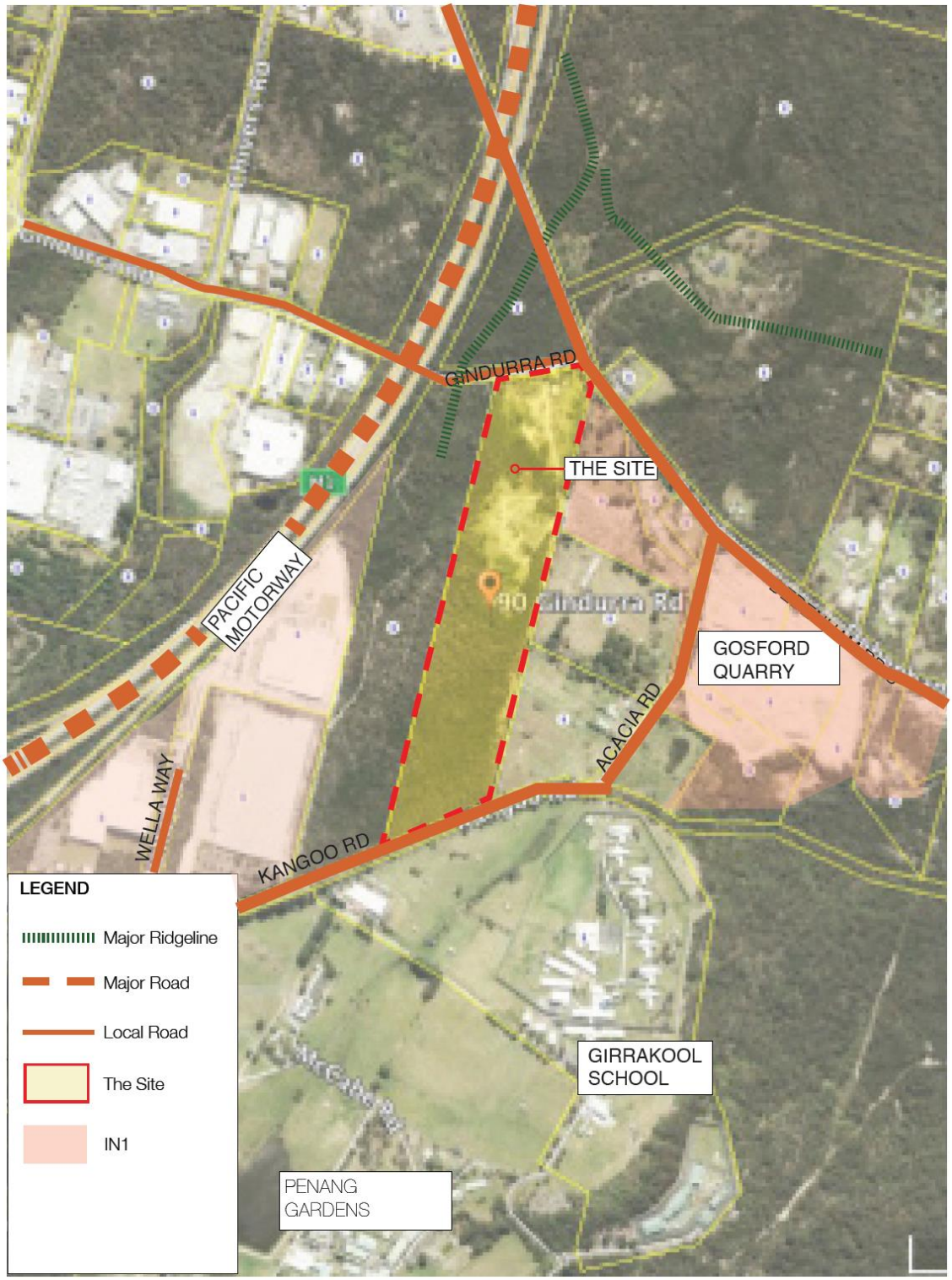
16.3.1 Land use

Under the Gosford LEP 2014, the site is within the Somersby Business Park. The site is zoned as IN1 (General Industrial) zone under Central Coast - Gosford LEP 2014. The proposed land use is consistent with the LEP purpose. Due to historic clearing of the site and disturbance from previous and current land use the Heritage Council of NSW acknowledges it is unlikely to be affected by historic features. The adjoining lot to the north and west is predominantly bushland mixed with industrial, the east is bounded by an orchard and Gosford quarries site and to the south is Girrakool School and

Mt Penang Gardens. Mt Penang Gardens is a significant recreation and open space resource for the Central Coast region.

The site forms the eastern edge of the industrial zone of the Somersby Industrial Park (SIP) and is bordered to the east by small rural properties within an (RU1). The sandstone Quarry on Debenham Rd S is a significant landmark in the immediate site surrounds.

Figure 15.1. Regional context (see Figure 8 in Appendix U).



16.3.2 Major roads

The Site is located east of the Pacific Motorway with local roads Acacia and Kangoo to the east and south. The site is accessed via Gindurra Rd which, via a tunnel under the M1 connects the Western and Eastern industrial zones of Somersby. With restrictions on height the tunnel is primarily used by smaller vehicles and local traffic. Debenham Rd S connects Gindurra Rd with Acacia Rd and Kangoo Rd travelling through a semi-rural landscape. Debenham Rd S provides a direct connection into West Gosford.

The M1 is a prominent feature in the landscape surrounding the site however visual connectivity with the M1 is limited due to its elevation in relation to the site and the extent of vegetation between the site and the motorway.

16.3.3 Topography

Topography (describes the shapes and landform) surrounding the Site is undulating (smooth and wave like). The land rises to the north from Kangoo Rd from approximately 195 Australian Height Datum (AHD) to 213 AHD at the site entry on Gindurra Rd. Views from within the industrial area are generally contained by vegetation and buildings however distant views to ridgelines are accessible from within the site.

Although the site is elevated the undulating nature of the landscape contains views from the North, East and West. Views from the South are primarily screened by vegetation.

16.3.4 Vegetation

Vegetation on site is mapped as E26 - Exposed Hawkesbury Woodland and E29 - Hawkesbury Banksia Scrub - Woodland. Areas of Sandstone Hanging Swamp Endangered Ecological Community (EEC) have been identified on the southern portion of the site. Surrounding roads are well vegetated and significant areas of bushland exist to the north of the site. Surrounding ridgelines are well vegetated and influence the character of the site by dominating the visible horizons.

16.4 Proposed development

The final developed site will be landscaped, with native vegetation selected to surround the developed area of the site. There will be dense landscaped zones along the western and northern boundary, including along Gindurra Rd and Debenham Rd. The landscaped areas will consist of a mix of large trees (C*orymbia gummifera, Eucalyptus racemose*), medium trees (*Allocasuarina littoralis, Banksia serrata, Ceratopetalum gummiferum*) and shrubs (*Banksia ericifolia, Bauera rubioides, Doryanthes palmari, Kunzea ambigua, Leptospermum polygalifolium, Hakea sericea*).

The 5m noise barrier along the eastern boundary of the site will reduce to 2m in height at the north-eastern corner of the site, to reduce the visual impact of the site from Gindurra Rd. The noise barrier will be screened by a mix of native plants, including a native vine.

More details are provided in the Landscape Plan, which is attached as Appendix F.

16.5 Impact assessment

16.5.1 Viewpoint Analysis

This part of the visual assessment considers the likely impact that development would have on the existing landscape character and visual amenity by selecting prominent sites, otherwise referred to as viewpoints.

A visual impact assessment was conducted. The report is provided at Appendix U.

16.5.2 Viewpoint Selection Process

Viewpoints are selected to illustrate a combination of the following:

- Present landscape character types.
- Areas of high landscape or scenic value.
- Visual composition (eg. focused or panoramic views, simple or complex landscape pattern).
- Range of distances.
- Varying aspects.
- Various elevations.
- Various extent of development visibility (full and partial visibility).
- Sequential along specific routes.

Viewpoints have been carefully selected to be representative of the range of views within the study area. The selection of viewpoints is informed by topographical maps, field work observations and other relevant influences such as access, landscape character and the popularity of vantage points.

A total of 10 viewpoints were recorded as part of the field work process. The majority of these viewpoints were taken from publicly accessible roads surrounding the site. The viewpoints which have been included represent the areas from where the development would appear most prominent, either based on the degree of exposure or the number of people likely to be affected.

It is important to note that viewpoints for this study have been taken only from accessible public land.

16.5.3 Process of Viewpoint Analysis

Once the viewpoint was selected, panoramic photographs were taken at eye level from the viewpoints towards The Site. Photographs were taken with a Canon EOS 5D Mark III digital SLR through a 50mm lens to best represent the human eye.

The visual impact of the viewpoint was then assessed both on site and in the topographic and aerial information to ensure accuracy. The findings of the viewpoint analysis have been quantified and are summarised in Table 4 of Appendix U. Viewpoint assessment locations are given in Figure 15.2 (see also Figure 7 of Appendix U).

16.5.4 Overview of Viewpoint Analysis

The visual sensitivity and visual effect of each viewpoint have been assessed which, when combined, result in an overall visual impact for the viewpoint (Refer to Table 3 in Appendix U). Of the ten (10) viewpoints assessed as part of this VIA, the proposal would be visible from a total of five (5) viewpoints. Of the five (5) viewpoints from which the proposal would be visible, four of these have been assessed as having a low visual impact with one having a Moderate Visual Impact.

Figure 15.2. Viewpoint assessment locations (see also Figure 7 of Appendix U).

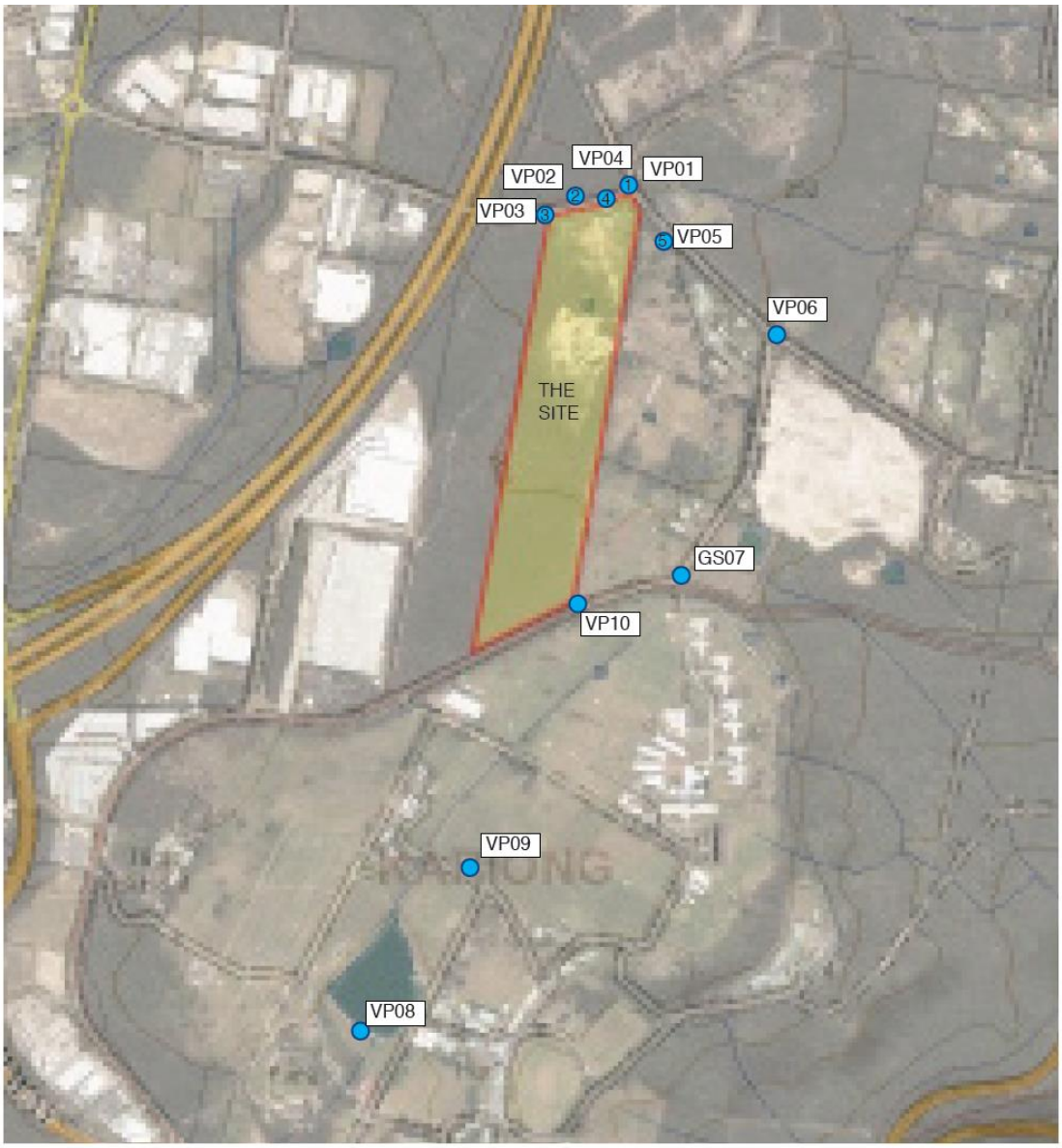


Table 16.1. Results of viewpoint analysis.

Viewpoint	Visual sensitivity	Visual effect	Potential visual impact
VP01	Moderate	High	High
VP02	Low	Moderate	Low
VP03	Low	Moderate	Low
VP04	Low	High	Moderate
VP05	High	Low	Moderate
VP06	High	Low	Moderate
VP07	High	Low	Moderate
VP08	High	Nil	Nil
VP09	High	Nil	Nil
VP10	Moderate	Nil	Nil

16.5.5 Photomontage development

A photomontage is a visualisation based on the superimposition of an image (i.e. building, road, landscape addition etc.) onto a photograph for the purpose of creating a realistic representation of proposed or potential changes to a view. (Horner and Maclennan *et al.*, 2006). A photomontage has been prepared for Viewpoint VP05. This location has been selected to illustrate the potential visual impact of the sound attenuation barrier.

The photo simulations based on photography from typical sensitive viewpoints are included within the following analysis section. The images that the photo simulations have been based on were captured with a Canon EOS 50D Mark III Full Frame Digital SLR through a 50mm fixed focal lens which closely represent the central field of vision of the human eye. The full series of photomontages are given in Section 5 of Appendix U. A photomontage before and after development for viewpoint 05 (VP05) is given in Figure 15.3, which has been identified as having the potential for most visual impact of the development (classified as 'moderate impact' in Table 3 of Appendix U).

Figure 16.1. Panoramic photomontages 'before' and 'after' development (as per Section 5 of VIA).

PANORAMA VP05 Existing View

PHOTOMONTAGE VP05 View of proposal

PHOTOMONTAGE VP05 View of Proposal - highlighted orange. The building structure can be seen. The sound attenuation wall is obscured by existing vegetation.

The study found that the proposal is likely to be viewed as a continuation of the existing industrial development in a large scale industrial zone and as the site is already disturbed it is our determination that the visual impacts from public domain areas are acceptable.

16.6 Mitigation measures

These principles may be incorporated into the concept design to achieve better visual integration of the proposal and the existing visual character at both, local and regional scales. The mitigation measures can mitigate any visual impact of the proposed development whilst enhancing the visual character of the surrounding environment.

16.6.1 Incorporated Mitigation Methods

Methods incorporated into the concept design for mitigating the potential visual impact include:

- The built form of the proposed buildings are of a similar scale to the surrounding industrial and commercial buildings.
- Building materials selected will reduce colour contrast and blend any new and existing structures, as far as possible, into the surrounding landscape.
- The existing vegetation buffer along the southern boundary will be retained and supplementary planting incorporated where possible (in accordance with the screen planting principles).
- Retention of existing trees within the Site to assist in fragmenting views of the proposed development.

16.6.2 Screen Planting Principles

The following principles will apply to screen planting:

- Foreground visual planting is to be undertaken in areas of highest visual effect, such as along Gindurra Rd and on the site's Eastern boundary;
- The use of endemic flora species which will integrate with the existing landscape character whilst providing habitat for fauna; and
- Planting should aim to fragment views instead of blocking completely.

The Landscape Plan has incorporated these principles and ensures that a dense landscape zone will provide visual screening of the facility from the road and neighbouring properties.

16.7 Conclusions

With all visual impact assessments, the objective is not to determine whether the proposal is visible or not, it is to determine how the proposal will impact on existing visual amenity, landscape character and scenic quality. If there is a potential for a negative impact on these factors it must then be investigated and determined how this impact can be mitigated to the extent that the impact is reduced to an acceptable level.

The existing landscape character is a mix of industrial development, rural properties and bushland ridgelines and corridors. The scale of the built form in the proposal is small compared to existing industrial developments in the Somersby Industrial Area and is more in keeping with adjacent rural residential developments.

The implemented design principles of this report seek to avoid, reduce and where possible, remedy adverse effects on the environment arising from the proposed development. Implementation of the mitigation measures, which propose a combination of primary mitigation measures (site planning principles) and secondary measures (landscaping, street trees, colour and material selections) are proposed to reduce localised negative impacts.

With the implementation of the recommended mitigation measures, the proposed development could be undertaken whilst maintaining the core landscape character of the area and have a negligible visual impact on the surrounding visual landscape.

The full Visual Impact Assessment is provided at Appendix U of this EIS. A copy of the Landscape Plan is provided at Appendix F.

17 Chemicals and Hazards Impact Assessment

17.1 Introduction

The waste and chemical impact assessment addresses the impacts and mitigation measures for the appropriate and sustainable management of wastes and chemicals during operations. Impacts and mitigation measures are considered for the construction and ongoing operational phase of the project, consistent with the Secretary's Environmental Assessment Requirements (SEARs) for SSD8660.

In this chapter, we assess the adequacy of the proposed measures to minimize natural resource consumption and minimize impacts from handling, transporting, storing, processing and reprocessing of waste and/or chemicals.

Management and mitigation measures are then proposed to minimize the consumption of natural resources, maximize waste avoidance and recycling. We then outline how the project will contribute to recycling goals of regional waste strategies and the *NSW Waste Avoidance and Resource Recovery Strategy 2014 – 2021.* We also consider measures to prevent litter and waste blowing or tracking from the premises.

This chapter provides a summary of the investigation into chemicals management issues for the proposed development. An assessment of the risks associated with the project is detailed in Chapter 3.

17.2 Legislative requirements

The following guidelines and legislation influence the management of chemicals in NSW:

- *Protection of the Environment Operations Act* 1997 *(POEO Act 1997)*
  Regulates chemical pollution and wastes, establishes management and licensing requirements along with offence provisions to deliver environmental outcomes.

- *Chemical Control Orders*
  Made under the *Environmentally Hazardous Chemicals Act 1985* when chemicals or chemical wastes pose serious threats to the environment and there are particular challenges in their management. Out of the five chemical control orders in place in NSW, the applicable CCO for the facility is the *Scheduled Chemical Wastes Chemical Control Order* 2004 (NSW EPA, 2004). Scheduled chemical wastes are wastes containing chemicals defined by the schedule attached to the order and special care is required minimise their impacts on the environment. The CCO establishes requirements for the management and control of the wastes that contain scheduled chemicals at a combined concentration above 2 mg/kg. It covers certain activities such as generating, processing, storing, distributing, conveying and disposing of scheduled chemical wastes.

- *Waste Avoidance and Resource Recovery Act* 2001

  This Act underpins the NSW Government's *Waste Avoidance and Resource Recovery Strategy 2014 – 2021,* setting targets for recycling and reduction of litter in six key result areas.

- NSW Environment Protection Authority (2014). *Waste Classification Guidelines: Part 1, Classifying waste.*
- NSW Department of Planning (2011). *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33.*

17.3 Baseline Conditions

17.3.1 Generation and management of waste – current operations

A full description of the processes for avoiding the generation of waste, recovering and processing waste for recycling, and management of residual waste for disposal is provided in Chapter 6 of this EIS. For brevity, this content is not repeated in this section.

17.3.2 Chemical use, handling and storage

A small range of fuels, oils, fluids and gases will be stored in the warehouse for the principal purpose of servicing on site vehicles and mobile plant and equipment. These chemicals are stored in a cool, shaded area of the warehouse, on bunded stands and shelves as per the requirements of the Australian Dangerous Goods Code.

Chemicals to be stored on site are given in Table 17.1. These chemicals and the risk they pose are also discussed above, within the Environmental Risk Assessment section of the EIS (see Chapter 3).

Table 17.1. List of chemicals stored on-site during operational phase.

Potential pollutant	Storage location	Maximum quantity on site
Hydraulic oil	Storage area (warehouse)	1,000 Litres
Engine oil	Storage area (warehouse)	1,000 Litres
Gear oil	Storage area (warehouse)	1,000 Litres
Transmission oil	Storage area (warehouse)	1,000 Litres
Degreaser	Storage area (warehouse)	1,000 Litres
Brake fluid	Storage area (warehouse)	500 Litres
Grease drum cartridges	Storage area (warehouse)	100 Litres
Diesel	Storage area (warehouse)	5,000 Litres
LPG (gas)	Storage area (warehouse)	1,000 Kg

It is noted that an audit of licenced sites by the NSW EPA in 2008 (NSW EPA, 2009) found that the main chemicals stored at regulated sites that pose risks to the environment are hydrocarbons, such as fuels, oils and lubricants (46% of sites), followed by metals and metalloids and other halogenated organic compounds. Management of these chemicals according to best practice is required to minimise impacts on soils, waterways and public health.

Once the construction phase is completed, chemicals as per Table 17.1 will be safely stored in the new warehouse building (approved under DA52541/2017) according to *Code of Practice for Managing the Risks of Hazardous Chemicals in the Workplace* (Safe Work Australia, 2012)..

A Pollution Incident Response Management Plan outlining procedures and practices in the event of an incident or chemical spill on the site has been prepared (Appendix V).

17.4 Impact assessment

17.4.1 Management of wastes during the construction and management phase of the project

A full description of the potential impacts from waste generation and recycling operations during the construction and operational phases of the project is provided in Chapter 6 of this study. For brevity, this content is not repeated in this section.

17.4.2 Chemicals use and Code of Practice

The chemicals on-site are fuels – diesel and LPG, oils - grease and degreasers. Risk of harm to environment is due to leaks, spills and fire during the construction and operation phases of the facility.

Commercial and industrial users of hazardous chemicals such as petrochemicals, flammable oils and fluids have a duty of care to manage the risks associated with hazardous chemicals in the workplace. This includes ensuring the safe use, handling and storage of chemicals, as well as specific duties under the model Work Health and Safety Regulations and the *Code of Practice for Managing the Risks of Hazardous Chemicals in the Workplace*.

A substance is deemed to be a hazardous substance if it meets the classification criteria specified in the *Approved Criteria for Classifying Hazardous Substances (NOHSC:1008, 2004]* (NOHSC, 2004).

17.4.3 Chemicals use – construction phase

To avoid the impacts of chemicals on the environment during the construction phase of the development, all fuels, oils, lubricants and chemicals will be securely stored in the warehouse building only in accordance with the *Code of Practice for Managing the Risks of Hazardous Chemicals in the Workplace* (Safe Work Australia, 2012).

17.4.4 Risk to Environmentally Sensitive Areas

The subject site is located at significant distance to riparian areas or a nearby waterway. No sensitive riparian areas or waterways exist on the site. The site drains via overland flow towards the south west of the site, following the gently sloping topography of the landscape. The landscape drains towards a drainage line to the south, commencing approximately 130 m from the site. This drainage line then terminates in a dam on the Mt Penang Parklands, located 480m to the south of the site (Figure 2.7). The outline from the dam discharges into a minor tributary of Piles Creek, which then discharges into Mooney Mooney Creek, some 5.3km south west of the subject site. Mooney Mooney Creek then flows into the Hawkesbury River.

A small area of threatened flora species, *Melaleuca biconvexa* exists on the North-west boundary of the site and will be protected through a 10m buffer and fencing to exclude this part of the site from the development. Red Bloodwood - Scribbly Gum / Old-man Banksia open forest on sandstone ridges of northern Sydney and the Central Coast was determined to be the dominant native vegetation community located on the south of the site (see Chapter 12). These areas are excluded from the development and are unlikely to be affected by an incident at the facility.

Given the distance between the subject site and these Environmentally Sensitive Areas (ESA), a small chemical spill that is appropriately contained and cleaned up as per the existing Pollution Incident Response Management Plan (Appendix V), the risk to ESAs is considered to be low.

17.5 Mitigation measures

17.5.1 Waste management and mitigation measures

A full overview of measures proposed to avoid, reduce and recycle wastes is defined in Chapter 6 of this EIS, and is not repeated here again. Please note that the contribution of the project to the NSW EPA's draft *Waste and Resource Recovery Infrastructure Strategy 2017-2021* is given in Chapter 2.

17.5.2 Chemical use risk mitigation

The risk of chemical contamination occurring on site is mainly due to spills and leaks. To reduce these risks, mitigation measures have been proposed to reduce risk to 'as low as reasonably practicable'. These are defined in Table 17.2. Risk, likelihood and mitigation measures proposed during the construction and operational phases of the project.

Table 17.2. Risk, likelihood and mitigation measures proposed during the construction and operational phases of the project.

Risk	Likelihood	Impact	Mitigation
Construction Phase			
Spills & Leaks	High	Low	No chemical storage on site during construction works. Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan (Appendix V)
Fire Hazard	Low	Medium	Fire safety measures as per Fire Safety Procedures in the Pollution Incident Response Management Plan and the Emergency Plan (Appendix W)
Operational Phase			
Spills	High	Medium risk - Potential to cause contamination to land and waters	Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan
Leaks from vehicles onsite	Medium	Low risk	Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan
Fire risk	Medium	High Risk	Fire safety measures as per Fire Safety Procedures in the Pollution Incident Response Management Plan and the Emergency Plan

Impacts from spills will be remediated by using a spill response management system as addressed in the Pollution Incident Response Management Plan presented at Appendix V.

Risk from bush fires is identified as a hazard, though it is proposed that these risks will be mitigated by implementing a number of measures as described in Chapter 13:

- Maintenance of Asset Protection Zones (Inner and Outer);
- Ensuring adequate site access for fire-fighting appliances;
- Provision of a fire hydrant and protection for water piping;
- Safety measures regarding placement and installation of electricity and gas requirements; and
- Landscaping and property maintenance to minimise fuel loads and fire risk.

17.5.3 Other reporting requirements

If there is an incident involving a chemical spill, a chemical pollution event or a possible misuse of a chemical or pesticide, there is a 24-hour Environment line (131 555) that can be contacted to report the incident. This procedure is defined in the Pollution Incident Response Management Plan (Appendix V).

The health, safety and welfare of people at workplaces where chemicals are used and stored are regulated by WorkCover NSW, through Worksafe *Australia Model Code of Practice-Managing Risks of Hazardous Chemicals in the Workplace* under the *Work Health and Safety Act* 2011. There is an additional requirement for people conducting business or undertaking use of chemicals in their workplace to help manage health and safety risks associated with hazardous chemicals.

17.6 Conclusion

This section has focused on the management and handling of chemicals during the construction and operational phases of the project. Waste management issues are addressed in detail in Chapter 6 of the report. The assessment found that the risk of harm due to chemicals spills and leaks during the construction and operational phases of the project is deemed low. Containment measures and clean-up of the incident will address the negligible harm to environment, consistent with existing pollution incident response procedures in place at the site.

A range of mitigation measures are proposed to minimise impacts from chemicals during the different stages of the project. These measures will help mitigate against the impacts of a chemical spill or fire, thereby reducing the potential for harm to receiving waterways.

18 Compilation of mitigation measures and statement of commitments

18.1 Introduction

A wide range of mitigation measures to prevent or minimise environmental impacts which may be generated by the proposal have been detailed throughout this EIS. This Section of the report is a compilation of the recommended mitigation measures. Implementation of these measures would be considered necessary to minimise impacts and maximise positive outcomes on the physical, social and economic environments of the local area and wider region.

We also highlight Statement of Commitments the proponent has agreed to implement as conditions of approval for the proposed development.

18.2 Objective

The objective of this Section of the EIS is to outline how the recommended environmental protection measures will be implemented and managed in an integrated manner to demonstrate that the proposal is capable of complying with statutory obligations under EPA licenses or approvals. This includes the environmental management and cleaner production principles which will be followed when planning, designing, establishing and operating the proposal.

18.3 Cleaner Production Principles

Cleaner production is a practical method for protecting human and environmental health. This is achieved through the continuous application of an integrated, preventive environmental strategy towards processes, products and services. Cleaner production increases the overall efficiency of products and services and reduce damage and risks for humans and the environment. A proactive approach to the reduction in the risk and consequence of potential environmental impacts at the source results is a decreased reliance on reactive environmental mitigation measures.

The cleaner production techniques that are applicable to the ongoing operations of the project include:

- Selecting and using the most appropriate technology and materials to reduce the quantity of resources used and to minimise the amount of waste generated;
- Improved operation and maintenance practices to reduce the quantity of resources used and to minimise the amount of waste generated;
- Employing processes that are efficient in their consumption of energy, materials and natural resources and reduce greenhouse gas emissions;
- Selecting energy efficient plant and equipment for use in the facility;
- Reuse of captured stormwater as the primary source of water for the site;
- Safely disposing of any residual wastes and process residues;
- Promoting the safe use, handling, recycling and disposal of waste products through an understanding of their life cycle.

Where cleaner production principles can no more remove environmental risk or consequence, mitigation strategies must be considered to ensure the remaining potential environmental harm is reduced to the lowest risk level possible.

18.4 Mitigation Strategies

Without appropriate environmental management measures being incorporated in the design of the Project and the contractual arrangements associated with the proposed works, there will be the potential for adverse impacts on the

environment. Effective implementation is necessary to ensure the Project has minimal impact on the physical, social and economic environments of the local area and wider region.

Table 18.1 summarises the mitigation measures identified in this EIS to ameliorate impacts and safeguard the environment so that the desired environmental outcomes are achieved for the various components of the project for design, construction and operation.

Table 18.2 provides an overview of the Statement of Commitments the proponent has proposed to help inform the conditions of approval for the development.

Table 18.1. Compilation of Environmental Mitigation Measures and Statement of Commitment.

Issue	Mitigation Measure
Waste	
Minimise the amount of waste generated and sent to landfill from site – construction phase	Woody garden organics will be shredded and either used as mulch on site or sold as mulch in the landscape products business.
	Concrete stockpiles will be investigated and tested for compliance with EPA *Recovered Aggregate Resource Recovery Order* 2014. Compliant materials to be used a base for the hardstand area in accordance with the EPA *Recovered Aggregate Resource Recovery Exemption* 2014. Scrap metal will be sold. Any non-useable material, including stockpiles found to be contaminated will be removed from site and disposed in a licensed landfill.
	Any excess material will be sold directly off-site as fill or stockpiled for sale in the building products business.
	Recycled asphalt brought onto the site will comply with EPA *Reclaimed Asphalt Pavement Resource Recovery Order* 2014 and will be used as a top layer for the hardstand in specific areas. The material will be used in accordance with the EPA *Reclaimed Asphalt Pavement Resource Recovery Exemption* 2014. Any excess will be sold as product in the building supplies business.
	MSW will be collected in a MGB / skip bin and removed regularly by a licensed waste removal contractor and disposed at a licensed landfill.
Minimise the amount of waste generated and sent to landfill from site – operational phase	Mixed building waste from demolition or construction projects. Waste may contain cardboard, plastic, etc. among the concrete, bricks, soil, metal. Recovered materials will be processed into saleable products and sold either directly to customers or through the on-site building supplies business. Aggregate will be sold to construction and road projects. Recovered fines will be sold as landfill alternative daily cover. Re-useable timber will be sold for construction and landscape projects. Residual waste will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426). Products to be tested and sold under a relevant EPA Resource Recovery Order: *Recovered Aggregate Resource Recovery Orde*r 2014; *"Batch process" Recovered Fines Resource Recovery Orde*r 2014; *Mulch Resource Recovery Orde*r 2016; *Recovered Plasterboard Resource Recovery Orde*r 2014.
	Concrete / tiles / masonry: Clean, inspected material will be crushed, screened and blended to produce aggregate and soil-replacement products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426). Products to be tested and sold under a relevant EPA Resource Recovery Order: *Recovered Aggregate Resource Recovery Order* 2014; *"Batch process" Recovered Fines Resource Recovery Order* 2014.
	Timber, stumps, and rootballs: Clean, inspected material will be shredded, screened and blended to produce a range of mulches and landscape products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426). Products to be tested and sold under a relevant EPA Resource Recovery Order: *Mulch Resource Recovery Orde*r 2016.

Issue	Mitigation Measure
	Metal: Clean, inspected metals will be sorted into metal types. Some scrap metal may be shredded to reduce size and save space. Recovered metal will be removed to a metal recycler off-site (One-Steel, EPL: 1977). Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426).
	Asphalt: Clean, inspected material will be crushed, screened and blended to produce aggregate and soil-replacement products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426). Products to be tested and sold under a relevant EPA Resource Recovery Order: *Reclaimed Asphalt Pavement Resource Recovery Order* 2014.
	Virgin Excavated Natural Material (VENM): VENM will be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill (Genesis Landfill, Eastern Creek, EPL: 13426).
	Soils that meet the CT1 thresholds for general solid waste in Table 1 of the NSW EPA's Waste Classification Guidelines: Clean, inspected material will be crushed, screened and blended to produce aggregate and soil-replacement products. These will then be sold either directly to customers or through the on-site building supplies business. Any contaminants will be collected in a separate bunker or skip bin and regularly removed from site for disposal in a licensed landfill. Products to be tested and sold under a relevant EPA Resource Recovery Order: *Recovered Fines Resource Recovery Order* 2014 or *Excavated Natural Material Resource Recovery Order* 2014.
Maximum amount of stock held on site at any one point in time	A maximum of 40,000 tonnes of waste and waste derived products will be held on site at any one point in time. This figure includes 10,000 tonnes of landscaping materials which will be purchased and sold commercially from the site.
Minimise stockpile heights	Stockpiles of waste materials in the designated waste storage area will be limited to 3m. Height guidance will be provided by the 3m height of the concrete block bays. Stockpiles of inert material such as concrete, brick, soil etc. will be limited to a maximum of 3m in height in the processing and blending areas. Height Poles to the exact length (3m) will provide on-site guidance for stockpile management. Stockpiles of organic material such as timber and mulch will be limited to a maximum of 3m in height in the processing and blending areas. Height Poles to the exact length (3m) will provide on-site guidance for stockpile management. Stockpiles of all processed products, aggregates and landscaping supplies will be limited to 3m. Height guidance will be provided by the 3m height of the concrete block bays.
Stormwater management and soil erosion	
Prevent soil erosion during construction	Sediment barriers and a temporary OSD basin will be established prior to any earthworks on site.
	Stockpiles of topsoil will have water applied at the rate of 2.2L/m^2/hr to reduce wind erosion.

Issue	Mitigation Measure
Prevent soil erosion during operations	All operational and storage areas within the development area will be hardstand; concrete pavement, bitumen or compacted crushed concrete with a waterproof membrane underlay.
	Sediment barriers and fences will be permanently maintained on site.
Stormwater capture and treatment	The proposed development has been divided into six distinct sub-catchments and given a risk assessment based on the proposed activity that would occur in the sub-catchment. The site will be contoured to direct stormwater towards drains that channel stormwater to grassed swales then to an OSD basin. Gross Pollutant Traps will be used to reduce sediment and organic material flowing into the OSD basin. The OSD basin will precipitate sediment and remove pollutants with the assistance of a floating wetland. Grass swales will help reduce the nutrient load of the stormwater. Water from the high-risk area will be monitored continuously before being captured in an emergency spill pond. The high-risk stormwater will only pass into the OSD if testing is shows it is not contaminated. As much captured stormwater as possible will be recycled for dust suppression on-site. Recycled water will be treated in a water treatment unit on-site prior to re-use.
Water cycle management	Water captured in the OSD basin and the rainwater tanks attached to the warehouse and Tip and Spread Building will be used on site, mainly for dust control. Some water will also be used to irrigate the stand of *Melaleuca biconvexa* during dry periods. Wastewater from the water treatment unit will be disposed as trade waste to sewer.
Soil and Contamination	
Management of risks associated with asbestos during construction phase	An appropriate Asbestos Management Plan should be implemented prior to any development to manage the identified non-friable ACM associated with AEC 2.
	The Asbestos Management Plan should include detailed inspection and remediation prior to any future development.
	Asbestos removal should be undertaken in accordance with an Asbestos Removal Scope of Works / Remedial Action Plan prepared by a Licensed Asbestos Assessor or Competent Person.
	Asbestos removal works should be undertaken by a licensed asbestos removal contractor.
	Subsequent to licensed asbestos removal work, a Clearance Certificate must be issued by a Licensed Asbestos Assessor or Competent Person prior to reoccupation.
	Construction works should include an Unexpected Finds Protocol (UFP) to provide recommended actions for the identification of any further ACM on the ground surfaces or within excavations.
	The Site must be managed such that the ground surfaces are at all times free of visible ACM. Any identified ACM must be managed in accordance with the UFP.

Issue	Mitigation Measure
	Prior to demolition, the onsite buildings and structures should be assessed for hazardous materials including but not limited to asbestos and lead paint. All asbestos containing materials within the buildings and structures at the site must be removed prior to demolition in accordance with Safe Work Australia Codes of Practice.
Soil and groundwater contamination	A waterprooof layer will be installed under all operational and storage areas of the site. Paving and hardstand will be installed over the waterproof membrane layer. The OSD Basin will be lined with HDPE (or equivalent). Ongoing groundwater monitoring will be undertaken.
Air Quality (Dust and Other Emissions)	
Minimise impacts on air quality by controlling dust and other emissions – construction phase	
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the relevant regulatory bodies.
Site management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
	Hold regular liaison meetings with other high-risk construction sites within 500 m of the site boundary, to ensure plans are coordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.
Monitoring	Undertake daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary.
	Carry out regular site inspections to monitor compliance with the dust management plan / CEMP, record inspection results, and make an inspection log available to the local authority when asked.

Issue	Mitigation Measure
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Agree dust deposition, dust flux, or real-time continuous monitoring locations with the relevant regulatory bodies. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.
Preparing and Maintaining the Site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
	Erect solid screens or barriers around dusty activities or the site boundary that they are at least as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. Use sprinklers on all outdoor storage bays and misting systems in all buildings for continuous dust control.
	Avoid site runoff of water or mud. Use sediment barriers and fences.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below
	Cover, seed or fence stockpiles to prevent wind erosion
Operating Vehicle/Machinery	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate
	Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste management	No burning of waste materials.
	Ensure all on-road vehicles comply with relevant vehicle emission standards, where applicable

Issue	Mitigation Measure
Specific Measures to Construction Traffic	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
	Record all inspections of haul routes and any subsequent action in a site log book.
Minimise impacts on air quality by controlling dust and other emissions – operational phase	
Road haulage	Vehicle restrictions that limit the speed of vehicles on the road (<30 kh/hr)
	Surface improvement by paving
	Surface treatment - watering (2.2L/m^2/hr)
Materials handling	Minimising the drop height from vehicles (<1.5m)
	Application of water (2.2L/m^2/hr) via a comprehensive system of sprinklers and misting systems installed across all storage and processing areas
	Modification of activities in windy conditions
	Loading materials to a 3-sided enclosure
	Covering loads with a tarpaulin
	Limit load sizes to ensure material is not above the level of truck sidewalls
	Minimising travel speeds and distances (<30 kh/hr)
	Keep travel routes and materials moist
Materials processing	Screening, sorting, mulching and crushing operations to be conducted inside enclosed buildings
	Tip and Spread area to be enclosed in a three-sided building to provide protection from wind
	Application of water
	Modification of activities in windy conditions
Wind erosion	Application of water
	3-sided enclosures around stockpiles

Issue	Mitigation Measure
	Modification of activities in windy conditions
Transport and Traffic	
Vehicle access, management, parking and design	All vehicles shall be able to enter and exit in a forward direction. Access and internal circulation are to be designed in accordance with AS2890 and Council's DCP.
	Vehicular access will be provided off Gindurra Road via a secure gate located a sufficient distance within the property so that vehicles up to the size of a B-Double will be able to store without interrupting traffic flow in Gindurra Road. Internal roadways will allow vehicles to circulate within the site to load or unload and exit via Gindurra Road in a forward direction.
	Service vehicle access will be available via the main entry / exit off Gindurra Road. A concrete kerb to be installed on the outbound lane to prevent vehicles turning rights onto Debenham Rd.
	The access point will be designed to ensure vehicles can enter the site with minimal delays to other road users. The entrance will be moved 14m west along Gindurra Rd to improve sight issues. To facilitate the right turn movement into the site it is recommended that the existing centre line marking in Gindurra Road be relocated a minimum of 3 metres south (towards the site) to provide sufficient width for a right turn lane into the site. The right turn lane should be a minimum of 60 metres in length to provide sufficient storage for two B-Doubles. The site access should be designed to ensure that the largest vehicle entering or exiting the site is able to do so without encroaching on the opposite lane in Gindurra Road. No Stopping signs would need to be installed on both sides of Gindurra Road for the full length of the right turn lane.
	No Stopping signs will be required along the frontage of the site.
	The existing access to the site will be modified to ensure that heavy vehicles up to a B-Double can enter and exit safely. The site entrance has been designed so that vehicles exiting the site can only turn left onto Gindurra Rd. All vehicles will be able to enter and exit the site in a forward direction, with the internal parking layout to be designed at the detailed design stage in accordance with Council requirements and AS/NZS 2890.1:2004 Parking facilities Off-street car parking.
	The accesses, internal roads and parking aisles will be designed in accordance with AS/NZS 2890.1:2004 Parking facilities Off-street car parking. The aisle width requirement is 5.8 metres.
	A parking area for heavy vehicles is proposed within the site near the main entrance off Gindurra Road. Three nominated queuing / waiting locations for heavy vehicles within the site.
	Addition of second weighbridge (to allow dedicated in and out weighbridges)
	The parking layout shall be designed in accordance with AS/NZS 2890.1:2004 Parking facilities Off-street car parking. Parking Class: 1A (residential, staff). Bay lengths: 5.4 metres; Bay widths: 2.5 metres; and Aisle widths: 5.8 metres.

Issue	Mitigation Measure
	Internal pedestrian access will be provided from the main gate to the main building.
Noise and Vibration	
Minimising noise emissions during the construction phase	Construction works to be limited to 7am to 6pm Monday to Friday, 8am to 1pm on Saturday. No construction work on Sundays or public holidays.
	Avoiding the use of noisy plant working simultaneously and close together during construction works.
	Equipment used intermittently is to be shut down when not in use.
	Where possible, equipment with directional noise emissions should be orientated away from sensitive receivers.
	Regular compliance checks on noise emissions from all plant and machinery.
	Non-tonal reversing alarms should be used on all items and heavy vehicles used for construction.
Minimising noise emissions during the operational phase	5m high noise barriers to be built and maintained along the eastern site boundary. The noise barrier reduces to 2m height as it approaches Gindurra Rd, for aesthetic reasons.
	Mulching and crushing operations to occur inside enclosed buildings.
	Office/warehouse building façade construction to be fitted with sound insulation.
	Processing building to have all doors and openings completely closed during noisy activities
	Concrete storage bunker walls and Tip and Spread building act as noise barriers within the site.
Biodiversity	
Avoiding impacts from stormwater	Prior to any construction, areas of the site will need to be cleared and contoured to provide adequate drainage to a stormwater detention pond in the south-west corner of the site. Civil site works will need to ensure that there is appropriate drainage and stormwater capture at the site. The three dams located on-site will be filled. The captured stormwater will be used for operational purposes at the site.
Sewerage	The site will be connected to the town sewerage system as part of DA52541/2017.2.
Biosecurity risks – pathogens	Basic control principles include avoiding transport of sediment onto the vegetated areas of the property by cleaning all work clothing, gloves, tools and machinery that enter any protected, vegetated areas. In some cases, a solution of 70% ethanol or methylated spirits in 30% water may be sufficient to disinfect equipment prior to use. The report, 'Arrive Clean, Leave Clean' (Commonwealth of Australia 2015) provides further information and best practice methods to reduce spread of these pathogens between work Subject Sites.
Pests	Vertebrate pests should be controlled on an annual basis (or more regularly as required). Control methods include 1080 fox baiting, trapping, den fumigation and shelter habitat removal.

Issue	Mitigation Measure
Weeds	All environmental and priority weeds will be entirely eradicated from the subject site and then managed under a Vegetation Management Plan (VMP). The VMP will require an annual site visit by a team of qualified bush regenerators to ensure the control of weeds within the subject site.
Avoidance of impacts during clearing operations	A 10 m buffer surrounding *Melaleuca biconvexa* individuals to ensure the species is not impacted by the development.
	Preparation of a Vegetation Management Plan (VMP) to guide the on-going protection and management of the *Melaleuca biconvexa.*
	Avoidance of the southern portion of the Subject Property, which totals 4.1 ha and contains habitat for *Prostanthera junonis* and *Hibbertia procumbens*. The area partially falls under Management Zone 1b and 1d of the Somersby Industrial Park Draft Plan of Management (Connell Wagner 2005) and the feasibility of entering into a Biodiversity Stewardship Agreement will be investigated.
	Assigning an Ecologist to undertake a pre-clearing survey of the vegetation prior to clearing and development. If any significant ecological values such as nests are found, clearing is to be delayed until the nest is vacated.
	Assigning an Ecologist to be present on site during the clearing events. The Ecologist will be able to guide works crews away from sensitive ecological features and will be on hand to capture and relocate displaced fauna. Where possible the clearing of mature trees will be avoided if they can be accommodated into the development footprint.
	Preventing the inadvertent introduction of exotic flora propagules by following the DEP (2015) 'Arrive Clean, Leave Clean' Guidelines.
	Ensuring appropriate erosion and sedimentation controls are maintained throughout the construction phase and the period immediately following as outlined in the 'Blue Book' (Landcom 2004).
Secure Ecosystem Credits	A total of 103 ecosystem credits and 28 Eastern Pygmy-Possum species credits must be retired in order to offset the impacts of the proposed development.
Fire Safety	
Asset Protection Zone requirements	The following points are to be adhered to for providing APZs; The Inner Asset Protection Area (IPA) is to have a tree canopy cover less than 15%; The Outer Asset Protection Area (OPA) is to have a tree canopy cover less than 30%; No trees are to be located within 2m of the building roof line; Garden beds with flammable shrubs are to be located a minimum 10m from the building; Tree limbs within 2m of the ground are to be removed; and Removal of ground fuels should be removed each year prior to the bushfire season (October-March).
Site Access	Sufficient access is also required to comply with the Planning for Bushfire Protection (2006). These include: Minimum carriageway width of 4.5m (one way) or 8m (two way); Minimum vertical clearance of 4m to any overhanging obstructions; Curves have a minimum 6m inner radius; Minimum 6m between inner and outer curves; Crossfall is not more than 10°; Maximum grades for sealed roads is 15°; Maximum grades for unsealed roads is 10°; Some short constrictions in the access may be accepted where they are not less than 3.5m and extend for no more than 30m; For internal roads: roads are to be through roads. Maximum length of a dead end roads is 100m in from a through road. Dead end roads to be clearly sign posted; For internal roads: provide a minimum 12m outer radius turning circle for dead end roads.

Issue	Mitigation Measure
Water requirements	All above ground water and gas service pipes and fittings external to the building are metal.
Electricity and Gas requirements	Where practicable place electrical transmission lines are underground or; If overhead electrical transmission lines are proposed, lines are installed with short pole spacing (30metres), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002); Reticulated or bottled gas is installed and maintained in accordance with AS 1596 and the requirements of relevant authorities; Metal piping is to be used; All fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10m and shielded on the hazard side of the installation; Release valves are directed away from the building and at least 2m away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are to be metal; Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.
Landscaping and property maintenance	The following principles should be applied for the establishment of gardens and property maintenance: Apply the principles for APZ and vegetation management as attached to the appendix of this report; Maintain short cropped grass less than 100mm adjacent to any building; Keep areas under fences, fence posts and gates and trees raked and cleared of fuel; and Utilising non-combustible fencing and retaining walls. Prior to the bushfire season, which runs from October to March, the site should be maintained utilising the following guidelines from Appendix 5 PBP (2006): Remove organic material from the roof and gutters and valleys; Check tiles and roof lines for broken tiles or dislodged roofing materials; Ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps; Doors are fitted with draught seals and well maintained; Mats are of non-combustible material or in areas of low potential exposure; Screens on windows and doors are in good condition without breaks or holes in fly screen material and frames are well fitting into sills and window frames; Where applicable, check pumps and water supplies are available and in working order; Where applicable, drenching or spray systems are tested before the fire season; Hoses and hose reels are not perished and fittings are tight and in good order; and Woodpiles, garden sheds and other combustible materials are located away from the house.
Fire prevention	KSSS plans to prevent fire at the proposed facility by: • Eliminating ignition sources near dusts and combustible material; • Prohibit smoking and naked flame to designated smoking areas (no smoking policy for employees and signage for visitors); • Employee induction and education on fire prevention; • Regular inspection of stockpiles; • Sprinkler systems will be installed, in permanent locations, to control dust to the point where potential for fire is minimised; • Site security (fencing, locked gates when facility is closed, gate houses for visitors); • Plant maintenance; • Keeping maintenance and activities that can produce sparks, such as welding, away from combustible material piles; • Avoiding conditions that can lead to spontaneous combustion (e.g., moisture between 25 – 45 percent and temperatures above about 93ºC in stockpiles); • Keeping stockpiles low and turning them when the temperature exceeds 60ºC; • Management of vegetation and debris; and

Issue	Mitigation Measure
	• Designing the facility for access by firefighting equipment, including clear aisles among stockpiles and access to an adequate water supply.
Fire detection	Regular inspection of stockpiles. Infrared / heat detection devices overlooking key stockpiles and all processing equipment. Audible and visual alarms to be automatically activated by detection devices.
Fire suppression and control	A total of six (6) fire hydrants and six (6) fire reels will be installed on site. Portable fire extinguishers will be located on each piece of mobile equipment and in each building.
Smoke management	Install a smoke extraction fan in the Secondary Sorting Warehouse.
Fire water containment	The OSD basin has sufficient capacity to capture firefighting water. The OSD output valves can be closed to prevent overflow from the OSD basin. Fire water will be tested and disposed to an appropriate outlet.
Heritage	
Measures to preserve historic and Aboriginal Heritage	The southern portion of the study area should not be developed in the future.
	If any suspected archaeological remains are discovered during the development, all activity must stop and an archaeologist consulted.
	If any suspected human remains are discovered during the development, all activity must stop and the find reported to the NSW Police and the Coroner.
Visual Impact	
Methods incorporated into the concept design for mitigating the potential visual impact	The built form of the proposed buildings are of a similar scale to the surrounding industrial and commercial buildings.
	Building materials selected will reduce colour contrast and blend any new and existing structures, as far as possible, into the surrounding landscape.
	The existing vegetation buffer along the southern boundary will be retained and supplementary planting incorporated where possible (in accordance with the screen planting principles).
	Retention of existing trees within the Site to assist in fragmenting views of the proposed development.
Screen planting principles	Foreground visual planting is to be undertaken in areas of highest visual effect, such as along Gindurra Rd and on the site's Eastern boundary.
	The use of endemic flora species which will integrate with the existing landscape character whilst providing habitat for fauna.
	Planting should aim to fragment views instead of blocking completely.
Chemicals and hazards	

Issue	Mitigation Measure
Spills and leaks – Construction phase	No chemical storage on site during construction works. Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan (Appendix V)
Fire hazards – Construction phase	Fire safety measures as per Fire Safety Procedures in the Pollution Incident Response Management Plan.
Spills and leaks – Operational phase	Maintain spills management response kit onsite – immediate clean-up of spill as per Pollution Incident Response Management Plan.
Fire risk	Fire safety measures as per Fire Safety Procedures in the Fire Safety Study, Emergency Plan and Pollution Incident Response Management Plan.

Table 18.2. Statement of Commitments the proponent has proposed to address further matters relating to the environmental assessment of the project, and through feedback from the community consultation and engagement process. These commitments are additional to the compiled mitigation measures for the proposed project.

Statement of Commitment	Description of Commitment
Community engagement	A Community Consultative Committee is formed post approval. Group is to be independently chaired. Meeting will involve neighbours (rural residents and business park representatives), representative(s) from community groups (e.g. Kariong Progress Association and Mangrove Mountains & Districts Community Group) and held on a quarterly basis so data on the performance of the facility can be shared, and feedback can be provided to the site operator. This committee shall provide a forum for involving the community during the construction and operational phases of the project.
Landscaped buffer zone to the east of the site	Advanced tree plantings to be used in landscape buffer between noise wall and surrounding properties to be implemented to soften the interface between the development and neighbouring rural properties. A trellis and native vines to be provided to screen the noise wall and provide a softened buffer between the industrial area and adjacent rural residential properties.
Staged increase in processing pending independent assessment of facility performance and compliance with conditions of consent	A commitment that recycling will increase in stages, only after independent testing is done to prove the facility is performing to the highest environmental standards. These stages proposed include: • Following development approval, waste receival to increase over time to a threshold of 100,000 tonnes per annum; • Consent to increase waste receival to 150,000 tonnes per annum; • Consent to increase waste receival to 200,000 tonnes per annum.
Continuous environmental monitoring and publication of results	Continuous monitoring of air quality (dust) and noise at the site boundaries. Water quality to be tested during overflow events. Results to be published on a monthly basis on the Kariong Sand and Soil Supplies web site.
Groundwater monitoring	The groundwater will be sampled and tested regularly, in accordance with the conditions of the Environment Protection Licence.

Statement of Commitment	Description of Commitment
Operational Environmental Management Plan	An Operational Environmental Management Plan will be prepared and published on the Kariong Sand and Soils website to outline the range of environmental management techniques and procedures that will be used to ensure that the environment is managed on site at all times.
Town water (or groundwater) backup supply	Town water or groundwater (subject to approval) will be used as a backup emergency supply of water on the site for dust control in case that water from the stormwater pond is exhausted in prolonged dry weather.
Road Safety Audit	Prior to issue of construction certificate, the proponent will prepare a Stage 3 (Detailed Design) Road Safety Audit in accordance with Austroads Guide to Road Safety Part 6: Road Safety Audit by an independent TfNSW accredited road safety auditor.

18.5 Environmental Management System

Adopting an Environmental Management System (EMS) and a monitoring program, for both the construction and operational phases, is an important component of the proposal to demonstrate KSSS's commitment to implementing the measures outlined in this EIS.

To ensure an integrated approach, the EMS will include Environmental Management Plans (EMPs), specifically created to address the management and mitigation of the following environmental issues, as compiled in the table above. These sub plans include:

- Waste;
- Water;
- Soils and contamination;
- Air quality;
- Traffic;
- Noise and vibration;
- Flora and fauna;
- Fire safety;
- Historic and Aboriginal heritage;
- Visual impact; and
- Work health and safety.

The key objectives of the EMPs will be to ensure:

- Works are carried out in accordance with relevant environmental statutory requirements and relevant non-statutory policy, as detailed throughout this EIS;
- Works are carried out in accordance with the goals and requirements presented in this EIS;
- Works are carried out in such a way as to minimise the likelihood of environmental degradation;
- Works are carried out in such a way as to manage the impact of the works on neighbouring properties;
- All employees engaged in the works comply with the terms and conditions of the EMPs;
- Clear procedures for management of environmental impacts, including corrective actions;
- Continual improvement of environmental management; and
- Responsibilities and reporting requirements to ensure compliance with the EMP.

The EMPs will be prepared following assessment and approval of the Project and will serve as working documents to be used throughout the detailed design, construction and operational stages. They will be integrated into KSSS's existing management systems, procedures and plans for its activities within the facility, to ensure consistency in approach.

Each EMP developed for the site will contain, but not be limited to, the following information:

- Goals and objectives;
- Licenses, permits, approvals and statutory requirements;
- Lists of required actions, timing and responsibilities (including relevant environmental authorities);
- Operational procedures for preventing environmental impacts;
- Reporting requirements and procedures;
- Corrective and preventative action procedures;
- Procedures and forms for documentation and reporting of issues;
- Standard specifications for incorporating environmental safeguards;
- Environmental awareness and environmental management training and education requirements

- Guidelines for emergencies;
- Surveillance, review and auditing procedures for modification of the EMPs;
- Complaint procedures;
- Maintenance and monitoring programs; and
- Quality assurance procedures

Adherence to the EMPs will enable environmental safeguards and mitigation measures to be effectively implemented and sustainable work practices adopted for the entire Project. This also demonstrates the KSSS's commitment to preventing environmental pollution, minimising the impact of the proposal on the environment and complying with all relevant legislation.

18.6 Environmental Monitoring and Reporting

Environmental monitoring will be a fundamental component of the Operational EMPs for the proposal. Monitoring programs will be developed and presented in EMPs, in accordance with the conditions of approval and Licence requirements.

However, specific environmental monitoring recommended for the project have been defined in the environmental investigations done for the EIS. This monitoring is recommended for implementation, in addition to any specific environmental monitoring required as a condition of the SSD planning approval or EPA Licence for the site. Proposed environmental monitoring is given in Table 18.3.

Table 18.3. Environmental monitoring as recommended through technical investigations done in the EIS.

Environmental issue	Monitoring	Purpose	Proposed limit conditions
Waste	Weighbridge records for all incoming waste materials and outgoing products and waste exported by the site under an appropriate EPA *Resource Recovery Order*	For monthly reporting to the EPA for compliance with proposed Authorised Amount and annual processing limits	Maximum 40,000 tonnes of waste or product held on site at any one point in time Annual processing limit of 200,000 tonnes per year
Water	Periodic water quality sampling in stormwater detention dam	Assess quality of water stored on site and effectiveness of stormwater quality controls on site	Water quality parameters and frequency of testing as recommended by the EPA
	Water quality grab samples during overflow events	Assess quality of water discharged from site in peak storm events	Water quality parameters as recommended by the EPA
	Groundwater quality testing through upstream and downstream bores	To monitor groundwater quality.	Water quality parameters as recommended by the EPA
Air quality	Campaign fence line monitoring (north / south / east and wet boundaries), including a meteorological station on site	To confirm the effectiveness of dust control measures on the site, and to validate predictions in the air quality impact assessment	Periodic monitoring of dust deposition, PM_{10} and $PM_{2.5}$ at a frequency as required by the EPA
Noise and vibration	Periodic noise and vibration validation monitoring at closest residential receivers along Acacia Rd (No's 10, 12, 16 and 32) Ongoing noise monitoring along boundaries	Confirm the effectiveness of noise and vibration controls and management practices on the site during construction and operation	As per predicted worst-case noise levels ($LA_{eq,\ 15m}$) in Table 16 of Appendix O)

Monitoring requirements will be focused on ensuring compliance with the relevant environmental sub-plans, for example:

- Visually monitoring dust generation from work zones to ensure that excessive dust is not being produced;
- Monitoring noise and vibration generation from work zones to ensure that excessive noise and vibration is not being produced; and
- Monitoring stockpiling heights.

Monitoring requirements will also be focused on ensuring current mitigation/management systems remain fit for purpose and are in good working order to ensure they will remain effective.

Operational monitoring may also result from investigative monitoring or regulatory compliance monitoring, such as conducting investigative noise monitoring in response to specific complaints.

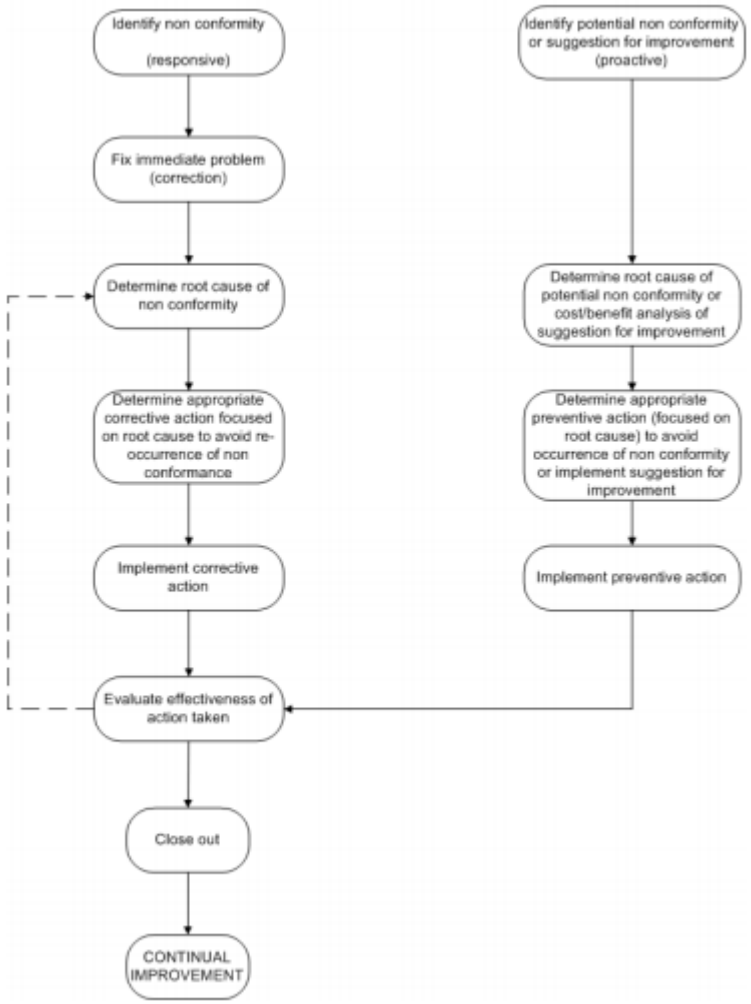
Environmental performance reporting is a key decision support tool that provides management with the information to make meaningful and positive change. Reporting requirements will be details in the EMPs for the relevant implementation phases.

The identification of actual and potential non-conformities contributes to continual improvement of the environmental management system through corrective action and preventive action, respectively. If the reports identify any shortcomings in the way that the construction activities or the operations are being conducted, or in the performance of environmental control structures, the necessary changes will be made to the EMPs to reflect these changes. The NSW EPA will receive all relevant reports and prompt notification of any incidents or deviations in performance as well as updated EMPs as required.

18.7 Environmental Auditing and Continual Improvement

Environmental system audits will be conducted in accordance with a schedule nominated in the EMP. This will include a schedule of independent audits by accredited external auditors. Quantified and unquantified information contained in the EIS will be assessed to ensure that the construction and operational phases of the Project meet acceptable environmental standards. Audits will be based on available information and observations. Environmental audits will also assess the Project against any Conditions of Approval imposed by statutory authorities. The register that is completed during compliance audits become a record of the evaluation of compliance. All detected non-compliances will be followed up with corrective actions as per the flow chart below.

Figure 18.1. Non-compliance corrective actions flow chart.



Actual and potential non-conformities identified and suggestions for improvement are made by the following means:

- Internal audit;
- External audit;
- Site inspections;
- Feedback from external parties;
- Complaints from customers or other stakeholders;
- Suggestions for improvement from staff and contractors;
- Occurrence of environmental emergencies and accidents;
- Testing of emergency preparedness and response; and
- Management review.

The above flowchart illustrates the organisation's process for non-conformity, corrective action and preventive action, through:

- Identifying actual and potential environmental nonconformities;
- Recording suggestions for improvement;
- Taking appropriate action to correct non-conformities and mitigate environmental impacts;
- Taking corrective action to avoid recurrence of non- conformities; and

- Taking preventive action to avoid occurrence of non-conformity.

KSSS or their environmental representative will be responsible for maintaining a register of environmental nonconformity and suggestions for improvement to environmental management. Each record is associated with a corrective and/or preventive action. Corrective and preventive action will require a change environmental management documentation in a continual process for document control.

This process has the ultimate goal of driving continual improvement.

18.8 Conclusion

The objective of this Section of the EIS is to outline how the recommended environmental protection measures will be implemented and managed in an integrated manner to demonstrate that the proposal is capable of complying with statutory obligations under EPA licenses or approvals.

This Chapter described the mitigation measures to be implemented for potential impacts of the proposal that have been identified throughout this EIS. The Chapter provides an outline of the proposed environmental management measures, and additional strategies, including cleaner production principles, which will be followed when planning, designing, establishing and operating the proposal. These measures and processes will be incorporated into EMPs and monitoring programs to ensure a commitment to implementing the requirements of relevant legislation outlined in this EIS. Monitoring the efficacy of those measures will inform a process to drive continual improvement.

19 Cumulative Impact Assessment

19.1 Introduction

This cumulative impact assessment addresses the cumulative environmental impacts of the proposed sand, soil and building materials recycling facility at 90 Gindurra Rd, Somersby, as well as to address the Secretary's Environmental Assessment Requirements (SEARs).

The proposed development involves establishing a sand, soil and building materials recycling facility (the Facility), a site formerly operating as a building and landscape supplies business at 90 Gindurra Rd, Somerbsy. The Facility will utilise state-of-art C&D processing equipment to process up to 200,000 tonnes of sand, soil and building materials per annum.

A cumulative impacts assessment is an environmental assessment that examines both the positive and negative environmental impacts of a proposal where there is a clustering of a land use type. A cumulative impact on the environment results from the incremental impact of human activities with consideration to the historic, current and foreseeable planned activities for a particular area. Cumulative impacts from a cluster of premises will vary between locations but typically cumulative impacts are a product of the location, the number and type of facilities present in the vicinity, the way they are managed, and the capacity of the local environment to accommodate these facilities.

The proposed development is not considered to make a significant contribution to cumulative impacts due to the mitigation measures that will be put in place to manage environmental impacts, which is in addition to the numerous long-term cumulative benefits of the proposed development, including a contribution to the attainment of waste management objectives including the aims and objectives of relevant legislation around the management of problem wastes, illegal dumping and waste to landfill targets.

19.2 Objective

This cumulative impacts assessment aims to achieve the following objectives:

- Identify the extent that the receiving environment is already stressed by existing development and background levels of emissions to which this proposal will contribute;
- Assess the impact of the proposal against the long-term air, noise and water quality objectives for the area;
- Identified infrastructure requirements flowing from the proposal; and
- Assess the likely impacts from such additional infrastructure and measures reasonably available to the proponent to contain such requirements or mitigate their impacts.

19.3 Assessment of stress level of existing environment

The facility is to be located at 90 Gindurra Rd, Somersby (Lot 4/DP227279), which is zoned IN1 General Industrial under the *Gosford Local Environmental Plan* 2014. The lot has a total area of 10.8 hectares, most of which is currently undeveloped. The lot is located at the eastern edge of the Somersby Industrial Park, near to the Pacific Motorway (M1).

The site has a number of environmental issues that need to be managed. Most of the site is covered in vegetation, with significant areas of native vegetation. Eastern Pygmy Possums were found at the site. According to the *Gosford Local Environmental Plan* 2014, the site is bushfire prone land, being surrounded by rural properties and undeveloped sites.

Noise and dust are considered to be the priority issues for the site. Although located in an industrial park, and close to the Pacific Motorway and a quarry, the surrounding land uses are relatively quiet. Neighbouring industrial properties are enclosed factories and warehouses.

The south-west corner boundary of the site is 1.1km away from the nearest Residential zone R2 (Kariong township), the proposed processing area being 1.5km from the nearest residential zone. However, there are several residential dwellings on rural properties (RU1 and RU2) within 250m of the site.

There are no major sources of water, protected zones and/or Environmentally Sensitive Areas (ESAs) that can be directly affected by an incident at the facility. The subject site is located at significant distance to riparian areas or a nearby waterway. No sensitive riparian areas or waterways exist on the site. The site drains via overland flow towards the south west of the site, following the gently sloping topography of the landscape. The landscape drains towards a drainage line to the south, commencing ≈130 m from the site. This drainage line then terminates in a dam on the Mt Penang Parklands, located 480m to the south of the site. The outline from the dam discharges into a minor tributary of Piles Creek, which then discharges into Mooney Mooney Creek, some 5.3km south west of the subject site. Mooney Mooney Creek then flows into the Hawkesbury River.

The site is surrounded by undeveloped land and rural lots. Therefore, it is anticipated that there would be little stormwater run-off from surrounding properties. The stormwater on-site will be collected in a dam on the south-western boundary of the site, with the water used for dust control.

Consequently, the potential cumulative impacts associated with the proposal, with respect to historic and current land use is considered minor. Furthermore, as the existing facility provides an important service to domestic and commercial markets with respect to resource recovery activities, should the proposal not be approved, resource recovery would be restricted into the future and likely result in recoverable materials being sent to landfill.

19.4 Assessment of the long-term impacts of the proposal

As identified within the respective Sections and technical studies, the proposals environmental impacts, such air, noise and water quality meet all relevant environmental legislation, policies and objectives. The following Sections provide a summary of the key long-term environmental impacts of the proposal.

19.4.1 Waste Management

The waste generated during the demolition / construction phase of the project is estimated to be up to 18,090 m^3 of inert material (recycled concrete, rubble, soil), 5 m^3 of scrap metal, 100 m^3 of woody garden organics, 20m^3 mixed building waste and 3 m^3 of municipal solid waste (MSW). Existing concrete stockpiles on site need to be sampled and tested for compliance with the EPA's *Recovered Aggregate Resource Recovery Order* 2014 to confirm the material is acceptable for use in construction works on the site. The metal will be recycled at a scrap metal recycling facility, off-site. The woody garden organics will be shredded to produce mulch, and either used on-site or sold. The MSW will be removed from site and disposed in a licensed landfill.

During the operational phase, up to 200,000 tpa of waste materials will be received on site for recycling. The majority will be soil or source-separated inert material. It is estimated that the recycling rate for the facility will be approximately 95%, with approximately 5,225 tpa of residual waste being removed for disposal to landfill. The recovered material will be processed into various building and landscaping products and sold from the premises.

A Waste Management Plan is provided at Appendix H.

19.4.2 Water Impacts

The main water issues associated with the site are the potential for stormwater contamination from on-site operations and water use for dust suppression.

The on-site storm water and erosion control measures will ensure that all storm water is captured and treated on-site.

Erosion on site will be limited by the use of concrete pavements, asphalt and crushed concrete hardstands, as well as vegetation in non-operational areas. Any sediment carried in the storm water will be captured in grassed swales and gross pollutant traps, then in sediment inlet ponds, followed by storage in an OSD basin. Sediment is to be removed regularly.

The on-site detention storage is proposed as part of the storage pond in the south-western corner of the site as shown on the Stormwater Management Plan included in Appendix E: Site, civil design and stormwater plans. The OSD basin will have a storage capacity of 5ML, with a headspace of up to 1.5m to allow for capture of firefighting water, if required. The pond is to be an open water body with steep sides and an access for maintenance. Inclusion of floating wetlands in the pond will further attenuate pollutants in a biological process to see metals, suspended solids and nutrients removed. Overflow from the OSD basin is discharged from the site onto adjoining bushland via a 50m wide level spreader will spread the water out onto adjoining bushland. Emergency spill prevention controls would include watertight penstocks which would prevent stormwater containing any spilled material from leaving the site.

This development is predicted to exceed its best practice water quality targets, to achieve a substantial water quality beneficial effect and to closely match runoff flow frequencies with that of a forested land-use. Volumes of runoff and runoff frequency are reduced back to pre-European levels reducing potential impacts and protecting the bushland from any damages at the point of discharge.

Groundwater will be protected through the operational areas being either sealed hardstand or through the use of a waterproof membrane layer under areas covered in compacted crushed concrete.

Stormwater captured in the OSD basin will be treated and re-used for dust suppression on the stockpiles. Water captured in rainwater tanks will be used in dust misting systems, and for irrigating vegetation during extended dry periods.

The site will be connected to the town sewerage system. Wastewater from the water recycling treatment unit will be discharged to sewer as trade waste. A covered vehicle wash bay will use a coalescing plate separator to firstly treat dirty water (separating oils and grease) and then to discharge this water to trade waste.

The Water Cycle Impact Assessment and Soil and Water Management Plan Report is provided at Appendix I.

19.4.3 Soils and contamination

A site investigation was conducted that included a review of site history, site inspection and soil sampling.

The information obtained from the review of available site history materials and site inspection identified three (3) potential Areas of Environmental Concern (AEC):

1. AEC 1 - Fill Materials of Unknown Origin - Fill materials and natural soils within the site were tested for a range of potential contaminants of concern. The samples tested reported results below the adopted criteria for the proposed development excluding 20-8613/TP3 - 0.5m, which reported a zinc concentration of 575 mg/kg which slightly exceeded the adopted ecological investigation levels. Results from three neighbouring test pits (<20m away) and all other test pits from across the site were analysed to be below the adopted

criteria. The Zinc result for this sample appears to be an outlier and is considerably lower than Health Investigation Levels. Therefore, no significant risk of chemical contamination is expected across the site.

2. AEC 2 - Asbestos Containing Material - During the sampling, multiple fragments of non-friable asbestos cement (AC) were identified on ground surfaces within the north-eastern section of the site adjacent the buildings as well as in the central section of site.

3. AEC 3 - Hazardous Building Materials - Due to the age of the onsite buildings and structures, it is likely that hazardous building materials including but not limited to asbestos containing materials and lead paint may be present within these structures.

Based on the scope and limitations of the investigation, in consideration of the site observations and sample analytical results, it is considered that the site is unlikely to pose a significant contamination risk with regards to chemical contamination, however ACM was identified on ground surfaces within the north-eastern and central sections of site. A series of recommended mitigation measures will be implemented to reduce the risk at the site.

A full copy of the Contaminated Site Assessment is provided at Appendix J.

19.4.4 Air Quality

A risk-based assessment of the potential construction phase air quality impacts indicates that the implementation of a range of mitigation measures would be required to ensure that the risks (both health and amenity) to the surrounding community would be low or not significant.

The dispersion model predictions associated with the operational phase of the project indicate that the proposed operations can be performed without additional exceedances of the air quality criteria at any residential or non-residential receptor location surrounding the project site.

A range of emissions control measures would be implemented as part of the project operation, including; enclosing dust-generating operations, use of water misting systems on stockpiles and in buildings, and the use of a water cart around the paved areas and roads. The air quality mitigation measures are discussed in detail in the main body of the report and in the Air Quality Impact Assessment report. It is considered that the measures adopted represent best practice dust control. The measures which are adopted have been demonstrated to ensure that the environmental objectives are achieved.

It is further recommended that a campaign of fence-line air quality monitoring is performed to provide the EPA with assurance that the site can be operated with the best practice measures outlined in the report and without giving rise to unacceptable air quality impacts.

A full copy of the Air Quality Impact Assessment is provided at Appendix M.

19.4.5 Traffic

The level of operation, by 2025, is estimated to generate up to 164 vehicle trips per day consisting of staff operational vehicles, 12 tonne tippers, 32 tonne truck and dog or semis, and 40 tonne B-Doubles. The peak hour movements were calculated based on the operation of a similar development, with a review of the typical movements across a day for this type of facility showing that peak truck movements for the site do not coincide with the road network peak periods. An allowance for 17 vehicles in the AM peak and 9 vehicles in the PM peak has been made based on the data provided. It is noted that the road network between Wisemans Ferry Road and 90 Gindurra Road is an approved B-Double route by the National Heavy Vehicle Regulator.

The site operator is anticipating that 25% of materials entering the site will come from Sydney while the remainder will be sourced locally on the Central Coast. It is expected that 100% of the products leaving the site will be used in the local area. These will be bulk loads transported in the various heavy vehicle classes listed above. There will be no sales direct to the public.

The existing road network and major intersections are currently operating at a good level of service with spare capacity and the traffic generated by the proposed development will be distributed to the road network over an 8 hour working day. The additional traffic is expected to have only a minor impact on the LoS of each of these roads and they will still be operating within their existing capacity.

From the route nominated, it is also clear that these additional trips will not have any significant impact on the operational performance of the intersections at Central Coast Highway / Kangoo Road. The intersections of the Central Coast Highway / Wisemans Ferry Road and Wisemans Ferry Road / Gindurra Road have been assessed and as each of these intersections is currently operating at acceptable levels of service with sufficient spare capacity to cater for the additional traffic generated by this proposed development the impact on the future development is acceptable.

The existing access has been reviewed on site and is to be relocated 14 metres west in accordance with Council's recommendation to satisfy sight distance. A concrete kerb is recommended on the exist to the site to ensure vehicles only exit to the left on Gindurra Road and do not proceed into the rural and residential areas to the east. A "no right turn" sign will also be installed at the exit to the site.

To facilitate the right turn movement into the site it is recommended that a right turn lane into the site be installed on Gindurra Road. The right turn lane shall provide sufficient storage for two B-Doubles (60 metres) with "No Stopping" signs installed. Management of vehicles internal to the site through the use of queuing/waiting areas, traffic lights and boom gates to control access to the weighbridge is described.

A full copy of the Traffic Impact Assessment is provided at Appendix N.

19.4.6 Noise and vibration

A noise and vibration assessment, including noise modelling, was conducted for the proposed development. The assessment found that the predicted noise emissions from the site to the surrounding environment are low. The proposed development satisfies the Project Noise Trigger Levels (PNTLs) of the NSW Noise Policy for Industry (NPI) of the NSW Environment Protection Authority during all the time periods, providing the following noise mitigation measures are included:

- 5m high noise barriers along the eastern site boundary;
- 3m high noise barriers inside the site – one adjacent to the processing zone and another two adjacent to the landscaping storage zone and tip and spread waste inspection area;
- Processing building façade construction to provide a minimum airborne sound insulation performance of 35 dB Rw. This requirement should be reviewed and confirmed during detailed design;
- Processing building to have all doors and openings completely closed during processing activities; and
- Processing building mechanical equipment (AC units etc.) should have a maximum aggregate sound power level of 80 dB LWA. This requirement should be reviewed and confirmed during detailed design.
- Additional noise mitigation measures have been considered in the assessment in response to agency and community consultation. These include:
- Enclosure of the tipping and spreading bays to reduce noise during the unloading process;
- Enclosure of the crushing/grinding operation to reduce noise generation during processing; and
- Enclosure of the mulching operation to reduce noise generation during processing.

The sleep disturbance impacts from the operational noise events generated by the site were investigated in this assessment. There proposed development satisfies the sleep disturbance trigger levels at all nearby sensitive receivers.

The existing traffic noise levels on the nearby affected roads already likely exceed the RNP criteria. Therefore, all new traffic noise increases must satisfy the RNP 2 dB increase criteria. The noise assessment found that the proposed development generates negligible additional traffic noise. The Road Noise Policy (RNP) criteria are satisfied as a result.

The construction noise impacts have been assessed in accordance with the NSW interim Construction Noise Guidelines (ICNG). During standard construction hours, exceedances of the NMLs of up to 12 dB are predicted at the closest residential receivers on Acacia Road and Debenhams Road South. No receivers were found to be "highly noise affected" per the ICNG. Standard noise mitigation measures have been recommended for the construction phase. In addition, the operational noise walls along the eastern boundary should be constructed as early as practicable to reduce construction noise impacts for the remainder of the construction period.

The noise and vibration impact assessment also recommended that construction noise monitoring is undertaken for the duration of the construction period with bi-monthly reporting of construction noise levels. This monitoring should be undertaken at the worst-affected receiver during construction, with the assessment identified as 242 Debenhams Rd South.

Construction traffic noise levels must satisfy the RNP 2 dB increase criteria. The assessment shows that the construction traffic generates negligible additional traffic noise. The NSW Road Noise Policy (RNP) criteria are satisfied as a result.

The offset distances (in all directions) between the vibrationally intensive equipment and any sensitive receivers is large (> 300 m). The potential for vibration impacts due to the construction or operation of the development are effectively nil. All vibration criteria with respect to cosmetic damage to buildings and human comfort impacts will be satisfied as a result.

The study concluded that the proposed materials processing facility is a complying development with respect to noise and vibration impacts and is, therefore, suitable for construction and operation.

A full Noise and Vibration Impact Assessment is provided at Appendix N.

19.4.7 Biodiversity

Biodiversity consultants, Narla Environmental, conducted site assessments over multiple days in 2018 and 2019. The ecologists determined that a large portion of the development area had been historically cleared and modified and contained large old stockpiles of a range of materials including fill, large slabs of concrete, polystyrene, corrugated iron and conglomerate rocks. Large infestations of weeds and exotic pasture grasses had taken over much of the centre of the site, on and surrounding old stockpiles. Native vegetation was restricted mainly to the western and southern boundaries of the development area, in which vegetation was derived from three vegetation communities classified according to Plant Community Types (PCTs), including:

- PCT 1642: Scribbly Gum - Red Bloodwood - Old Man Banksia heathy woodland of southern Central Coast
- PCT 1643: Red Bloodwood - Smooth-barked Apple - Scribbly Gum - Old Man Banksia heathy woodland on sandstone ranges of the Central Coast
- PCT 1579: Smooth-barked Apple - Turpentine - Blackbutt open forest on ranges of the Central Coast

Four (4) native vegetation zones were identified based on the PCT classification above and an assessment on condition consistent with the requirements of the FBA (OEH 2014b):

- Zone 1: PCT 1642 – Low Condition
- Zone 2: PCT 1642 – Moderate to Good Condition
- Zone 3: PCT 1579 – Moderate to Good Condition
- Zone 4: PCT 1643 – Moderate to Good Condition

A further two (2) zones that constituted non-native vegetation and were not assigned a PCT were classified as 'Cleared' and 'Weeds and Exotics'.

Eight (8) plots and transects were established within the development area to best sample the natural variation of the vegetation across the development area. Plots were randomly stratified to attain best coverage across the development area. The current and future site value scores for the vegetation zones were then assessed and calculated based on the data from the eight plots and transects collected on site and entered into the BCC. The current site value scores range between 25.17 / 100 to 83.51 / 100. For areas of complete clearing the future site value score is 0 / 100.

The BCC and Bionet identified a list of 17 species credit fauna species that were subject to targeted survey within the development area. Targeted survey was conducted using remote camera trapping, bat acoustic monitors, spotlighting, fauna call playback, and opportunistic sightings.

Eastern Pygmy Possum (*Cercartetus nanus*) was confirmed on the subject site through targeted surveys. The Eastern Pygmy Possum is a Species Credit species. No other Species Credit fauna species were identified within the Subject Site.

A total of 32 threatened 'species credit' flora species were modelled as having potential to occur, or historically recorded within 10km of the subject site. Such species were surveyed utilising the parallel field transverse method as recommended by the NSW Guide to Surveying Threatened Plants. The survey periods aligned with the flowering period (when the species are most conspicuous) of most flora species, thereby having the greatest chance of displaying key diagnostic features.

During targeted surveys, the ecologists identified the presence of one threatened flora species within the subject site, *Melaleuca biconvexa*, which is listed as Vulnerable under the TSC Act and EPBC Act. This species is a Species Credit species. Fifteen (15) individual specimens were recorded on the subject site. The occurrence of Melaleuca biconvexa was restricted to the western boundary of the subject site, confined to a small patch of mature individuals with evidence of regeneration. This small patch of *Melaleuca biconvexa* will be excluded from the development, including a 10m vegetation buffer surrounding the population. No other threatened flora species were identified within the subject site during site inspection.

Specific ameliorative measures have been incorporated into the site design and operations to prevent any direct or indirect impacts to this population of *Melaleuca biconvexa*. This will involve treated water being used to irrigate land draining to this plant community aiming to supply the same average annual volume of water that would have flowed to this community under predevelopment conditions.

The proposed development is restricted to the northern sections of 90 Gindurra Road, Somersby NSW (Lot 4 / DP 227279). Total impacts to native vegetation is 3.11 ha, with the remainder of the development area consisting of already cleared land or dominated by exotic vegetation. This includes the clearing of:

- 1.4 ha within Zone 1: PCT 1642 – Low Condition
- 0.78 ha within Zone 2: PCT 1642 – Moderate to Good Condition
- 0.30 ha within Zone 3: PCT 1579 – Moderate to Good Condition
- 0.63 ha within Zone 4: PCT 1643 – Moderate to Good Condition

Impacts to Eastern Pygmy-possum are anticipated within Vegetation Zone 2 and Vegetation Zone 4. A total impact of 1.41 ha to Eastern Pygmy-possum has been calculated.

In total, 103 ecosystem credit and 28 Eastern Pygmy-Possum species credits must be retired in order to offset the impacts of the proposed development.

Although complete clearing of native vegetation has been used to calculate credits within the development area, several avoidance measures have been implemented during project design. Several mitigation measures will also be implemented during development to reduce impacts as much as possible.

The proponent will now explore the generation of credits from an on-site Biodiversity Stewardship site, before considering other options such as the purchase of credits from the market or payment to the Biodiversity Conservation Trust.

A full copy of the Biodiversity Assessment Report is provided at Appendix P.

19.4.8 Fire Safety

A Fire Safety Study was conducted by fire consultants, ACOR, for the proposed development. The fire safety study investigated proposed combustible materials to be stored at the site and the potential impacts of thermal radiation, the risk mitigation strategies and the recommendations for fire detection and protection.

At maximum capacity, the facility will store on-site approximately 3,907 tonnes of combustible materials at any one time comprising six discrete locations. The fire load associated with these materials is equivalent to approximately 60,525 gigajoules of energy.

The study identified that the open stockpiles of combustible materials stored in the yard (waste storage bays, processing area and landscape storage bays) are unlikely to cause an escalation of the fire event by direct thermal radiation. However, the risk from spread of burning embers could result in escalation. Consequently, methods to detect likely fire conditions and take preventative actions have been identified.

The Secondary Sorting Warehouse (SSW) has several stockpiles of combustible (recovered) materials with proximity to each other. A fire in any of the SSW stockpiles is likely to spread to each of the other stockpiles, meaning that the worst-case heat release rate (49MW) in the SSW is much lower than for the open yard stockpiles (96 – 3,817MW).

Diesel fuel and lube oil, stored in a bunded compound in the southwest corner of the SSW, are unlikely to cause escalation to other combustible materials within the SSW, with fully developed burn time lasting 1.75 hours at 75kW/m2 thermal radiation. This level of flux will cause damage to the zincalume cladding but should not result in combustion initiation in the actual SSW infrastructure.

LPG cylinders stored at the northern end of the SSW will be impacted by thermal radiation from a fire in the process area at a thermal radiation flux less than 4.7kW/m^2, however, this is unlikely to result in gas venting, assuming that firefighting water can applied within 20 minutes of a fire commencing.

An LPG cylinder jet fire is unlikely to result in injury at distances beyond 10 metres from source.

Flame heights in the SSW will extend beyond the three (3) metre high, concrete, tilt-up panels and cause thermal stress failure of the zincalume cladding. Thermal radiation will then be able spread into the yard space closest to the heat source.

Similarly, the yard stockpiles will extend to one metre below the top of the concrete block walls, allowing flame height to extend above the masonry heat barrier. The only thermal radiation that is likely to escape from the KSSS yard originates in the waste storage bay holding only timber. The distance of this bay from the eastern boundary of the

KSSS property (44 metres) and the presence of the five (5) metre high noise barrier allows a thermal shadow to prevent radiation within a minimum of 54 metres from the source, to the east and 95 metres from the source to the west. The furthest extent of thermal radiation from source is 25 metres.

The consequences of a fire event may results in:

- Injurious thermal radiation (30 seconds exposure) originating in the SSW will be blocked (shadowed) to an average distance of 13 metres beyond the site boundary (at ground level) to the east, by the five (5) metre high noise barriers, effectively negating impacts adjacent to the SSW;
- Injurious thermal radiation (after 30 seconds exposure) originating in the processing area will not extend beyond the boundary of the KSSS premises;
- Injurious thermal radiation (after 30 seconds exposure) originating in the central landscape storages will not extend beyond the boundary of the KSSS premises;
- Injurious thermal radiation (after 30 seconds exposure) originating in the waste storage bays will not extend beyond the boundary of the KSSS premises; and
- An LPG vapour cloud explosion, involving the contents of two 18kg LPG cylinders should not cause injury beyond the western and northern boundaries of the site. On the eastern boundary, injurious overpressure with up to a 10 per cent probability of injury will extend approximately 15 metres into the adjoining property adjacent to the SSW.

An LPG vapour cloud explosion, involving the contents of two 18kg LPG cylinders (one LPG cylinder will cause the two other LPG cylinders to explode generating a maximum overpressure from two LPG cylinders) should not cause injury beyond the western and northern boundaries of the site. On the eastern boundary, injurious overpressure with up to a 10 per cent probability of injury will extend approximately 15 metres into the adjoining property.

The fire study indicates that three additional fire hydrants and four fire hose reels will need to be installed adjacent to the outside storage areas.

Firewater generated during a fire event will either be contained within the bunded compound of the SSW or will flow though dish and /or swale drains to the on-site detention (OSD) pond. Contaminated firewater captured in the OSD will be analysed prior to being discharged or removed from site by a licensed third party waste contractor.

The estimated firewater application for a four hour duration fire in the SSW is approximately 288kL of which 50% is assumed to evaporate (144kL contaminated firewater, equivalent to a depth of 68mm over the SSW floor area. Consequently, a 70mm high bund wall will be installed internally, at each opening to the SSW.

The estimated firewater application for a four hour fire in one of the processing area finished mulch bays is approximately 288kL of which 50% is assumed to evaporate (144kL contaminated firewater, equivalent to 2.9% of the OSD pond ullage capacity).

ACOR has modelled outcomes that are consistent with low consequence and low probability and considers that the development can be managed to provide a risk outcome that is acceptable to persons, property and the environment.

A copy of the full Fire Safety Study is provided at Appendix Q: Fire Safety Study.

19.4.9 Bushfire Hazard

The proposed development was assessed against the potential threat of bushfire. The proposed works relate to the construction of four unenclosed, non-habitable structures (aggregate storage bay, landscape storage bay, waste

receival bay and waste storage bay). The nominated asset protection zones relate to achieving a maximum expected radiant heat load of 29 kW/m2. This intent is achieved for the landscape storage bay and waste receival bay, however, cannot be achieved for the proposed aggregate storage bay. The proposed aggregate storage bay on the north western end of the site is located within 5m of the western boundary. In the event of a bushfire, the aggregate storage bay could be exposed to flame contact. However, the concrete storage bays should provide some radiant heat shielding against any potential fire running from the west and south west. The proposed waste storage bay on the south eastern end of the development is located within 2m of the eastern boundary. An Asset Protection Zone (APZ) cannot be provided to the east of this structure. However, the land to the east is managed and the proposed 5m high concrete block wall / acoustic barrier will provide adequate bushfire separation from the land to the east.

The bushfire consultant recommends (where possible) that a minimum 15m APZ is provided around each proposed structure. This would provide a non-vegetated buffer to prevent potential bushfire spreading onto the subject site or fire spreading from the subject site onto the adjoining allotments. The recommended APZs are achieved for all proposed structures except for the proposed aggregate storage bay. This is a concrete open structure containing non-combustible aggregates. This structure and deficient APZ has zero influence with regards to bushfire behaviour or bushfire protection.

The proposed blending and processing areas are not defined by any building works. All proposed built structures are non-combustible and suitably located. In the event of a bushfire it is our view that the proposed development will not influence bushfire behaviour and will not increase bushfire risk for any adjoining properties.

All proposed works are to be constructed from non-combustible materials. The nominated asset protection zones are deemed to be adequate. Site access, including access via the public road system is suitable for emergency response vehicles. The development complies with Planning for Bushfire Protection (2006) with regards to the provision of water. The requirements for electricity and gas (if applicable) can also be complied with. We recommend that at bushfire emergency evacuation plan is prepared such that employees and visitors are informed about suitable egress routes away from the site in the event of bushfire. Compliance with the NCC (2016) via compliance with AS3959, the Australian Standard for the Construction of Buildings in Bushfire Prone Areas can also be achieved.

A full copy of the Bushfire Hazard Assessment is provided at Appendix R.

19.4.10 Heritage

19.4.10.1Historical heritage

The assessment has identified that the study area likely contains the archaeological remains of the 1920s cottage and associated buildings in the north eastern section. The significance assessment has identified that these archaeological remains do not contain any significant fabric or research potential and therefore does not require any management. The southern border of the study area is adjacent to a state listed conservation area, Mount Penang Parklands and as such required an assessment of possible impacts resulting from the proposed development. The works are confined to the northern section of the study area with no plans to use the southern section. The significance of the Mount Penang Parklands includes the visual relationship of the conservation area with its surrounds. Therefore, the southern portion of the study area should remain undeveloped to minimise any visual impacts. Built infrastructure within the study area should not exceed the height of extant buildings. It should also be mentioned that cumulative impacts of any future developments within the surrounds of Mount Penang Parklands will contribute the loss of the Parklands significance and should therefore be managed appropriately.

A copy of the Historical Heritage assessment is provided at Appendix S.

19.4.10.2Aboriginal heritage

Biosis Pty Ltd were engaged to conduct an Aboriginal Cultural Heritage Assessment for the site.

As part of the Aboriginal archaeological assessment, background research was undertaken for the study area, including a search of the Aboriginal Heritage Information Management System (AHIMS) database and a review of regional and local archaeological survey reports. There are 36 Aboriginal cultural heritage sites registered with the Aboriginal AHIMS register in the vicinity of the study area, however there are no recorded sites located within the study area. Background research has identified that previous surveys have identified an engraving site, SIE 26, as either being located within the study area (J. C. Lough & Associates 1981) or 50 metres to the west of the study area (AMBS 2002). SIE 26 has not been recorded on the AHIMS register. Biosis has checked the coordinates for this site, and through mapping has been able to confirm that this site is not located within the study area and is located approximately 120 metres to the west of the study area. The location of this site was also checked during the field investigation and was unable to be identified.

An archaeological survey of the study area was undertaken on the 2 February 2018, with two representatives of the Darkinjung Local Aboriginal Land Council. The field investigation was conducted in accordance with requirements 5 to 10 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW 'the code' (DECCW 2010). The field investigation involved the recording of the disturbances within the study area and focused on the identification of areas that may possess potential for Aboriginal archaeological sites and objects. The exposure and ground surface visibility (GSV) within the study area was also noted. Areas of exposure were investigated in order to identify any Aboriginal objects/sites that might be present upon the surface. The study area was observed to be highly disturbed by human activity within the area. Poor levels of ground surface visibly and the lack of appropriate sandstone exposures and overhangs suitable for rock engravings, shelters and grinding grooves within the area also contributed to the low potential for identifying these dominant site types within the study area.

A supplementary field investigation of the study area was conducted on Wednesday 11 September 2019 by representatives from Biosis, Awabakal & Guringai Pty Ltd and a Guringai Elder. No previously unrecorded Aboriginal cultural heritage sites were identified during the field investigation, and no areas of (archaeological) sensitivity were identified. Due to the high levels of disturbance identified in the northern section and the lack of sandstone exposures and overhangs suitable for rock, engravings, shelters and grinding grooves, there is allow potential for Aboriginal sites to be present within the study area.

The Aboriginal community was consulted regarding the heritage management of the project throughout its lifespan. Consultation has been undertaken as per the process outlined in the DECCW document, Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (consultation requirements). The appropriate government bodies were notified and advertisements placed in the Central Coast Express newspaper (27 June 2019) which resulted in the following Aboriginal organisations registering their interest:

- Darkinjung Local Aboriginal Land Council
- Widescope Indigenous Group
- Corroborree Aboriginal Corporation
- Awabakal & Guringai Pty Ltd
- A1 Indigenous Services
- Private citizen

A search conducted by the Office of the Registrar, Aboriginal Land Rights Act 1983 listed no Aboriginal Owners with land within the study area. A search conducted by the National Native Title Tribunal (NNTT) listed no Registered Native Title Claims, Unregistered Claimant Applications or Registered Indigenous Land Use Agreements within the study area, as the area is freehold and this extinguishes Native Title.

Upon registration, the Aboriginal parties were invited to provide their knowledge on the study area and to provide feedback on the provided Methodology document supplied to all Registered Aboriginal Parties (RAPs) on 25 July 2019. Comments received supported the proposed methodology. One group requested an additional site survey, which was

undertaken. No responses were received commenting on the cultural significance of the study area therefore the outcome of the consultation process with the RAPs so far is that the study area currently has an unknown level of cultural significance. The results of the consultation process are included in the Aboriginal Cultural Heritage Assessment report.

The Archaeological Report and Aboriginal Cultural Heritage Assessment report are provided at Appendix T.

19.4.1 Visual impact

The existing landscape character is a mix of industrial development, rural properties and bushland ridgelines and corridors. The scale of the built form in the proposal is small compared to existing industrial developments in the Somersby Industrial Area and is more in keeping with adjacent rural residential developments.

The implemented design principles of this report seek to avoid, reduce and where possible, remedy adverse effects on the environment arising from the proposed development. Implementation of the mitigation measures, which propose a combination of primary mitigation measures (site planning principles) and secondary measures (landscaping, street trees, colour and material selections) are proposed to reduce localised negative impacts.

With the implementation of the recommended mitigation measures, the proposed development could be undertaken whilst maintaining the core landscape character of the area and have a negligible visual impact on the surrounding visual landscape.

The full Visual Impact Assessment is provided at Appendix U of this EIS. A copy of the Landscape Plan is provided at Appendix F.

19.4.2 Chemicals and Hazards

An assessment was conducted of the risk posed by the management and handling of chemicals during the construction and operational phases of the project. The assessment found that the risk of harm due to chemicals spills and leaks during the construction and operational phases of the project is deemed low. Containment measures and clean-up of the incident will address the negligible harm to environment, consistent with existing pollution incident response procedures in place at the site.

A range of mitigation measures are proposed to minimise impacts from chemicals during the different stages of the project. These measures will help mitigate against the impacts of a chemical spill or fire, thereby reducing the potential for harm to receiving waterways.

A Pollution Incident Response Management Plan is attached at Appendix V. An Emergency Plan is attached at Appendix W.

20 Conclusions

This EIS has been prepared for Kariong Sand and Soil Supplies. It presents the findings of a comprehensive environmental evaluation of planned development of 90 Gindurra Rd, Somersby (Lot 4 DP 227279) to establish a sand, soil and building materials and a building and landscape supplies business.

The EIS study evaluates the social, environmental and economic impacts and benefits of the project. The EIS defines the context of the proposed development, and examines those issues considered to be relevant. This EIS considers the potential environmental effects of the proposal during construction and operation, and proposes mitigation measures to prevent, reduce or offset significant adverse impacts on the environment.

All statutory planning assessments, including the preliminary hazard analysis and environmental risk assessment, including stakeholder consultation. Consultation with neighbours, Central Coast Council, NSW Department of Planning and Environment, the NSW Environment Protection Authority, Roads and Maritime Services, Ausgrid, Office of Environment and Heritage, NSW Rural Fire Service, NSW Department of Primary Industries, NSW Fire and Rescue have been undertaken to inform the EIS. Extensive consultation with neighbours and community groups has also been undertaken.

An EIS was submitted to DPIE on 29th January 2019. During the public exhibition period, 1,329 submissions were received. Substantial feedback on the proposed development was provided by government agencies, neighbouring businesses and the general public. In addition, Kariong Sand and Soil Supplies conducted extensive community engagement.

The development proposal has been revised to incorporate and address the comments received from organisations and the public. This EIS documents the measures to be taken to mitigate any potential negative impacts on the surrounding environment and neighbouring properties. This EIS provides an assessment of the revised project, and forms part of the resubmission of the development application for consideration.

This EIS has been prepared in accordance with the requirements of the *Environmental Planning and Assessment Act* 1979, and Clause 6 and 7 of the *Environmental Planning and Assessment Regulation* 2000. The EIS has also been delivered to meet the Secretary's Environmental Assessment Requirements, which were issued on 23/08/2017 (SSD 8660).

This EIS includes an assessment of the potential environmental impacts associated with the proposed development. The EIS has considered a range of social, environment and economic factors of the project, with a focus on Ecologically Sustainable Development principles. The assessment found that there were no significant environmental impacts that could not be mitigated by appropriate mitigation measures and management strategies.

The environmental assessment process has been used to inform the upgrade to the site and ensure operations will be sustainable and create minimal disruption to neighbours and the local community. Waste receival, processing and recycling operations have been designed to minimise traffic impact on local roads, avoid noise and dust emissions, effective management of wastes, protection of soils, surface and ground water quality, and minimisation of risk of fire at the site.

The facility will provide additional C&D recycling in the Central Coast region. It will also be a source of high-quality recycled products for construction and landscaping industries across the region.

The facility will help achieve a significant reduction in solid waste to landfill and assist the NSW Government to reach its recycling target of 80% for construction and demolition waste by 2021. The proposal will have positive flow on effects throughout the local economy through the creation of 20 new direct jobs. An economic analysis of the project

also suggests that development will inject $407 million into the Central Coast economy over the next 20 years (comprising capital and operating expenditure from the plant, and product revenue).

Consent is now sought for the proposal under the *Environmental Planning and Assessment Act* 1979.

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Appendix A: Development consents operating on the property

Appendix B: Section 10.7 Certificates

Appendix C: Secretary's Environmental Assessment Requirements (SEARs)

Appendix D: Site survey

Appendix E: Site, civil design and stormwater plans

Appendix F: Landscape design plans

Appendix G: Capital Investment Value

Appendix H: Waste Management Plan

Appendix I: Water Cycle Impact Assessment and Soil and Water Management Plan

Appendix J: On-site Surface Water Sample Results

Appendix K: Baseline Groundwater Investigation

Appendix L: Contaminated Site Assessment

Appendix M: Air Quality Impact Assessment

Appendix N: Traffic Impact Assessment

Appendix O: Noise and Vibration Impact Assessment

Appendix P: Biodiversity Assessment

Appendix Q: Fire Safety Study

Appendix R: Bushfire Hazard Assessment

Appendix S: Historical Heritage Assessment

Appendix T: Aboriginal Cultural Heritage Assessment

Appendix U: Visual Impact Assessment

Appendix V: Pollution Incident Response Management Plan

Appendix W: Emergency Plan

Appendix X: Community Consultation Report

Appendix Y: Letters of Support

Appendix Z: Owner's Consent