Boral Quarries
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Stockton Sand Quarry Dredging

PRELIMINARY ENVIRONMENTAL ASSESSMENT

Prepared for Boral Resources (NSW) Pty Ltd | September 2018

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1 INTRODUCTION

1.1 Overview

Boral Resources (NSW) Pty Ltd owns and operates the Stockton Sand Quarry (the site or the quarry), a long standing operation that extracts and transports up to 500,000 tonnes of sand product per year for use in the building, landscaping and construction markets.

Due to current and future demand for sand in the local Hunter and Sydney market, Boral is seeking approval for continued operations at the site through a State Significant Development (SSD) application. Boral propose to extract sand from a former sandpit by excavator and dredging (the Project).

This Preliminary Environmental Assessment (PEA) has been prepared by Element Environment Pty Ltd, on behalf of Boral for submission to the Department of Planning and Environment (DP&E) to satisfy the provisions of Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

1.2 The Applicant

Boral Resources (NSW) Pty Ltd is a wholly owned subsidiary of Boral Limited (Boral) and is the Applicant for the Project. Boral is an international building and construction materials group, headquartered in North Sydney, Australia. Boral's competitive position is underpinned by being a market leader in cement and construction materials in Australasia, Plasterboard in Australia and Asia and Cladding and Roof Tiles in the USA.

The Boral Australia division employs over 5,000 employees in its quarry, concrete, asphalt, concrete placing and cement operations. The business is a major supplier of products to the dwelling, commercial construction, and roads and engineering markets.

Boral operates over 110 quarries producing products such as concrete aggregates, crushed rock, asphalt and sealing aggregates, road base materials, sand and gravels for the Australian construction materials industry.

1.3 Document Purpose

The purpose of this PEA is to provide an outline of the nature, scale and extent of the Project, background environmental data, sufficient to establish the key environmental issues of significance and the level of environmental assessment required for the application. Specifically, the PEA:

- seeks formal Secretary's Environmental Assessment Requirements (SEARs) from the DP&E on the scope and environmental assessment requirements, which includes requirements of relevant government agencies, as the basis for the preparation of a detailed Environmental Impact Statement (EIS) and to facilitate further planning and design refinement; and
- provides conceptual design information to the community, key government agencies and other relevant stakeholders for feedback to inform the planning, design and EIS process.

2 SITE DESCRIPTION

2.1 Site Location

The site is located in Fullerton Cove, approximately 9.8 kilometres (km) north north-east of the Newcastle Central Business District (CBD), within the Port Stephens Local Government Area (LGA) (refer to **Figure 1**).

Access to the site is via Nelson Bay Road and Coxs Lane.

Coxs Lane is a local roadway which terminates at the entrance to the quarry at its eastern end. Nelson Bay Road is a major arterial roadway which links the Newcastle CBD to Newcastle Airport, Nelson Bay and the wider Port Stephens area to the north (refer to **Figure 2**).

2.2 Land Use and Ownership

The site is owned and operated by Boral and covers an approximate area of 246 hectares.

Boral's land holding is identified as:

- Lot 1 DP 1006399 and Lot 1 DP 242093, comprising 234 hectares and located predominantly on the eastern side of Nelson Bay Road, with a small portion also situated on the western side of Nelson Bay Road;
- Lot 2 DP 1006399 comprising 10.4 hectares and located predominantly on the western side of Nelson Bay Road, with a small portion also positioned on the eastern side of Nelson Bay Road (formerly Part Lot 167, Part Portion 167); and
- Lot 3 DP 664552 comprising 1.619 hectares and located wholly on the eastern side of Nelson Bay Road, and within which the existing depot and weighbridge are located (formerly within Part Lot 3, Part Portion 3).

The site also covers a Crown land title (Lot 7300 DP1130730) under licence agreement with the NSW Department of Industry (Lands and Forestry).

Land use surrounding the site is a mixture of rural residential, public recreation and environmental conservation areas.

To the north west of Nelson Bay Road is the rural residential area of Fullerton Cove. This area comprises a mixture of residential properties and commercial premises. The main access for these properties is via Fullerton Cove Road and Coxs Lane to and from Nelson Bay Road. These properties are separated from the site by Nelson Bay Road, with the closest approximately 480 metres (m) from the entrance to the quarry. A new residential development at Fern Bay (Fern Bay Seaside Village) is also positioned approximately 1.5 km to the west south west of the site. Sensitive receiver areas are shown in **Figure 2**.

The majority of environmental conservation areas positioned adjacent to the boundary of the site are designated as Crown land and extend along the Stockton Bight beach and dune system. The beach and dune area is used for a variety of recreational purposes including fishing, four wheel driving, quad bike riding, hiking and horse riding. There are no formal public access points through Boral's holding to Stockton Bight. Formal access to the dunes and beach is via Lavis Lane near Williamtown, and a new access within Seaside Estate at Fern Bay.

The former Sygna ship wreck is located near the site and was previously a significant landmark to which a number of tourist operators conducted sand based tours.

Figure 1
Regional context

STOCKTON SAND QUARRY DREDGING
PRELIMINARY ENVIRONMENTAL ASSESSMENT

CAMBIUM GROUP

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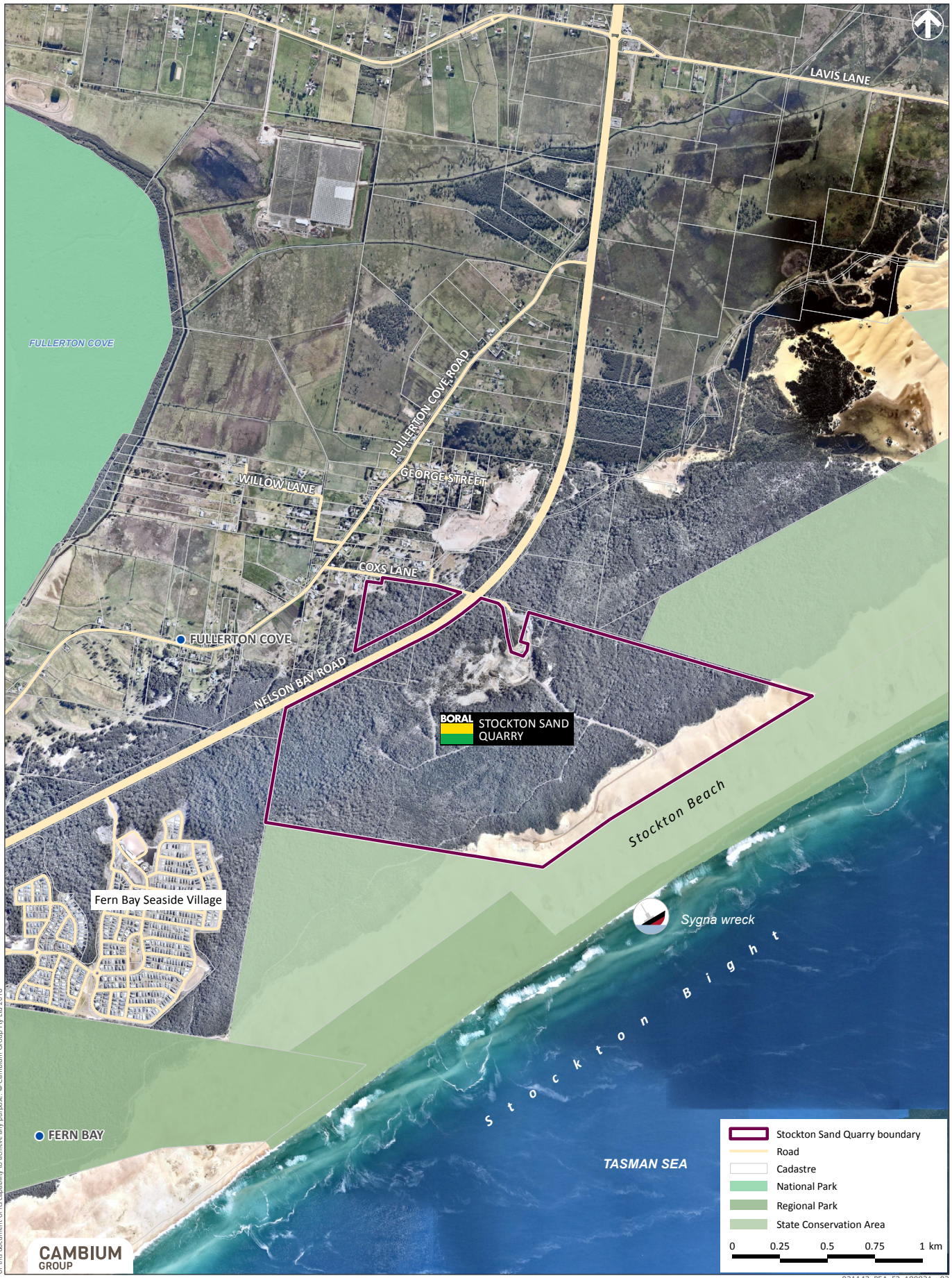
Figure 2
Local context

STOCKTON SAND QUARRY DREDGING
PRELIMINARY ENVIRONMENTAL ASSESSMENT



Source: Nearmap, December 2017

2.3 Zoning

The majority of the site is zoned RU2 – Rural Landscape zone under the Port Stephens Local Environmental Plan (LEP) 2013. Extractive industries are permissible in this zone with consent. The portion of Crown Land is zoned RE1 - Public Recreation, in which extractive industry is prohibited. The relevant aims and objectives of the RU1 and RE1 zone are discussed in **Section 6.3.3**.

Further afield, land to the north, south and east of the site is zoned E1 – National Parks and Nature Reserves, and this land is associated with environmental conservation areas of Stockton Bight. A portion of land adjacent to the north east of the site is also zoned as E3 – Environmental Management.

Figure 3 shows LEP zoning boundaries within proximity to the Project site.

2.4 Topography and Hydrology

The majority of the site comprises relatively stable and vegetated hind dune and inter dune environments, while the south eastern property boundary encompasses an un-vegetated and mobile foredune environment. The current area of extraction of windblown sand (Pit 7) occurs in the sheltered side of this un-vegetated foredune. Elevations of the dunes in the vicinity of the site typically range from 8 to 16 m Australian Height Datum (AHD) with some in excess of 20 m AHD, while the lowest interdunal areas are approximately 4 m AHD (RPS 2016).

2.5 Hydrology and Groundwater

The site is located within the Stockton Sandbeds, which consists of quartzose sand deposits and forms an outer barrier dune system. The Tomago sandbeds, which form the inner barrier dune system, is northwest of the site (ERM 2005).

The site is positioned within a north east to south west oriented dune ridge that forms part of the outer barrier dune system and is composed of a thick deposit of fine to medium sand. Therefore, the sand has a high infiltration capacity likely to be in excess of 100 millimetres (mm) per hour resulting in approximately 90 to 95 percent (%) of rainfall infiltrating directly to an underlying unconfined aquifer (ERM 2005).

No permanent streams or waterbodies are visible within the Project area indicating that surface runoff is negligible and infiltration occurs quickly through porous sands, thereby contributing to high groundwater recharge. Some temporary ponding of water is evident in the dune system within the Project area and along Stockton Bight to the south east of the site, however it is likely that this ponding is associated with naturally low lying interdunal swales where there is interaction with shallow groundwater. It is also possible that some surface runoff which does not infiltrate through the sand may also accumulate in these swale areas contributing to the ponding.

The Pacific Ocean is located approximately 1.3 km from the Project site, and surface water at the site likely infiltrates to groundwater aquifers, which as detailed further below, ultimately flow towards Fullerton Cove in the north.

Detailed studies of groundwater were previously undertaken during assessment of a wastewater plant proposed to be located south of Boral's property at Fern Bay. These studies showed that the water table is shallow, ranging from less than one metre in low lying areas to more than 20 m below some dunes. In the vicinity of the transgressive dune system it was reported that there is a groundwater divide and that groundwater flows both inland to the north west and the south east towards the Pacific Ocean (ERM 2005).

The Stockton Sandbeds and transgressive dune sands are the main aquifer at the site and comprise the Stockton Groundwater Source of the Water Sharing Plan for the North Coast Coastal Sands Groundwater Sources (RPS 2016).

As identified above, underlying and hydraulically connected with the Stockton Sandbeds are the Tomago Sandbeds of the Tomago Groundwater Source.

Permeability of the Stockton Sandbed aquifer is likely to be quite high but will be variable due to the variation in sediment size. Hydraulic properties are likely to be similar to those of the Tomago Sandbeds, which have a reported average hydraulic conductivity in the order of 23 m per day (RPS 2016).

The dominant recharge to the aquifer is via direct infiltration of rainfall and runoff. The NSW Department of Industry (Water) have applied an average rainfall recharge component of 22% for the Stockton Groundwater Source in assessing the volume of water that percolates to the water table each year. However, localised recharge rates in dunal environments with predominantly closed drainage systems are likely to be significantly higher.

Discharge from the site will be via through flow to the ocean and also inland towards Fullerton Cove and its associated drained estuarine flats. A component of evapotranspiration will also apply, particularly in low lying areas such as interdunal depressions and along the low lying margins of Fullerton Cove to the north (RPS 2016).

2.6 Geology

The site is part of a dual sand barrier system known as the Stockton Bight.

Stockton Bight is a wide south facing coastal embayment bordered by Nobbys Head at Newcastle in the south, and Birubi Point at Anna Bay in the north. The beach is approximately 32 km long and the Quaternary sand barrier system extends up to 10 km inland (ERM 2005).

The bedrock of Nobbys Head and the higher relief of Newcastle CBD border the southern side of Stockton Bight. The rocks consist of Permian aged coal measures and some sandstone. The Hunter River has been deflected to the south by the Stockton Bight sand barrier system and enters the sea at Nobbys Head. The Bight sediments abut the sedimentary Permian rocks of the Tomago coal measures and Mulbring siltstone between Raymond Terrace and Big Swan Bay, and at the northern end of the Bight abut the Carboniferous Nerong Volcanics at Birubi Point. Between the Stockton training wall of the Hunter River and Birubi Point is the Stockton sand barrier system (ERM 2005).

2.7 Climate

The site is located in Australia's cool temperate climatic region, which is characterised by mild to warm summers and cold winters, with common frost and occasional snow fall.

Rainfall data was obtained from Bureau of Meteorology (BoM) Station 061055 (Newcastle Nobbys Signal Station), located approximately 8.3 km to the south west of the site.

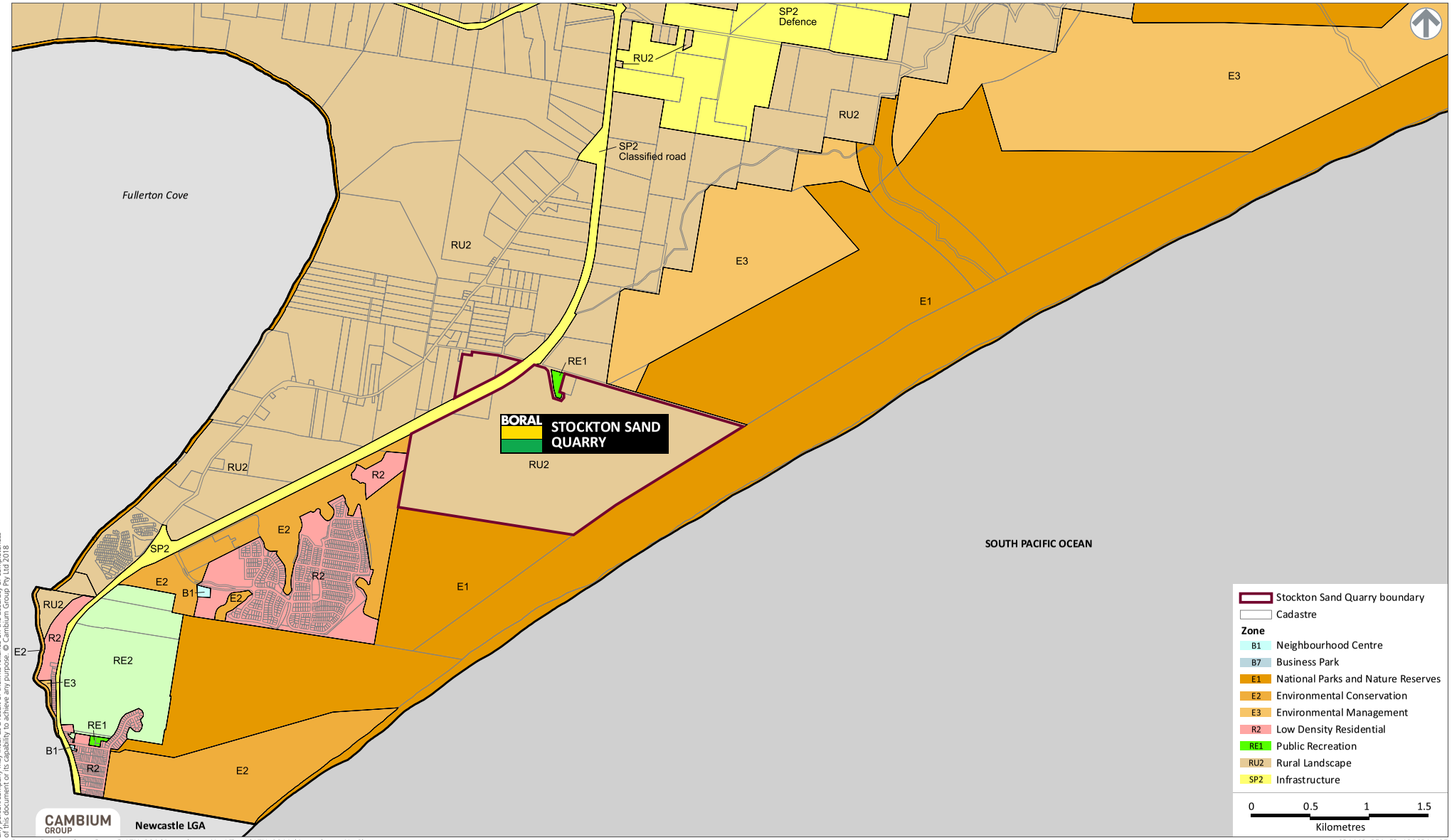
The BoM weather station shows an average annual rainfall of 1122 mm. The mean maximum and minimum temperature in January is 25.6ºC and 19.2ºC, while the mean maximum and minimum temperature in July is 16.8ºC and 8.5ºC.

A review of historical rainfall data over 148 years indicates that rainfall is relatively evenly spread over the first 6 months of the year, with average rainfall ranging from 89.5 mm in January to 117.5 mm in June. The latter half of the year is typically drier, with average rainfall ranging from 71.1mm in November to 92.8 mm in July.

A review of recent rainfall data recorded during 2017 indicated that the highest monthly rainfall of 2017 was 238.8 mm, recorded in March 2017. For the 2017 period, the total rainfall of 970 mm was below the historical annual mean of 1120 mm (BoM, 2018).

Figure 3
Zoning

STOCKTON SAND QUARRY DREDGING
PRELIMINARY ENVIRONMENTAL ASSESSMENT



Source: Port Stephens Council. LZN_004 (Amendment No 15) and LZN_004A (Amendment No 9).

3 EXISTING OPERATIONS

3.1 Historical Ownership

Sand extraction at the site took place previously by G. Hawkins and Sons under a consent granted in 1976. Sand was extracted over a number of years in the late seventies, with sand hauled along the old internal haul road which was upgraded following the 2005 development consent, as detailed further below.

Boral acquired the site in 1992.

The eastern section of Boral's landholding was previously dredged for mineral sands by Mineral Deposits Limited between late 2000 and 2003, before the dredge was dismantled at in early 2004.

Extraction of sand on the vegetated dunes in the middle of the site above 5 m AHD commenced under a development consent issued by Port Stephens Council in May 1996. The consent was for sand extraction and road transport up to 500,000 tonnes per annum (tpa) for a period of 13 years. The development involved clearing of native vegetation, sand extraction by front end loader, mobile screening, stockpiling and dispatch by road. This extraction area was progressively rehabilitated until the approved resource was exhausted in 2007.

In January 2006, the Minister for Planning issued development consent for a new extraction area on the un-vegetated windblown sand dunes (above 2.5 m AHD) adjoining the beach to the east. The annual extraction rate and transport remained the same as the original consent for a period of 20 years.

The site has minimal infrastructure, which is located near the entry to the site in the north east, and comprises a site office with amenities, workshop and weighbridge.

3.2 Site Operations

Boral previously quarried sand in the central area of Lot 1 (formerly Part Portion 3), to the east of Nelson Bay Road. This extraction commenced in 1996 and was exhausted in 2007 with the consent lapsing on 1 May 2009.

Following the completion of the original extraction area in Lot 1 in 2007, Boral commenced extraction of windblown sand in the 2006 development consent area, which continues today. The rehabilitation of the windblown extraction area will occur near the end of resource extraction.

The extraction methodology in the previous extraction area in Lot 1 and the current windblown sand area is identical. In this extraction methodology, sand is dry-screened in order to remove roots and minor naturally occurring coal fragments. Recycled roadbase from Boral's Kooragang Island recycling facility are imported to provide an inert stable base for haul roads and the floor of the operating extraction area. A front-end loader or excavator loads road trucks in-pit with screened raw sand for transport off-site via the weighbridge.

When an area of extraction is exhausted, topsoil and previously felled vegetation is re-spread over finished areas and the area is actively rehabilitated and managed. On average, three hectares of exhausted extraction area are rehabilitated annually and progress is monitored and reported annually.

As part of the current operations, Boral has previously funded maintenance of Coxs Lane through road levies, constructed entry and exit ramps onto Nelson Bay Road and established a depot and weighbridge on site.

Operating hours of the site are outlined in **Section 4.2.4**.

3.3 Employment

The quarry employs six full time staff as well as providing employment opportunities for numerous Boral and customer truck drivers and associated service personnel.

3.4 Planning Approval History

The following section presents the current licences and approvals that Boral currently hold to operate the Stockton Sand Quarry.

3.4.1 Development Consents

Stockton Sand Quarry has also been the subject of a number of more recent development consents and various licences as outlined in **Tables 1** and **2**.

Table 1: Planning approval history

Date of Development Consent	DA/MOD Number	Details
1 May 1996	DA No. 2010/94	Sand extraction on the vegetated dunes in the middle of the site above 5 m AHD and road transport up to 500,000 tonnes per annum for a period of 13 years. This development consent has now lapsed.
24 January 2006	DA No. 140-6-2005	A new extraction area on the un-vegetated windblown sand dunes (above 2.5 m AHD) adjoining the beach to the east. The annual extraction rate and transport remained the same as the original consent for a period of 20 years.
6 March 2006	Modification to DA No. 2010/94	Modification to the original 1996 development consent was approved by Port Stephens Council. The modification amended certain administrative conditions of consent and imposed additional conditions regarding heavy vehicle movements and a restriction to extract no more than 500,000 tpa (inclusive of the DA 2010.94 and DA 140-6-2005 extraction areas).
10 May 2006	Modification to DA No. 140-6-2005 (Modification 1)	Modification to the 2006 development consent to remove reference to a portion of land incorrectly specified under the 2006 consent and permit extraction of windblown sand on Lots 1 and 2 DP1006399 and Lot 3 DP 664552.
June 2011	Modification to DA No. 140-6-2005 (Modification 2)	Modification to the 2006 development consent, including more appropriate

Date of Development Consent	DA/MOD Number	Details
		controls to manage interactions with the public in active extraction areas.

Table 2: Other licences

Description	Licence Number and Licence Authority	Comments
Crown Land Licence	LI 196915 NSW Department of Industry (Lands and Forestry)	Licence agreement for Crown land title (Lot 7300 DP1130730)
Surface Water Licence	20AL213136 NSW Department of Primary Industries (Water)	Boral received a Water Access Licence (WAL) in January 2015 with a zero share allocation for the Stockton Groundwater Source under the Water Sharing Plan for the *North Coast Coastal Sands Groundwater Sources 2016*. The WAL permits extraction of groundwater, however as the WAL has a zero share component and all existing allocations within the source are exhausted, Boral is not yet able to extract from the aquifer. Boral intends to retain this WAL whilst it investigates water access options for the site.
Bore Licence	20BL171772 NSW Department of Primary Industries (Water)	Ten monitoring bore licences issued on 4 March 2008 in perpetuity.

3.5 Environmental Protection Licence (EPL)

Boral is the licensee of EPL 10132 for the scheduled activity of 'extractive activities'. The EPL permits the extraction, storage and processing of between 100,000 and 500,000 tonnes of material per annum.

3.6 Environmental Management

Environmental management and monitoring at the site is undertaken in accordance with the following documents, previously prepared and approved in accordance with DA 140-6-2005:

- Environmental Management Strategy (ERM 2007).
- Erosion and Sediment Management Plan.
- Groundwater Monitoring Program (ERM 2008).
- Rehabilitation and Landscape Management Plan.

Boral submitted updated management plans in March 2016. The updated management plans were revised to reflect the ongoing operating conditions for the site.

Boral currently monitor groundwater quality at the site in accordance with the Groundwater Monitoring Program which was developed as a requirement of the development consent.

4 THE PROPOSED PROJECT

4.1 Need, Justification and Alternatives

4.1.1 Need and Justification

Boral is a leading producer and supplier of building and construction materials in the country. Accordingly, a significant amount of development in NSW, including many of Sydney's best known structures, are underpinned by Boral-supplied concrete, cement, asphalt and construction materials such as natural sand.

With the significant increase in approved infrastructure projects in Sydney and other parts of NSW, the leading suppliers of natural sand are under pressure to meet this increased demand as natural sand has unique structural characteristics to manufactured sand and is essential to meet design specifications on many infrastructure and associated development projects.

As Stockton Sand Quarry is one of Boral's few remaining natural sand quarries, Boral propose to meet part of this increased demand in natural sand by extracting the remaining sand from the same quarry pit approved under the 1996 development consent.

The expanded operations at Stockton Sand Quarry will provide:

- supply of essential natural sand to major infrastructure and associated development projects;
- continued employment of six full time employees and truck/transportation drivers, with further jobs created through flow-on effects;
- optimal use of a regionally-significant resource; and
- economic benefits to the local community through the purchase of goods and services and local expenditure both directly and indirectly through employee wages.

Boral's operations provide substantial economic benefits at Federal, State and local levels while being committed to maintaining a good working relationship with the local community and implementing best practice environmental management across the site.

4.1.2 Project Alternatives

Do Nothing

If the proposed extraction of additional sand is not approved, the quarry will cease to operate in 2025, and possibly earlier due to current extraction rates. This would result in loss of employment, reduced revenue to local service providers, sterilisation of a valuable resource and shortages of raw materials for essential NSW infrastructure and associated development projects.

Alternative Locations

As outlined earlier Stockton Sand Quarry is one of Boral's few remaining natural sand quarries. With the significant increase in demand for natural sand, all of Boral's natural sand quarries are operating at full capacity.

As Boral's Stockton Sand Quarry has a substantial remaining natural sand resource and is relatively close to Boral's existing Hunter and Sydney supply contracts, it is an ideal site to meet current and predicted future market demand for natural sand.

4.2 Project Description

4.2.1 Sand Extraction and Additional Site Infrastructure

Sand from the centre of Lot 1 (formerly Part Portion 3), to the east of Nelson Bay Road was only extracted to 5 m AHD under the original 1996 development consent. The sand resource above 5 m AHD was exhausted in 2007 and the original 1996 development consent has now lapsed. Significant sand resource remains below 5 m AHD.

Boral is seeking SSD approval to dredge an estimated 8 million tonnes of sand at a rate of up to 500,000 tonnes per annum from the former extraction area. Until such time that the 2006 windblown sand consent lapses, the two development consents would run in parallel to reach the maximum extraction and processing quantity of up to 750,000 tonnes per annum. Additionally, in order to reduce resultant heavy vehicle movements on local roadways, Boral is proposing to limit the total exportation of sand product via road transportation to 750,000 tonnes per annum until the 2006 windblown sand development consent lapses.

Mobile plant and equipment utilised at the site would be operated across both development consents. Upon dispatch from the site, Boral would implement a docket system at the weighbridge to monitor outgoing product and assign to a development consent. This would ensure that the extraction output of both consents is monitored for compliance.

Following expiry of the 2006 development consent in 2025, the SSD approval would be the sole development consent for the site, permitting extraction, processing and transportation of up to 500,000 tonnes per annum. To account for market fluctuations in demand, Boral are seeking a development consent period of 25 years for the SSD approval.

Sand extraction will involve clearing and grubbing of established vegetation from previous rehabilitation and possible sieving of accumulated leaf litter and organic matter. Cleared vegetation will either be mulched or stockpiled on-site for later reuse in rehabilitation. The sand will be extracted by excavator above and below the shallow aquifer (approximately 0.5 m deep) within its reach. The excavated sand will then be dry or wet screened at the extraction face.

A pond would be created and will be made large enough to float a dredge and accommodate fresh water pumping for the proposed wash plant.

As the dredge pond is expanded, two other smaller ponds will be formed. Portions of the dredge pond will be sectioned off as designated fresh water and fines ponds, or new fresh water and fines ponds will be dug by excavator.

The dredge will then progressively extract sand in a south westerly direction away from the site office in a staged process. Extraction will then move to the east and culminate with removal of the proposed processing and stockpile area.

Sand will be extracted to a maximum depth of approximately 15 m below the water table.

4.2.2 Processing

Sand extracted by excavator will be dry or wet screened near the extraction face for immediate sale, or transported to the stockpile area.

A wash plant and stockpile area will be established in the eastern section of the site.

The sand/water pumped from the dredge will pass over an initial screen to separate oversize organic matter or debris and into a large wash tank to float out any fines (<75 um). After washing, the sand will be pumped through a cyclone and stockpiled for further dewatering.

The proposed stockpile area for the Project would encompass four stockpiles, each with dimensions of approximately 50 m long, 25 m wide and 4 m high. The total size of the stockpile area would allow for a maximum of 32,000 tonnes of sand product.

Dewatered sand will then be loaded with a front end loader into trucks for dispatch.

4.2.3 Importation of Fill

Boral propose to import up to 60,000 tonnes of clay based Virgin Excavated Natural Material (VENM) by road.

The fill is required to stabilise the edges of the pond and the upper portions of the natural batters that form underwater, to allow safe access for vehicles, plant and equipment around the ponds perimeter.

4.2.4 Transport

The Project will transport an additional 500,000 tonnes of sand per annum both north and south along Nelson Bay Road and beyond (refer to **Section 12.1** for transportation routes). The majority of trucks will be truck and dog combination, with an average of 28 tonnes, and a maximum of 34 tonnes.

The combined existing windblown sand extraction and the proposed sand dredging operation would extract and transport via road up to 750,000 tonnes of sand product per annum. Boral would limit the total exportation of sand product via road transportation to 750,000 tonnes of sand per annum until the 2006 windblown sand development consent lapses.

The approved rate of transport for the 2006 windblown sand development consent is 152 heavy vehicle movements per day of operation. In order to estimate the potential rate of heavy vehicle movements associated with a rate of 750,000 tonnes per annum, this rate has been applied via linear growth to reach an estimated 228 heavy vehicle movements per day.

It should be noted that the above estimate is indicative only and the rate of transport associated with the Project operating in unison with the 2006 windblown sand consent would be formulated as Project planning progresses. As such, this estimated figure is subject to change. All heavy vehicle movements would be assessed by the traffic and transport assessment proposed as part of the EIS to determine potential cumulative impacts on the local and regional road network.

4.2.5 Hours of Operation

The Project will continue to operate in accordance with the following approved hours of operation in the 2006 development consent:

- Monday to Friday – 6:15am to 5:00pm;
- Saturday – 6:15am to 12 noon; and
- No operation on Sundays or Public Holidays.

The site is also approved to operate extended hours during major supply contracts as follows:

- Monday to Friday – 6:15am to 6:00pm;
- Saturday – 6:15am to 3:00pm; and
- No operation on Sundays or Public Holidays.

4.2.6 Rehabilitation

The final land use will be determined by the detailed extraction and rehabilitation planning process to inform the EIS. The dredge pond could either be left as a freshwater lake and provide habitat for local fauna, backfilled partially with clay based VENM to stabilise pit edges and submerged batters or backfilled completely to support potential future residential development, or to reinstate local native vegetation communities. It should be noted that backfilling would be contingent on the available supply of VENM and the financial viability of transporting it to the site.

Boral has been successful at backfilling and rehabilitating dredge ponds with VENM at its Dunmore Lakes Sand Project on the NSW south coast. This experience and knowledge will be used in planning final rehabilitation options for the Project.

4.3 Project Site and Study Area

The Project site has been subject to previous disturbance associated with ongoing quarrying. The nature of disturbance associated with the Project will include tree clearing, installation of site infrastructure, access roads, excavation and dredging operations.

The Project site (identified as 'proposed extraction area' in **Figure 4**) is the same disturbance footprint as the quarry pit approved under the 1996 development consent and extends over Lot 1 DP 1006399 and partially into Lot 3 DP664552.

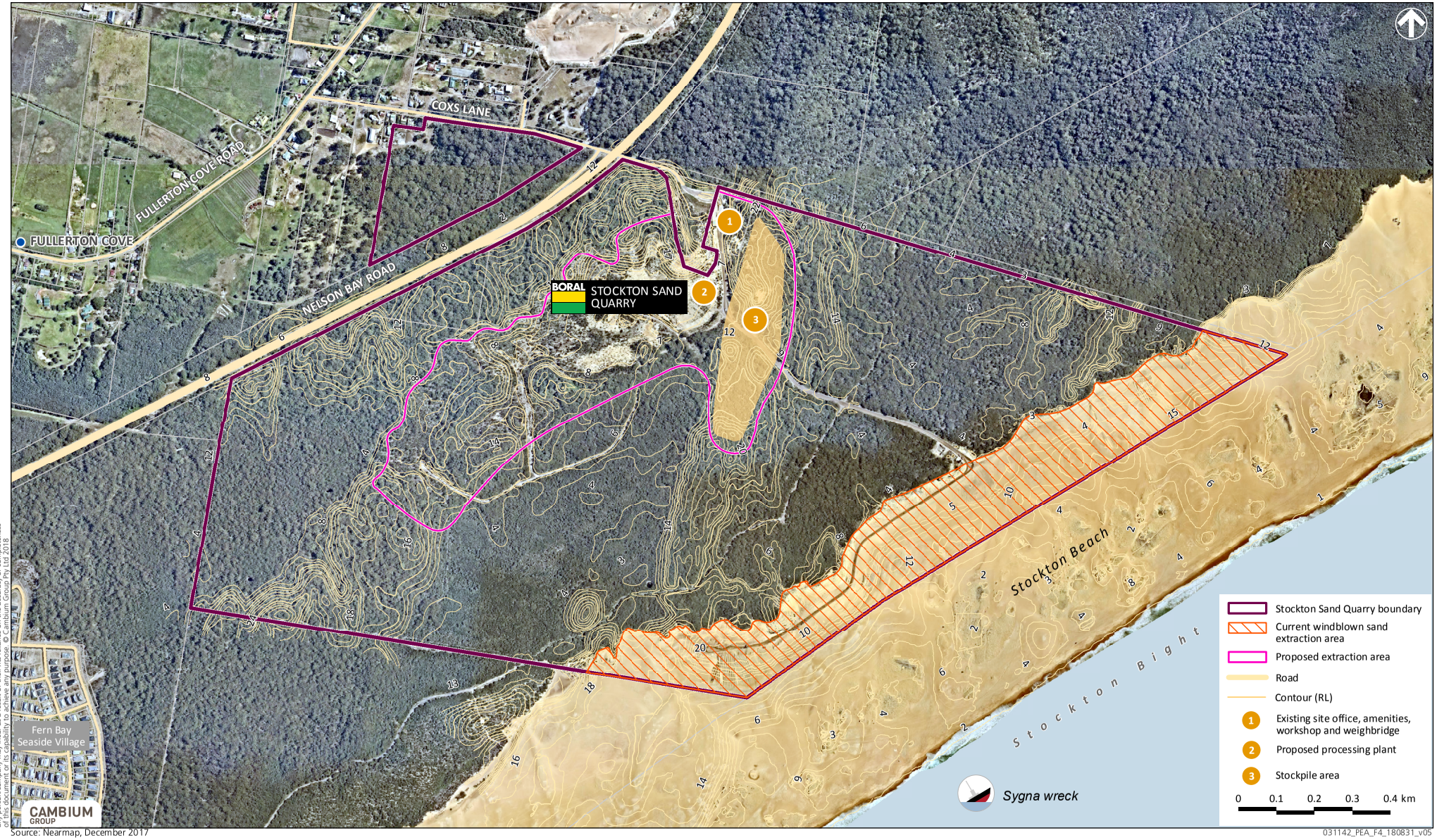
The Project site covers an area of approximately 37 hectares.

The Project site was previously assessed in the *Environmental Impact Statement, For a Sand Extraction Operation on Boral Resources Freehold Property at Fern Bay, Near Newcastle NSW* (ERM Resource Planning Pty Ltd, November 1994). This EIS supported the development consent granted by Port Stephens Council in 1996.

The Project site has been adopted as the 'study area' for all technical investigations outlined in **Sections 8** to **21**, that will inform the EIS. Therefore, these two terms are synonymous.

Figure 4
The Project

STOCKTON SAND QUARRY DREDGING
PRELIMINARY ENVIRONMENTAL ASSESSMENT



Source: Nearmap, December 2017

5 STAKEHOLDER ENGAGEMENT

Successful completion of the EIS will require consultation with a number of key stakeholders including the local community.

Stakeholder and community engagement will commence prior to and during the preparation of the EIS, to ensure that all potential issues are identified and considered in:

- the assessment of the Project;
- defining the Project, including the extent of the extraction area and other proposed infrastructure upgrades; and
- developing appropriate safeguards and environmental management measures.

5.1 Stakeholders

Boral plans to consult with all relevant stakeholders including (but not limited to) the following:

- NSW Department of Planning and Environment;
- Port Stephens Council;
- Transport for NSW (including Centre for Transport Planning, Roads and Maritime Services);
- NSW Office of Environment and Heritage (OEH), inclusive of the National Parks and Wildlife Service (NPWS);
- NSW Environment Protection Authority (EPA);
- NSW Department of Primary Industries (Fisheries, Land and Natural Resources and Agriculture);
- NSW Department of Industry (Water);
- NSW Department of Industry (Crown land in NSW);
- WaterNSW;
- Hunter Water;
- Worimi Local Aboriginal Land Council;
- Fern Bay and Fullerton Cove residents;
- Local Members of Parliament;
- Williamtown and surrounds residents action group;
- Stockton Bight Beach tourism operators; and
- local businesses.

Different methods of consultation will be adopted and will depend on the stakeholder, their level of interest in the Project and the level of impact to the key environmental issues that they have an interest in. Consultation methods will include:

- drafting letters to notify stakeholders of the Project and to identify any particular issues that they require to be considered in the preparation of the EIS. This will only be undertaken for those stakeholders that DP&E decide not to consult with during the preparation of SEARs;
- meetings with key Government agencies during the EIS process that would have a particular interest in or who have raised particular concerns about the Project;

- meeting with DP&E at the time of lodgement of the PEA either as part of a Planning Focus Meeting (if required) or independently, to discuss the Project, the key issues identified for consideration in the EIS process and the proposed consultation strategy;
- meetings with DP&E along with other key Government Agencies during the EIS process to discuss key issues; and
- meeting with DP&E at the time of lodgement of the EIS for adequacy to discuss the outcomes of the environmental assessment and consultation process, residual environmental impacts and environmental controls that are proposed to mitigate these impacts.

Where additional stakeholders become apparent during the preparation of the EIS, appropriate consultation will be undertaken.

5.2 Community

Boral has commenced consultation with members of the community in the vicinity of the site and that have the potential to be affected by the Project.

Boral has developed a comprehensive community engagement strategy which will be further implemented throughout the environmental assessment process. The focus of the engagement program is to keep the community informed and identify any relevant concerns the community may have about the Project, ensure these concerns are appropriately considered by the Project team and, where necessary, address these through changes or refinements to the Project.

The findings from the stakeholder and community consultation process will be presented in a separate chapter of the EIS. This will record consultation undertaken, issues identified and how these were addressed in the EIS.

The DP&E have recently released the *Social Impact Assessment Guideline for State significant mining, petroleum production and extractive industry development* (DP&E, September 2017). The social impact assessment (SIA) process will involve a thorough engagement of key community stakeholders who have the potential to be directly or indirectly impacted by the Project (refer to **Chapter 14** for details on scoping the SIA). A summary of community consultation undertaken to date as part of the SIA process is also provided in **Chapter 14**.

6 LEGISLATIVE PLANNING CONSIDERATIONS

Boral is seeking a SSD approval under Part 4 of the EP&A Act.

The following section identifies the applicable local and regional planning instruments, the relevant State and Commonwealth environment and planning legislation, and discusses the relevant planning approval process applicable to the Project.

6.1 Commonwealth Legislation

6.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary environmental legislation at the Federal level. The EPBC Act is administered by the Commonwealth Department of the Environment and Energy (DoEE), and provides a legal framework to protect and manage national and international important flora, fauna, ecological communities and heritage places, defined under the EPBC Act as matters of national environmental significance (MNES). The EPBC Act also confers jurisdiction over actions that have a significant impact on the environment where the actions affect, or are taken on, Commonwealth land.

An action that has, will have or is likely to have a significant impact on a matter of National Environmental Significance or Commonwealth land may not be undertaken without prior approval from the Commonwealth Minister, as provided under Part 9 of the EPBC Act.

The Protected Matters Search Tool is managed by DoEE and is used to identify MNES within the proximity of a project. A search was undertaken in May 2018 to determine the protected matters records listed under the EPBC Act within a 10 km radius of the Project site. Results of this search are presented in **Table 3**. This data, combined with local knowledge and records and further technical studies where relevant, will be used to assess whether the Project will have, or is likely to have, a significant impact upon a MNES or on Commonwealth land.

Table 3*:* Matters of National Environment Significance considered in the EPBC Act

Matters of National Environmental Significance	Commentary
World heritage properties	There are no World Heritage properties in the vicinity of the Project.
National heritage places	There are no National Heritage properties in the vicinity of the Project.
Wetlands of international importance (listed under the Ramsar Convention)	The Hunter Estuary wetlands are within 10 km of the Project. The Hunter Estuary wetlands are divided into two components, Kooragang and the Hunter Wetlands Centre. The Kooragang component includes wetlands at Kooragang Island and Fullerton Cove. Fullerton Cove wetlands are located approximately 2.2 km west of the Project site. The Project is unlikely to result in significant impacts upon the Fullerton Cove wetlands as the sand dredging process removes very little water from the aquifer.

Matters of National Environmental Significance	Commentary
	Potential impacts of the Project on the wetlands will be considered in the environmental assessment process.
Listed threatened species and ecological communities	There are 4 threatened ecological communities which have been recorded within the search area, namely: ▪ Central Hunter Valley Eucalypt Forest and Woodland (Critically Endangered); ▪ Coastal Swamp Oak Forest of NSW and South East Queensland (Endangered); ▪ Lowland Rainforest of Subtropical Australia (Critically Endangered); and ▪ Subtropical and Temperate Coastal Saltmarsh (Vulnerable Ecological Community). A total of 72 threatened species have been previously recorded within 10 km of the site. The above threatened ecological communities as defined by the EPBC Act have not been identified at the site as part of previous ecological surveys, or during ecological surveys already conducted for the purposes of the EIS for the Project.
Migratory species protected under international agreements	A total of 74 migratory species have been previously recorded within 10 km of the site. Potential impacts of the Project on these listed migratory species will be considered in the environmental assessment process.
Commonwealth marine area	There are no Commonwealth marine areas in the vicinity of the Project.
The Great Barrier Reef Marine Park	The Great Barrier Reef Marine Park is not in the vicinity of the Project.
Nuclear actions (including uranium)	There are no nuclear actions within the vicinity of the Project.
A water resource, in relation to coal seam gas development and large coal mining development	This is not applicable to the Project.

6.1.2 Native Title Act 1993

The *Native Title Act 1993* recognises that Aboriginal people have rights and interests to land and waters which derive from their traditional laws and customs. Native title may be recognised in places where Indigenous people continue to follow their traditional laws and customs and have maintained a link with their traditional country. It can be negotiated through a Native Title Claim, an Indigenous Land Use Agreement or future act agreements.

The National Native Title Register, Register of Native Title Claims, Unregistered Claimant Applications register, and Register of Indigenous Land Use Agreements were searched in May 2018 for reported native title claimants in the LGA. There were no results for declared native title in the LGA.

6.1.3 National Greenhouse and Energy Reporting Act 2007

The *National Greenhouse and Energy Reporting Act 2007* provides a single national framework for the reporting and dissemination of information about the greenhouse gas emissions, greenhouse gas projects, and energy use and production of corporations. It makes registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds.

Boral triggers the threshold for reporting under the NGER Act, and reports energy use and greenhouse gas emissions from its operations, including the Stockton Sand Quarry.

6.2 New South Wales State Legislation

Environmental planning instruments (EPIs) such as State Environmental Planning Policies (SEPPs), Regional Environmental Plans (REPs) and Local Environmental Plans (LEPs) are legal documents that regulate land use and establish requirements for development consent in NSW.

6.2.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The EP&A Act is the principal legislation overseeing the assessment and determination of development proposals in NSW. It aims to encourage the proper management, development and conservation of resources, environmental protection and ecologically sustainable development.

Implementation of the EP&A Act is the responsibility of the Minister for Planning, statutory authorities and local councils. It contains the following parts that impose requirements for planning approval:

- Part 4 which provides for control of 'development' that requires development consent from the relevant consent authority. Division 4.7 of Part 4 provides for control of SSD where the Minister for Planning (or delegate) is the consent authority;
- Division 5.1 of Part 5 which provides for control of 'activities' that do not require approval or development consent under Part 4; and
- Division 5.2 of Part 5 which provides for control of State Significance Infrastructure that does not require approval or development consent under Part 4.

Section 4.36 (2) of the EP&A Act states that:

> *A State environmental planning policy may declare any development, or any class or description of development, to be State significant development.*

Projects are classified as SSD if they are declared to be such by the SEPP (State and Regional Development) 2011 (SRD SEPP).

Clause 7 of Schedule 1 of the SRD SEPP declares the following development to be SSD:

> *"development for the purpose of extractive industry that extracts more than 500,000 tonnes of extractive materials per year"*; and
>
> *"development for the purpose of extractive industry that extracts from a total resource (the subject of the development application) of more than 5 million tonnes"*.

Although the Project would involve sand extraction at a rate of no more than 500,000 tonnes per annum, extraction would be from a natural sand resource estimated at 8 million tonnes. Therefore, the Project is SSD and Part 4 of the EP&A Act is the appropriate assessment pathway.

Under Section 4.36 of the EP&A Act, the Minister for Planning is the consent authority for SSD. However, it should be noted that pursuant to Section 2.9 of the EP&A Act, the Minister may delegate the consent authority function to the Independent Planning Commission.

Boral is required to submit a development application and supporting documentation to the DP&E. This PEA will be used to brief relevant government agencies about the Project and assist the DP&E to determine the SEARs.

6.2.2 Other Key NSW State Legislation

In addition to the requirements under Part 4 of the EP&A Act, the Project will require additional approvals, licences and/or authorisation under various other pieces of NSW legislation. **Table 4** summarises the key pieces of NSW legislation, potentially relevant to the Project.

Table 4: Summary of NSW Legislation

Legislation	Overview
NSW Protection of the Environment Operations Act 1997 (POEO Act)	The Act aims to protect, restore and enhance the quality of the environment in the context of ecologically sustainable development and to reduce risks to human health and prevent degradation of the environment. Section 48 of the Act outlines that an environment protection licence (EPL) (separate approval) is required for any scheduled activities to be undertaken at a premise at which Schedule 1 of the Act indicates that a licence is required. Environment Protection Licence (EPL) 10132 applies to existing operations at the quarry. The need for a new licence or variation to the existing EPL as a result of the Project would be discussed with the EPA during consultation for the EIS.
NSW Crown Lands Act 1989	The Crown Lands Act provides for the administration and management of Crown land in the eastern and central divisions of NSW. Crown land may not be occupied, used, sold, leased, dedicated, reserved, or otherwise dealt with unless authorised by this Act or the Crown Land (Continued Tenured) Act 1989. The Project site occupies a portion of Crown land which is currently managed by Boral under a licence agreement with NSW Department of Industry (Crown land in NSW). The Project would not alter the existing licence agreement, nor introduce additional activities on the parcel of Crown land.
NSW Water Management Act 2000 (WM Act)	The WM Act is intended to ensure that water resources are conserved and properly managed for sustainable use benefitting both present and future generations. Water sharing plans prepared in accordance with the WM Act include rules for protecting the environment and administrating water licencing and trading. Under Section 4.41 of the EP&A Act, SSD does not require a water use approval under Section 89, a water management work approval under Section 90, or an activity approval (other than an aquifer interference approval) under Section 91 of the WM Act. The NSW Aquifer Interference Policy (AIP), published by the NSW Office of Water in 2012, outlines the water licensing and assessment processes for aquifer interference activities under the *Water Management Act 2000* and

Legislation	Overview
	other relevant legislative frameworks. The Project will intercept an aquifer and consideration of the AIP would be required as part of the EIS.
NSW Water Act 1912	The *Water Act 1912* governs access, trading and allocation of licences associated with surface water and groundwater sources where a Water Sharing Plan is not in place. The Stockton Sandbeds and transgressive dune sands are the main aquifer at the site and comprise the Stockton Groundwater Source of the Water Sharing Plan for the North Coast Coastal Sands Groundwater Sources. As the site is subject to a Water Sharing Plan, it is unlikely that the *Water Act 1912* would be applicable to the Project.
NSW National Parks and Wildlife Act 1974 (NPW Act)	The NPW Act contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal heritage. The OEH administers the NPW Act. The NPW Act provides statutory protection for Aboriginal objects by making it illegal to move, damage, deface or destroy a relic without written permission from the OEH. Under Section 4.41 of the EP&A Act, SSD does not require an Aboriginal Heritage Impact Permit under Section 90 of the NP&W Act.
*NSW Biodiversity Conservation Act 20*16 (BC Act)	The BC Act provides protection for threatened plants and animals native to NSW excluding fish and marine vegetation) and integrates the conservation of threatened species into development control processes under the EP&A Act. No threatened ecological communities as defined by the BC Act (formerly *Threatened Species Conservation Act 1995)* and EPBC Act have been previously identified at the site. The entire Project area has previously been cleared of native vegetation for the 1996 dune consent, and subsequently rehabilitated. The Project requires the clearing of this rehabilitated vegetation. The rehabilitated vegetation community has the potential to contain threatened flora species or their habitat and suitable habitat for threatened fauna species. The Project therefore has the potential to impact on species, populations and communities listed under the BC Act.
NSW Heritage Act 1977	Historical archaeological relics, buildings, structures, archaeological deposits and features are protected under the *Heritage Act 1977*. The only listed heritage item located within 500 m of the Project is the 'Stockton Beach Dune System', which is heritage listed on the Port Stephens LEP. The curtilage of the heritage listing is adjacent to the north east and south east boundaries of the site. As the proposed extraction area will be located away from the Stockton beach dune system and on the same disturbance footprint as the quarry pit approved under the 1996 development consent, the Project would not impact upon this listing and is unlikely to impact on any other unknown historic heritage item.
NSW Roads Act 1993	Section 138 of the *Roads Act 1993* requires consent to be obtained prior to disturbing or undertaking work in, on or over a public road.

Legislation	Overview
	No upgrades will be required to the local road network to accommodate the Project and therefore a separate consent is not required under the Roads Act.
NSW Contaminated Lands Management Act 1997	This Act establishes a process for investigating, and where required remediating contaminated lands, that pose a risk to human health and the environment. A search of the EPA's Contaminated Land Record and List of Contaminated Sites notified to the EPA was undertaken in May 2018 for the Port Stephens LGA. No recorded contaminated sites within proximity to the Project were identified in the search. It is unlikely that contaminated soil exists within the Project site. Other than an unforeseen localised hydraulic oil leak from vehicles or machinery associated with the proposed sand extraction, the Project is unlikely to result in contaminating activities.
Hunter Water Act 1991 (HW Act)	The drinking water catchments of Hunter Water Corporation are located within the Port Stephens LGA. Under Section 51 of the HW Act, consent authorities, including the DP&E, are required to refer development applications that may significantly impact on water quality in the drinking water catchments to Hunter Water for comment. Following the introduction of the Hunter Water Regulation 2015, Hunter Water published the *Guidelines for developments in drinking water catchments* (Hunter Water, 2017) to provide guidance for development activities within the drinking water catchments and to consent authorities about matters of concern to Hunter Water regarding protection of drinking water quality. The Project site is not positioned within a drinking water catchment, however is located to the immediate south of the North Stockton Catchment Area. In accordance with the guidelines, development which warrants referral to Hunter Water under Section 51 of the HW Act include development which has potential to significantly alter groundwater tables, and extractive industries. Despite not being directly positioned within a drinking water catchment, as the Project involves dredging sand below groundwater adjacent to the North Stockton Catchment Area, Hunter Water will be consulted.
NSW Coastal Management Act 2016 (CM Act)	The objectives of the CM Act are to manage the coastal environment of NSW in a manner consistent with the principles of ecologically sustainable development for the social, cultural and economic well-being of the people of the State. The CM Act defines the coastal zone, comprising 4 coastal management areas: 1. coastal wetlands and littoral rainforests area 2. coastal vulnerability area 3. coastal environment area 4. coastal use area.

Legislation	Overview
	The CM Act establishes management objectives specific to each of these management areas, reflecting their different values to coastal communities. The CM Act is supported by the SEPP (Coastal Management) 2016, which maps coastal zones within NSW. A review of the SEPP mapping indicates the site is adjacent to a coastal environment area in Stockton Bight. As a result, the CM Act is not directly applicable to the site. However, considerations would be provided in the EIS for the potential to indirectly impact upon the management objectives of the adjacent coastal environment area.
NSW Waste Avoidance and Resource Recovery Act 2001 (WARRA)	The purpose of the WARRA is to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecological sustainable development. This Act provides for the making of policies and strategies to achieve these ends. This Act promotes a hierarchy of avoidance of unnecessary resource consumption; resource recovery (including reuse, reprocessing, recycling and energy recovery), and disposal (as a last resort). The EIS would examine strategies in which the Project could assist in achieving the actions and goals for the management of waste in accordance with this Act, including: ▪ purchasing recycled products where appropriate; ▪ developing and implementing waste management procedures to minimise the generation of waste and where unavoidable, re-use waste on-site; ▪ recycling as many wastes as practically possible through appropriate handling, separation, storage, and collection; and ▪ where waste cannot be re-used or recycled, transportation and disposal of waste off-site at an appropriately licensed facility.
Environmental Planning and Assessment Regulation 2000 (EP&A Regs)	Part 6 of the EP&A Regs provides greater detail than provided in the EP&A Act about the processing of development applications under Part 4 of the EP&A Act. SSD has special public notification requirements which are spelt out in the EP&A Regs. The EP&A Regs generally provide the operational framework consistent with requirements stated in the EP&A Act in respect of the making and assessment of development applications including SSD applications. Schedule 2 (Clause 6 and 7) of the EP&A Regs define general provisions of environmental impact statement requirements prepared under Section 4.12 (8) of the Act.

6.3 Environmental Planning Instruments

Environmental planning instruments (SEPPs, regional and local environmental plans) regulate land use and development and therefore are particularly relevant to any development proposed at the site.

6.3.1 State Environmental Planning Policies

SEPPs deal with issues significant to the State and people of NSW. They are made by the Governor on the recommendation of the Minister for Planning and may be exhibited in draft form for public comment before being gazetted as a legal document.

The SRD SEPP, which declares the Project as SSD has been discussed in **Section 6.2.1**.

The SEPPs relevant to the Project are summarised in **Table 5**.

Table 5: SEPPs relevant to the Project

SEPP	Overview
SEPP No. 33 – Hazardous and Offensive Development	SEPP No. 33 requires the consent authority to consider whether a proposal is a potentially hazardous industry or a potentially offensive industry. Whether SEPP 33 applies to the Project will be determined by applying the screening process specified in *Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines* (NSW Department of Planning, 2011).
SEPP No. 44 – Koala Habitat Protection	SEPP No. 44 restricts the granting of development consent for proposals on land identified as core koala habitat without preparation of a plan of management. Vegetation in the local area may constitute core koala habitat which must require consideration under the SEPP. Preliminary ecological surveys conducted at the Project site at the time of writing this PEA did not observe the presence of Koalas during the field surveys and did not indicate that the Project site provides “core koala habitat” as defined in SEPP 44.
SEPP No. 55 – Remediation of Land	SEPP No. 55 aims to provide a state-wide planning approach to the remediation of contaminated land and to reduce the risk of harm to human health and the environment by consideration of contaminated land as part of the planning process. Under SEPP No. 55 a consent authority must not consent to the carrying out of development on land unless it has considered potential contamination issues. A search of the EPA’s Contaminated Land Record and List of Contaminated Sites notified to the EPA was undertaken in May 2018 for the Port Stephens LGA. No recorded contaminated sites within proximity to the Project were identified in the search. It is unlikely that contaminated soil exists within the Project site. Other than an unforeseen localised hydraulic oil leak from vehicles or machinery associated with the proposed sand extraction, the Project is unlikely to result in contaminating activities.
SEPP (Mining Petroleum Production and Extractive Industries) 2007	This SEPP regulates the permissibility of mining, extractive industries and related development and specifies matters that must be considered in assessing extractive industry developments requiring consent under Part 4 of the EP&A Act. The SEPP outlines various activities that are permissible both

SEPP	Overview
	with and without development consent and defines developments that are prohibited, exempt or complying development. In accordance with Part 2 of the SEPP, the Project is not considered exempt or complying development under the SEPP and therefore requires consent in accordance with Clause 7. Accordingly, the Minister for Planning is the consent authority for the Project under Part 4 of the Act. Part 3 of the SEPP stipulates matters for consideration by the consent authority before determining an application for consent in respect of development for the purposes of extractive industry. Specifically, Clauses 12 to 17 (inclusive) require consideration to be given to the compatibility of projects with other surrounding land uses, including existing and potential extraction of minerals, natural resource management and environmental management, resource recovery, transportation and rehabilitation. The EIS would provide consideration of all matters stipulated in Part 3 of the SEPP.
SEPP (Infrastructure) 2007	The SEPP (Infrastructure) 2007 provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. This SEPP facilitates the development of State infrastructure, including telecommunication facilities, sewerage works and storm water management, and specified when development consent is (and is not required) for such development when carried out in certain zones. Under this SEPP, DP&E is required to formally forward development applications to the Roads and Maritime Services (RMS) for certain developments listed in Column 2 and 3 of Schedule 3 of the Policy and consider any representations made by the RMS. Traffic generating development is defined as 'industry' sized at 5000 m^2, with access to a classified road, or road that connects to a classified road. The total area of the Project site would exceed 5000 m^2 and the quarry connects to a classified road in the Nelson Bay Road. As such, the Project is considered traffic generating development under Schedule 3 of this SEPP and therefore requires referral to RMS. RMS would be consulted by DP&E during formation of the SEARs and would provide a response advising traffic considerations for the EIS.
SEPP (Coastal Management) 2018	The SEPP aims to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016*, including the management objectives for each coastal management area, by:

SEPP	Overview
	▪ managing development in the coastal zone and protecting the environmental assets of the coast, and ▪ establishing a framework for land use planning to guide decision-making in the coastal zone. A review of the SEPP mapping indicates the site is adjacent to a coastal environment area in Stockton Bight. As a result, the SEPP is not directly applicable to the site. However, considerations would be provided in the EIS for any indirect impacts upon the management objectives of the adjacent coastal environment area.

6.3.2 Port Stephens Local Environmental Plan

The Project is located within the Port Stephens LGA. Under the provisions of the Port Stephens Local Environmental Plan 2013 (Port Stephens LEP), the majority of the site is zoned RU2 – Rural Landscape. Extractive industries are permissible in this zone with consent. The portion of Crown land at the entrance to the site is zoned RE1 - Public Recreation, in which extractive industry is prohibited. No extractive activities are currently undertaken or are proposed on Crown land. Activities on Crown land are confined to an access roadway off Coxs Lane.

7 ENVIRONMENTAL RISK ASSESSMENT

A preliminary environmental risk analysis was undertaken to identify the key potential environmental factors or impacts associated with the Project, the results of which are outlined in **Section 7.1.2**. For those environmental factors that achieved a high or medium risk rating, further assessment is proposed, generally in the form of specialist technical investigations as detailed in **Sections 8 - 21**. For those environmental factors that achieved a low risk rating, no further specialist technical assessment is required as these non-key issues could largely be addressed using appropriate environmental safeguards and management measures.

7.1 Preliminary Environmental Risk Analysis

Evaluation of the construction and operating characteristics of development projects and the baseline environment assist in deriving important information on potential issues, and identifying further assessment needs. Where relevant, existing assessments and desktop based searches within the area, provide useful background information that aids the environmental risk process.

This environmental risk analysis has adopted an iterative evaluation process. This enables environmental risk issues to be incorporated into the Project design. The priority matrix illustrated in **Table 8** was the guiding tool in identifying priorities for this assessment. Each environmental factor is ranked between one and three based on the likelihood of occurrence and for the perceived consequence of effects if left unmanaged.

7.1.1 Risk Rating Assessment Criteria

The allocation of risk is based on the following considerations (see **Tables 6** and **7**).

Table 6: Allocation of risk based on likelihood of occurrence

Definition	Likelihood of Occurrence[1] Risk Rating
High probability of occurring	High
Potential to occur	Medium
Unlikely to occur	Low

[1] Likelihood of occurrence risk rating is based on current understanding of risks without further technical assessment and implementation of environmental controls/mitigation measures.

Table 7: Allocation of risk based on consequence of unmanaged effects

Definition	Consequence of Unmanaged Effects Risk Rating
Adverse environmental change; inter-regional implications; serious or long term cumulative impacts, offsets not readily available.	High
Moderate adverse environmental change; regional implications; modest or medium term cumulative impacts; offsets available	Medium
Minor environmental change; localised implications; imperceptible or short term cumulative impacts; offsets readily available.	Low

Table 8: Environmental Factors Priority Matrix

Likelihood of Occurrence	Consequence of Unmanaged Effects 3 High	2 Medium	1 Low
1 Low	4 (Medium)	3 (Low)	2 (Low)
2 Medium	5 (High)	4 (Medium)	3 (Low)
3 High	6 (High)	5 (High)	4 (Medium)

7.1.2 Risk Rating Analysis for the Project

A preliminary environmental risk analysis was undertaken, with rankings allocated to each environmental factor being based on the likelihood of occurrence and the perceived consequence of effects if left unmanaged. It does not consider the potential outcomes of specialist technical assessments and the application of mitigation measures to manage the environmental factor. In most cases, suitable mitigation measures are likely to minimise any potential impacts. Any residual risk remaining after the implementation of mitigation measures will be further considered and detailed in the EIS.

The information provided in **Table 9** provides a summary of the environmental factors considered in this PEA and their associated risk ratings.

Table 9: Risk Rating for Environmental Factors

Environmental Factor	Risk Rating	Comments
Groundwater	High	Extraction under the 1996 development consent was limited to above 5 m AHD, which is also above the water table. The Project proposes to extract from the same disturbance footprint as the 1996 development consent but to a depth of 15 m below the current ground level (to -10 m AHD). The Project will intercept groundwater and will require sand to be predominantly extracted by dredging. Therefore, the Project has the potential to impact on groundwater volume, hydraulic gradients and quality.
Biodiversity	High	The Project requires the clearing of native vegetation which was established through rehabilitation of the previous extraction area approved under the 1996 development consent. The regenerating vegetation community has the potential to contain threatened flora species and present suitable habitat for threatened fauna species. The regenerating native vegetation may also meet the classification as an Endangered Ecological Community and may require biodiversity offsetting.
Air Quality	Medium	The Project, combined with air emissions from the existing windblown sand extraction activities and other extractive industries and agricultural uses in the area has the potential to result in cumulative air quality impacts at sensitive receivers. As the Project is largely a wet process, involving the dredging of sand, dust emissions from the Project are not predicted to be significant.

Environmental Factor	Risk Rating	Comments
Noise	Medium	The Project, combined with noise emissions from the existing windblown sand extraction activities, other extractive industries in the area and road traffic from Nelson Bay Road has the potential to result in cumulative noise impacts at sensitive receivers. However, due to the distance to the nearest sensitive residential receivers (480 m), and Nelson Bay Road traffic being the dominant noise in the local area, noise emissions from the Project are not predicted to be significant.
Traffic and Transport	Medium	The Project will transport up to an additional 500,000 tonnes per annum both north and south along Nelson Bay Road. The Project will result in a possible 50% increase in heavy vehicle traffic from the site and once approved, there will be a total of 750,000 tonnes per annum of sand extracted and transported off site under two development consents. Therefore, the Project has the potential to impact on the capacity of Nelson Bay Road, other main heavy vehicle transport routes and associated intersections.

Environmental Factor	Risk Rating	Comments
Social	Medium	A SIA is required to be undertaken for all State significant extractive industry projects where the SEARs are issued after the date of publication of the *Social Impact Assessment Guideline for State significant mining, petroleum production and extractive industry development* (DP&E, September 2017) (the SIA guideline). Accordingly, an SIA will be undertaken for the Project as part of the EIS. A SIA scoping exercise has been conducted (refer to **Chapter 14**) which identified the matters that require further social impact assessment in the SIA. A summary of these matters is provided in **Table 11**.
Soils and Rehabilitation	Medium	The Project site is partially positioned within an area with mapped risk of Acid Sulfate Soils (ASS). As the proposed dredging activities would operate below the water table and potentially expose sandy soils to oxygen, assessment of potential ASS constraints at the site would be required. Rehabilitation of the area of disturbance associated with the Project and stabilisation of the edge of the dredge pond are matters requiring consideration in the EIS to address potential long-term land stability, safety, air quality and biodiversity impacts.

Environmental Factor	Risk Rating	Comments
Aboriginal Heritage	Medium	The area of proposed disturbance associated with the Project has been subject to previous surface disturbance and extraction of sand material. A search was undertaken of the Aboriginal Heritage Information Management System (AHIMS) on 28 May 2018 to determine whether any known Aboriginal sites are registered on or within 200 m of the Project site. No Aboriginal sites were identified within the search area. Although historic studies suggest that there is a low likelihood of Aboriginal heritage items being encountered by the Project, further consideration will be given in the EIS on the potential for Aboriginal heritage items to be encountered above and below the current ground level).
Visual	Low	The proposed extraction area will not be visible from Nelson Bay Road or surrounding residential areas. The only likely viewpoint will be along Stockton Bight beach. Users of this section of the beach have become used to extraction related activities with the windblown extraction activities that have been undertaken over the past 10 years.

Environmental Factor	Risk Rating	Comments
Surface Water	Low	Dredging associated with the Project would occur in sands that are extremely porous. Therefore, any rainfall that lands in the pit will not result in overflows from the pit due to the downward pressure gradient resulting in an equilibrium being maintained. The processing area will be located on porous sands within the extraction area footprint, and all process water will only contain natural fines and organics that occurs in the dredged sands. Process water will either percolate back through the porous sands or will drain back into the dredge pit preventing off site surface water runoff. Therefore, the Project is unlikely to result in negative surface water impacts.
Historic Heritage	Low	The Project would not result in impact to a registered heritage item/place afforded protection under the *Heritage Act 1977*. The area of proposed disturbance associated with the Project has been subject to previous surface disturbance and extraction of sand material. Therefore, the Project is unlikely to disturb items of historic heritage value.

Environmental Factor	Risk Rating	Comments
Land Contamination	Low	A search of the EPA's Contaminated Land Record and List of Contaminated Sites notified to the EPA was undertaken in May 2018 for the Port Stephens LGA. No recorded contaminated sites within proximity to the Project were identified in the search. Historic excavation in the Project site did not involve contaminating activities or incidents, and the secure nature of the site has ensured that there has been no dumping or disposal of hazardous materials. It is unlikely that contaminated soil exists within the Project site. Other than an unforeseen localised hydraulic oil leak from vehicles or machinery associated with the proposed sand extraction, the Project is unlikely to result in contaminating activities.
Waste Management and Minimisation	Low	The Project would likely generate a minor increase in volumes of waste currently produced at the site. It is not envisaged that the Project would result in the introduction of new waste streams. Opportunities for the reduction, reuse and recycling of waste will be further explored through the Project planning.
Hazards and Risk	Low	The position of the Project site and current quarry operations present several hazards and risks, including bushfire and storage and management of hazardous substances and dangerous goods. If not managed appropriately, these hazards and risks have the potential to result in adverse impacts to public safety, health and the environment.

8 GROUNDWATER

8.1 Existing Environment

A summary of groundwater resources within the vicinity of the Project is outlined in **Section 2.5**.

A review of the Groundwater Dependent Ecosystems (GDE) Atlas was undertaken in May 2018 and did not identify any aquatic GDE within the immediate proximity of the Project site.

Recent communications to the local and regional community from the EPA and local media stories have highlighted the groundwater contamination concerns associated with the Williamstown RAAF base's use of firefighting foams containing per- and poly-fluoroalkyl (PFAS) chemicals. This concern has been considered in framing the existing local groundwater environment.

8.2 Potential Impacts

The site is situated in an area hydrologically connected with the shallow Stockton Sandbeds and deep regional Tomago Sandbeds aquifer. The two key risks associated with the Project include:

- localised impact to groundwater volume or quality from dredging activities; and
- changes to groundwater hydraulic gradients that could influence the migration of regional groundwater contamination.

8.3 Further Assessment

Although a groundwater impact assessment has not been previously carried out at the site, a significant amount of groundwater monitoring has been undertaken and hydrogeological assessment and monitoring has also been performed across the wider Tomago Sandbeds aquifer to the west of the site, including:

- installation of seven additional groundwater bores intersecting both aquifers (two deep, two shallow and two paired), which complements an existing network of 11 bores across the Boral land holding;
- monthly monitoring of existing bores since 2008 and new bores since 2017 within the Boral holding; and
- groundwater modelling of the Tomago Sandbeds aquifer at the neighbouring Williamtown RAAF base since 2015.

A groundwater impact assessment would be undertaken for the Project using an analytical approach to characterise the existing environment, allow development of a water balance for the aquifer, and subsequent assessment of the potential impacts associated with the sand dredging under varying climatic conditions.

Characterisation of the existing environment involves a two-stage approach, including:

1. review of existing data for the shallow and deep aquifer from:
    - monthly monitoring data to assess changes in groundwater levels and chemistry over time, under varying climatic conditions;
    - hydrogeological works completed at the neighbouring Williamtown RAAF defence base; and
2. collection of site-specific data for the project area (chemical and physical) including:

- physical aquifer testing on installed bores to determine aquifer parameters;
- chemical testing for chemicals of concern known to impact the Tomago Sandbeds aquifer, such as perflurooctaine sulfonate (PFOS) and perflurooctanoic acid (PFOA) from firefighting foams; and
- installation of permanent groundwater pressure transducer loggers in select bores to assess groundwater level responses to climatic and tidal conditions.

Once the existing environment has been characterised, potential impacts associated with the Project can be assessed. These are likely to be associated with excavation of the sand resource to expose the aquifer to enhanced recharge and evaporative losses, which could result in changes to baseflow conditions and quality in the Fullerton Cove Catchment and other potential receptors (such as stock watering, irrigation and recreational water use).

9 BIODIVERSITY

9.1 Existing Environment

The following ecological assessments have been undertaken at or in close proximity to the site:

- *Fauna Impact Statement* (ERM Resource Planning, 1994);
- *Extension of Rutile and Zircon Mining 'Fullerton Project' Environmental Impact Statement for Mineral Deposits Limited* (Umwelt, 2000); and
- Annual rehabilitation and fauna monitoring undertaken by ERM between 1994 and 2005.

These assessments provide valuable background information on the Project site and surrounding areas in developing the scope of the biodiversity assessment for the Project.

9.1.1 Vegetation

The Project site was previously surveyed as part of the *Environmental Impact Statement, for a Sand Extraction Operation on Boral Resources Freehold Property at Fern Bay, Near Newcastle NSW* (ERM 1994) and *Stockton Sandpit Windblown Sand Extraction*, *Environmental Impact Statement* (ERM 2005) to validate existing vegetation mapping and identify threatened biodiversity. The vegetation surrounding the proposed extraction area, was found to be consistent with the *'Coastal sand apple-blackbutt'* vegetation community.

No threatened ecological communities as defined by the BC Act (formerly *Threatened Species Conservation Act 1995)* and EPBC Act have been previously identified at the site.

A review of the GDE Atlas was undertaken in May 2018 and identified a low to moderate risk that vegetation at the Project site could constitute a terrestrial GDE.

9.1.2 Threatened flora

The likelihood of threatened or significant flora occurring on the site was determined by the *Stockton Sandpit Windblown Sand Extraction*, *Environmental Impact Statement* (ERM 2005) which considered the type and condition of vegetation and habitats, and analysed database records. The results of other previous ecological investigations at the site were also used in determining the likelihood of occurrence of threatened flora.

A targeted search for the threatened orchids *Diuris arenaria* and *Diuris praecox* were conducted as part of ERM 2005. The survey coincided with the known flowering period of the orchids in the *'Coastal sand apple-blackbutt'* vegetation community. A total of 208 individual

Diuris praecox were recorded on the site, mostly along walking tracks and roads or in previously disturbed areas where there is reduced competition for light. Subsequent survey noted that the southern-most recorded *Diuris praecox* were not flowering at the time of inspection possibly due to increased shrub density and competition for light, while the most northerly recorded were still flowering.

All known occurrences of *Diuris praecox* are outside the Project disturbance footprint.

9.1.3 Threatened fauna

The endangered Eastern bentwing-bat (*Miniopterus schreibersii oceanensis*), Greater broad-nosed bat (*Scoteanax rueppellii*), Grey-headed flying-fox (*Pteropus poliocephalus*), Masked Owl (*Tyto novaehollandiae*) and Squirrel Glider (*Petaurus norfolcensis*) have been previously recorded at the quarry (ERM 2005).

Additionally, the Koala (*Phascolarctos cinereus*), Little bentwing-bat (*Miniopterus australis*), Yellow-bellied sheathtail-bat (*Saccolaimus flaviventris*), Hoary bat (*Chalinolobus nigrogriseus*), Eastern freetail-bat (*Mormopterus norfolkensis*), Greater broad-nosed bat, Grey-headed flying fox, Masked Owl, Squirrel Glider and Powerful Owl (*Ninox strenua*) are known to occur on an adjoining property (ERM 2005).

The White-bellied Sea-Eagle (*Haliaeetus leucogaster)* was also recorded during an ecological survey in 2004.

The above species are listed under the BC Act and some are listed under the EPBC Act.

9.2 Potential Impacts

The Project has the potential to impact on species, populations and communities listed under the BC Act and/or the EPBC Act.

The Project requires the clearing of native vegetation which was established through rehabilitation of the previous extraction area approved under the 1996 development consent. The regenerating vegetation community has the potential to contain threatened flora species or their habitat and suitable habitat for threatened fauna species. The regenerating native vegetation may also meet the classification of an Endangered Ecological Community (EEC) and may require biodiversity offsetting.

Potential key impacts to biodiversity as a result of the Project could include:

- habitat loss and associated impacts on threatened fauna, through vegetation clearance; and
- direct loss of threatened flora (including *Diuris arenaria* and *Diuris praecox*) and EECs.

Other potential biodiversity impacts that will be considered where relevant include fragmentation, edge effects and wildlife corridors.

9.3 Further Assessment

In order to fully understand the potential ecological impacts of the Project, a terrestrial biodiversity assessment will be undertaken in accordance with relevant legislation.

The terrestrial biodiversity assessment will be conducted in accordance with the Biodiversity Assessment Method (BAM) and involve:

- threatened species records and listings will be reviewed prior to field surveys via searches of State and Commonwealth databases;

- BioBanking survey requirements for threatened species would be obtained through use of BioBanking assessment tools to highlight the threatened biodiversity for targeted survey;
- a combination of targeted flora and fauna surveys, along with habitat based field assessments to identify threatened biodiversity and their habitats;
- mapping of survey locations, vegetation, key habitat features and any threatened species records;
- determining the extent of any identified Threatened Ecological Communities (TEC);
- identification of opportunities for impact avoidance and appropriate adaptive management actions to avoid significant impacts, as well as opportunities to enhance existing biodiversity values along the perimeter of the Project site;
- reporting on the findings of the survey, including methodology, and threatened species and/or their habitat recorded. The report will include formal Assessments of Significance under the BCA and/or EPBC Act for identified species; and
- a biodiversity offset strategy will be developed and reported on, taking into account the *NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014).

10 AIR QUALITY

10.1 Existing Environment

The existing air quality in the area immediately surrounding the site is influenced by prevailing meteorological conditions, traffic, topography, agricultural activities and the industrial land uses associated with Kooragang Island situated approximately 6 km south west of the site.

Wind patterns during summer and spring are characterised by light daytime breezes with stronger winds in the evening/night, predominantly from the south and south east, while winter and autumn winds tend to range from north east to south east during the day and significantly increase in speed during the evening and night (ERM 2005).

10.2 Potential Impacts

Dust emissions are usually a key community concern associated with quarries and extraction activities. The potential for any significant air quality impacts from the Project is low. The activity of dredging, pumping the sand to the processing area and processing sand would generate minimal dust due to the inherent moisture content of the material. However, dust emissions can still result from haul roads if driving surfaces are allowed to dry out. Therefore, as the Project will result in an additional 250,000 tonnes of sand beyond the existing consent transported from the site by truck, it has the potential to emit dust including respirable crystalline silica.

From a human health and nuisance perspective, particles are classified primarily by size, as TSP (total suspended particulates), PM_{10} (particulate matter with an aerodynamic diameter up to 10 µm) and $PM_{2.5}$ (particulate matter with an aerodynamic diameter up to 2.5 µm). Human health effects of dust tend to be associated with particles with an aerodynamic diameter of 10 µm or less (≤ PM_{10}). Emissions of TSP have the potential to result in nuisance impacts due to increased rates of dust deposition in the surrounding area.

Other potential pollutants that will be emitted as a result of the Project could include products of fuel combustion from the on-site vehicles and mobile/fixed equipment. Given the small scale of these emissions and the relative distances between the quarry and nearby sensitive receivers (closest resident approximately 480 m from the site), the Project would not be

expected to result in a significant increase in ambient concentrations of these pollutants at surrounding sensitive receivers.

10.3 Further Assessment

A quantitative air quality assessment will be undertaken through detailed analysis and assessment of air quality impacts, using air dispersion modelling. The air quality assessment would include the following key tasks:

- review of existing air quality monitoring data to characterise site meteorology and background dust levels and to determine criteria and potential constraints for the Project;
- characterise air quality in the regional air shed in regard to approved and foreseeable projects based on a review of publicly available information on surrounding operations;
- identification of the sources of air emissions from the Project and from neighbouring activities;
- develop an air dispersion model to determine the extent of predicted operational air quality impacts;
- conduct qualitative analysis and assessment of operational air quality, including reference to measured background levels which include the emissions from other activities; and
- description of existing and additional pollution control equipment and pollution control processes to be employed at the site to suppress or minimise emissions.

11 NOISE

11.1 Existing Environment

The site is surrounded by rural and environmental conservation land uses, which are generally characterised by low background noise levels. Noise sources in the local area include natural sources (waves, birdsong, insects and livestock), recreational activities along Stockton Bight and operations at the site itself.

Traffic noise along Nelson Bay Road is also a dominant influence upon background noise levels within the locality. Heavy vehicle movements are common along Nelson Bay Road.

11.2 Potential Impacts

The Project would be positioned in an area of the site that has not had extraction activities and associated noise emissions since the resource above 5 m AHD was exhausted in 2007. Furthermore, the doubling of heavy vehicle traffic from the site will generate additional road traffic noise. The Project will introduce additional noise sources from the site, potentially resulting in greater noise levels experienced at residences to the south and west of Nelson Bay Road.

11.3 Further Assessment

A quantitative noise assessment will be undertaken in accordance with the recognised standards and guidelines, including:

- NSW Noise Policy for Industry (EPA, 2017) (NPfI); and
- NSW Road Noise Policy (DECCW, 2011) (RNP).

The noise assessment would include the following key tasks:

- characterisation of background noise adjacent to the site through background noise monitoring as well as a review of any publicly available monitoring data;
- background noise monitoring will be undertaken to ascertain ambient noise levels in the vicinity of closest sensitive receivers. Background noise monitoring will involve the deployment of up to three unattended environmental noise loggers at three different representative locations in the vicinity of sensitive residential receivers that are located in proximity to the site such as Fullerton Cove to the west and Fern Bay to the south west. Noise loggers will be deployed to capture at least 7 days of "valid data" in line with the requirements of the NPfI. During the deployment of unattended loggers, operator-attended noise monitoring will be undertaken to determine existing industrial noise from nearby operations, as well as natural sounds and road noise sources from Nelson Bay Road and other major thoroughfares;
- a detailed assessment of prevailing weather conditions will be undertaken using historical weather data from the nearest BoM weather station over a minimum period of 12 months. The data will be analysed to derive the appropriate metrological parameters for the prediction of noise emissions under calm and noise enhancing weather conditions (i.e. wind and temperature inversions) in accordance with the NPfI;
- identification of noise-sensitive receivers surrounding the site;
- reliable Sound Power Level (SWL) data is essential for incorporation into a computer noise model of the site, approved project and proposed Project. SWLs for acoustically significant plant and equipment used during approved and proposed operations, would be sourced from the original EISs and suitable SWL databases, with appropriate corrections based on manufacturer's specifications and agreed practical noise mitigation treatments, as appropriate. Where required, these operational noise levels will be supplemented by near field measurements from the Boral's existing Stockton and Dunmore Lakes sand extraction operations;
- a site noise model (using Environmental Noise Model software or equivalent) would be developed to predict noise levels for day, evening and night periods and determine compliance with relevant noise criteria. The noise modelling and assessment process will involve:
  - developing operational noise modelling scenarios;
  - importing digital topographic data, including surrounding rural dwelling areas and detailed site development plans;
  - conducting predictive noise modelling in order to derive contributed noise emissions for calm and any prevailing noise enhancing weather conditions (i.e. wind and temperature inversions) in accordance with NPfI requirements;
  - predicting site intrusive noise levels for daytime, evening and night-time for the operating scenarios, to noise sensitive receiver locations located in the vicinity of the site;
  - producing noise contours for the operating scenarios to clearly indicate the impact of noise emissions from the Project; and
  - identifying appropriate noise mitigation measures for the site and inclusion in the impact assessment noise modelling.
- road transportation noise impacts would be evaluated in accordance with the RNP based on the existing traffic movements in the vicinity of the site, together with additional truck and employee's vehicle movements associated with the Project;
- reporting on:
  - noise modelling results;
  - existing and additional noise reduction equipment and noise emission control processes to be employed at the site to minimise or attenuate emissions; and

- description of how the Project noise trigger levels would be achieved, monitored and audited, and how corrective action would be taken when needed.

12 TRAFFIC AND TRANSPORT

12.1 Existing Environment

Access to the site is via Nelson Bay Road and Coxs Lane. Coxs Lane is a local roadway which terminates at the entrance to the quarry. Nelson Bay Road is a major arterial roadway which links the Newcastle CBD to Newcastle Airport, Nelson Bay and the wider Port Stephens area to the north.

Boral currently transports up to 500,000 tonnes per annum of sand products by road from the quarry to local and regional consumers.

Boral previously funded maintenance of Coxs Lane through road levies, constructed entry and exit ramps onto Nelson Bay Road and established a depot and weighbridge on site.

Boral currently uses the following truck routes:

1. **Newcastle supply contracts -** trucks exit the site and travel south along Nelson Bay Road towards Kooragang Island and Newcastle;
2. **Central Coast, Sydney and Hunter Valley supply contracts -** trucks exit the site and travel south along Nelson Bay Road to the intersection with Seaside Boulevard, where the trucks perform a U-turn at the roundabout before travelling north along Nelson Bay Road, west along Cabbage Tree Road and Tomago Road, and then left onto the Pacific Highway and M1 south towards Sydney via Hexham. Trucks may also proceed via the New England Highway to the Hunter Valley;
3. **North Coast supply contracts -** trucks exit the site and travel south along Nelson Bay Road to the intersection with Seaside Boulevard, where the trucks perform a U-turn at the roundabout before travelling north along Nelson Bay Road, and Medowie Road, and then right onto the Pacific Highway northbound;
4. **Port Stephens supply contracts -** on rare occasions, trucks exit the site and travel south along Nelson Bay Road to the intersection with Seaside Boulevard, where the trucks perform a U-turn at the roundabout before proceeding north and then east along Nelson Bay Road towards Port Stephens.

12.2 Potential Impacts

The Project will transport up to an additional 250,000 tonnes per annum both north and south along Nelson Bay Road and beyond via the same truck routes as existing operations. The majority of trucks will be truck and dog combination, with an average of 28 tonnes, and a maximum of up to 34 tonnes.

As a result, the Project will temporarily result in a 50% increase in heavy vehicle traffic from the site and once approved, there will be a total of 750,000 tonnes per annum of sand extracted and transported off site under two development consents until the windblown sand resource is exhausted or the existing windblown sand development consent expires in 2025.

The approved rate of transport for the 2006 windblown sand development consent is 152 heavy vehicle movements per day of operation. In order to estimate the potential rate of heavy vehicle movements associated with a rate of 750,000 tonnes per annum, this rate has been applied via linear growth to reach an estimated 228 heavy vehicle movements per day.

It should be noted that the above estimate is indicative only and the rate of transport associated with the Project operating in unison with the 2006 windblown sand consent would be formulated as Project planning progresses. As such, this estimated figure is subject to

change. All heavy vehicle movements would be assessed by the traffic and transport impact assessment proposed as part of the EIS to determine potential cumulative impacts on the local and regional road network.

12.3 Further Assessment

A traffic and transport impact assessment will be undertaken in accordance with the RMS *Guide to Traffic Generating Development* addressing the key heads of consideration with regard to traffic generation and impacts, transport issues, road safety, parking and internal circulation.

The traffic and transport impact assessment will involve:

- examination of the road network that services the site and the roads that form the transport routes including principal intersections;
- traffic volume and vehicle classification counts as well as intersection counts as required to establish base line traffic conditions;
- assessment of the existing road network used by the sand quarry trucks including road widths, intersection treatments, compliance with current standards, existing traffic volumes and vehicle classifications using the road network, road safety and identified deficiencies; and
- assessment of the traffic and transport impacts of the Project for the ongoing operation of the site including level of service on the road network, physical condition of the roads, road safety issues, the impact of the Project on the road network, potential cumulative impacts associated with any other approved projects in the area, and suggested mitigation measures including sections of road that require upgrading.

13 SOCIAL

The DP&E have recently released the SIA Guideline which considers social impacts to be a consequence experienced by people due to state significant mining, petroleum production, and extractive industry development.

Social impacts can involve changes to:

- way of life, including:
  - how people live, (e.g. how they get around, access to adequate housing);
  - how people work (e.g. access to adequate employment, working conditions and/or practices);
  - how people play (e.g. access to recreation activities); and
  - how people interact with one another on a daily basis;
- community, including its composition, cohesion, character, how it functions and sense of place;
- access to and use of infrastructure, services and facilities, whether provided by local, state, or federal governments, or by for-profit or not-for-profit organisations or volunteer groups;
- culture, including shared beliefs, customs, values and stories, and connections to land, places, and buildings (including Aboriginal culture and connection to country);
- health and wellbeing, including physical and mental health;

- surroundings, including access to and use of ecosystem services, public safety and security, access to and use of the natural and built environment, and its aesthetic value and/or amenity;
- personal and property rights, including whether their economic livelihoods are affected, and whether they experience personal disadvantage or have their civil liberties affected;
- decision-making systems, particularly the extent to which they can have a say in decisions that affect their lives, and have access to complaint, remedy and grievance mechanisms; and
- fears and aspirations related to one or a combination of the above, or about the future of their community.

Social impacts vary in their nature, and can be:

- positive (e.g. increased local and regional job opportunities) or negative (e.g. increased prevalence of certain physical health conditions);
- tangible (e.g. availability of affordable housing) or intangible (e.g. social cohesion);
- direct (that is, caused by the Project), indirect (that is, caused by a change that is caused by the Project), or cumulative;
- directly quantifiable, indirectly or partly quantifiable, or only able to be described and assessed in qualitative terms;
- experienced differently:
    - by different people and groups within a community (e.g. an increase in the cost of housing may be positive for homeowners wanting to rent out or sell their properties, but negative for individuals and families wanting to enter the same market);
    - by different communities (e.g. people neighbouring a project may experience most of the noise and dust impacts, while people in the region's nearest town may experience most of the job opportunities); and
    - at different times and stages of the project (for example, construction and commissioning, operation, decommissioning and closure, and post closure management).

The principle of environmental impact assessment (EIA) requires consideration of social, environmental, economic and other relevant effects in accordance with the EP&A Act. In this regard, social impact assessment (SIA) is a component of EIA.

Scoping is the first phase in both EIA and SIA. When effectively carried out, scoping highlights what elements of the natural or human environment ('matters') are expected to be impacted upon by activities associated with a SSD project (whether positively or negatively), how those impacts should be assessed and to what level of detail. It is used to focus the SIA on the most relevant and important issues for each project and ensures the scale of assessment required is proportionate to the importance of the expected impacts.

To scope potential social impacts, an understanding of the project's Area of Social Influence (ASI) is required. This should include an analysis of:

- the scale and nature of the Project, its associated activities (including ancillary infrastructure), potential direct impacts, potential indirect impacts that may extend from the Project site (e.g. transport routes) and potential cumulative impacts;
- who may be affected by the Project, how they are expected to be affected, and their relevant interests, values and aspirations;
- any potentially affected built or natural features located on or near the Project site or in the surrounding region that have been identified as having social value or importance, including key social infrastructure, facilities and amenities;

- any relevant social trends or social change processes being experienced by communities near the Project site and within the surrounding region, for example, trends in availability of rented accommodation, changes to relative employment in different industries, changing land uses over time, population and demographic changes; and
- the history of the Project and how communities near the Project site and within the surrounding region have experienced the Project and others like it to date.

The SIA guideline presents a 'Scoping Tool' which is used to identify:

- potentially affected people and the Project's area of social influence; and
- social impacts needing further investigation in the EIS and assignment of an appropriate level of assessment.

13.1 Area of Social Influence Development

The ASI for the Project was developed in accordance with the considerations outlined in the SIA guideline. As described in the SIA guideline, the term 'locality' does not have a prescribed meaning or refer to a fixed, pre-defined geographic boundary. In the context of the Project, care was taken to determine the ASI comprising the area within the actual Project boundary, but also the geographies external to the site where social impacts may arise.

The ASI was developed on the premise that relationships within and between scales will affect what people understand as impacts (Vanclay and Esteves 2011). This means that people may not perceive social impacts created by a project to be those felt exclusively within or immediately adjacent to the project boundary, or at a time when operations are conducted on site. Instead, it is possible for impacts to be felt at locations outside the project boundary and at any time of day (particularly in the event of long-distance haulage routes or complex supply chains). These time and space relationships between the Project site and communities, economies, infrastructure, and resources (both human and natural), were explored using a mixed-methods approach. The specific methods adopted were:

1. semi-structured interviews with key Boral Project personnel familiar with the existing operations on site and the local communities near the Project site;
2. semi-structured interviews with residents (via random sample "Stakeholder Perception Benchmark" doorknock) living near the Project site;
3. feedback from residents obtained during a doorknock of randomly selected residential properties in Fern Bay and Fullerton Cove in early March 2018; and
4. analysis of historical correspondence records.

The development of the ASI considered factors including but not limited to:

- supply chains;
- haulage of resources;
- transport of goods;
- materials and equipment;
- movement of workers (drive-in-drive-out/fly-in-fly-out working arrangements);
- natural features and recreational values (e.g. dunes at Stockton);
- ancillary infrastructure; and
- reputation of other extractive industries in the area.

13.1.1 Data Sources used to Develop the ASI

Both primary and secondary data sources were collected and analysed in developing the ASI. Primary data derived from the semi-structured interviews was reliable given the comprehensive knowledge of the Project that the key Project personnel held (two interviews were conducted with long-term Boral employees). Interviews with residents in the two suburbs closest to the Project site similarly provided reliable qualitative data.

Secondary data in the form of historical correspondence records associated with the existing operations was used to further develop an understanding of the ASI. This data provided an insight into the issues that the community have raised with Boral in past years, and the general sentiment towards the Project.

Results of the scoping activities which assisted the development of the ASI are shown in **Section 13.3.4**.

13.1.2 Data Limitations

The limitations of the data collection methods relate to the infancy of the Project and its approval process. Given the Project is in the scoping phase, a comprehensive range of technical studies are yet to be completed at the time of the ASI development. In addition, as details of the Project were not public domain during the initial stage of the scoping phase, initial interviews with residents (during the doorknock) could not involve questions about expanded operations at the site. These factors may have influenced considerations about the ASI. However potentially affected residents were provided with details of the Project during the later stages of the scoping phase and were invited to contact Boral with any queries or questions. No enquiries were received.

Notwithstanding the above limitations, the data derived from the methods provided a strong platform to develop the ASI and establish its reach with a degree of confidence.

13.2 Nominated Area of Social Influence

The ASI proposed for the Project is illustrated in **Figure 5**. The area is comprised of a polygon containing the Project site, the nearest communities including properties in Fern Bay and Fullerton Cove, and a small portion of the sand dune system adjacent to the Project site. The polygon is also comprised of linear areas associated with the main transport routes proposed to be used by the Project. These linear areas include Coxs Lane, and Nelson Bay Road from its intersection with Seaside Boulevard to its intersection with Cabbage Tree Road. There are no remote locations considered to be indirectly impacted.

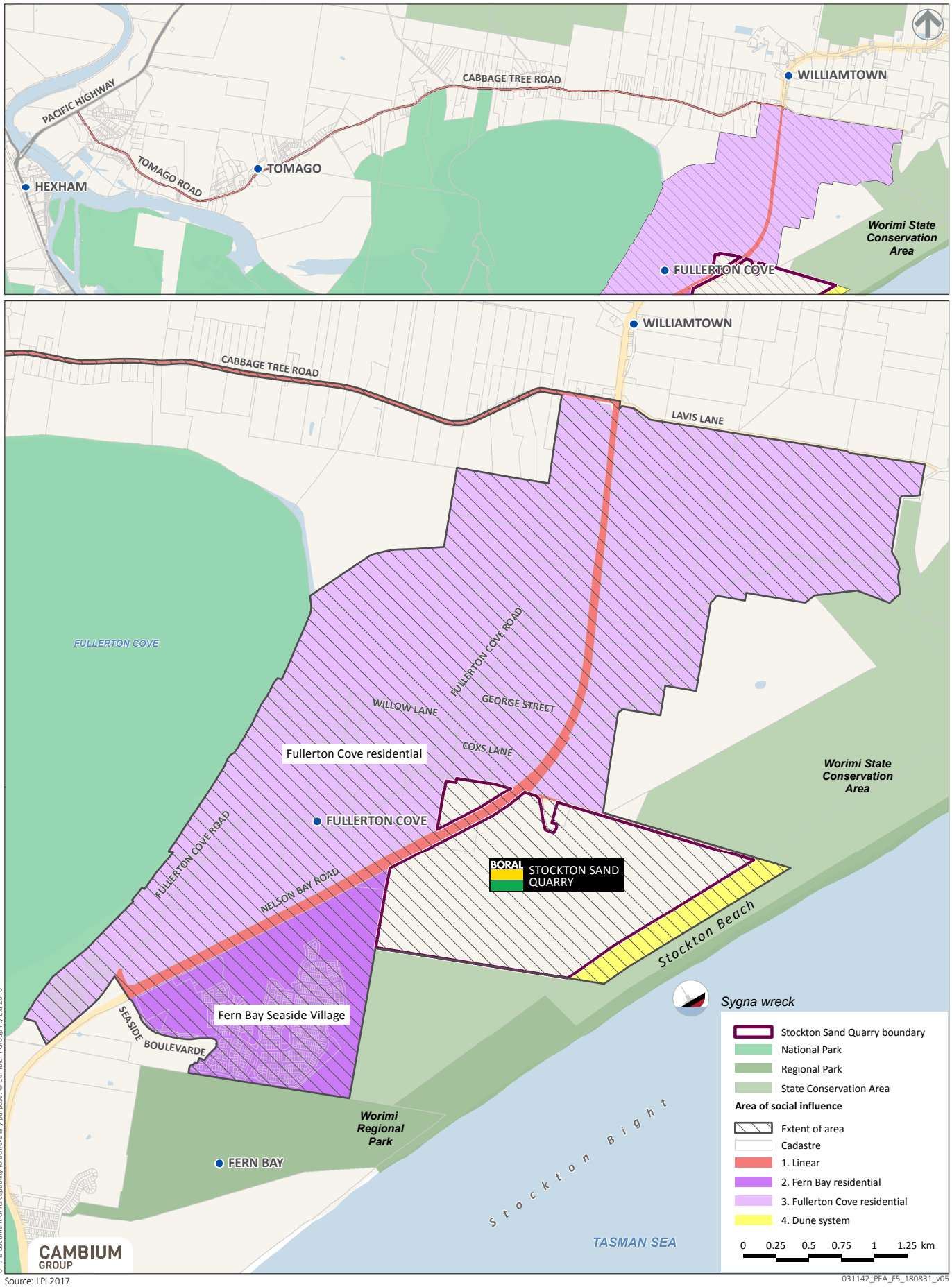
The suburb of Fern Bay, at the southernmost extent of the Port Stephens LGA, is north of Stockton (the only suburb of Newcastle situated north of the Hunter River), and east of the north arm of the Hunter River (entrance of Fullerton Cove). In July 2010, the NSW government approved a land release allowing for the development of approximately 684 homes at Fern Bay. This action paved the way for development associated with increased population growth identified in the Lower Hunter Regional Strategy (2006 – 2031). The regional significance of Fern Bay as a centre for employment and housing has also been outlined in the Hunter Regional Plan 2036.

Fullerton Cove is also a suburb of the Port Stephens LGA and is located to the north of Fern Bay. In the 2011 Census, the Fullerton Cove population was just 300 people, whilst Fern Bay had a total population of 1,625. Both suburbs have experienced significant population growth between 2011 and 2016. In the 2016 Census, the population of Fullerton Cove was 566 while Fern Bay was 2,763. Residences in Fullerton Cove are predominantly set on larger acreages (unlike smaller residential lots in Fern Bay) along the Fullerton Road corridor. The properties in Fullerton Cove are older than those in Fern Bay and are physically separated from the Project site by Nelson Bay Road and adjacent bushland.

The socio-economic profiles of Fullerton Cove and Fern Bay are outlined below. Insights into the relationships between their respective populations and the Project, including social issues and concerns, were gathered during the door knock exercise and submitted to the DP&E.

Figure 5
Area of social influence

STOCKTON SAND QUARRY DREDGING
PRELIMINARY ENVIRONMENTAL ASSESSMENT



Source: LPI 2017.

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13.3 Existing socio-economic profile

Socio-economic data derived from the 2016 Australian Census of Population and Housing provides a snapshot of the population profile in the local area. Data collected for Fern Bay has been compared to the Statistical Area Level 2 Stockton – Fullerton Cove. The Fern Bay (SSC or State Suburb) and Stockton-Fullerton Cove (SA2 or Statistical Area 2) census geographies were selected as the basis of the census data analysis below. This is because census data was only available for the Fern Bay area as a State Suburb dataset, and therefore it was the most accurate available. The Statistical Area 2 dataset was selected for Stockton-Fullerton Cove because the scale represents a community that interacts together socially and economically, and it allows a more detailed analysis than the inferior statistical area or suburb datasets (Australian Bureau of Statistics, 2018). The socio-economic variables discussed below align with the community profile measures adopted by the Australian Bureau of Statistics. **Table 10** provides a comparison of Fern Bay, the Stockton – Fullerton Cove and NSW populations in respect to a range of socio-economic indicators.

The populations do not differ markedly in terms of gender. It is clear that an older population resides in both Fern Bay and the Stockton – Fullerton Cove areas, in comparison to broader NSW. In the study area, the average number of children per household, people per household, incomes, and motor vehicles per dwelling are smaller when compared to NSW averages.

Table 10: Socio-economic indicators

Socio-economic indicator	Fern Bay	Stockton - Fullerton Cove (SA2)	NSW
Total population	2,763	566	7,467,527
Male	49.50%	49.90%	49.30%
Female	50.50%	50.10%	50.70%
Median age	53	51	38
Average children per family for families with children	1.8	1.7	1.9
Average people per household	2.2	2.3	2.6
Median weekly household income	$1,049	$1,164	$1,486
Median monthly mortgage repayments	$2,167	$2,000	$1,986
Median weekly rent	$430	$330	$380
Average motor vehicles per dwelling	1.6	1.6	1.7

The median age of 53 for Fern Bay, and 51 for Fullerton Cove suggests that the two are aging suburbs catering to established members of the workforce or retirees (**Table 11**). This position is corroborated by the fact that 55% of community members in Fern Bay and 45.8% of community members in Fullerton Cove own their homes outright, and only 23% of homes in Fern Bay and 27.2% of homes in Fullerton Cove are owned with a mortgage. Accordingly, the family structure of Fern Bay favours families without children (58.1%) over families with children (32.1%). This is echoed in Fullerton Cove with composition of families comprising 50.2% of couples without children compared to 34.0% of couples with children. The aging status of the community is further substantiated by the fact that 41.6% of couple families are not working in Fern Bay and 34.7% in Fullerton Cove.

The labour force status of working parents in couple families is also displayed in **Table 11**, and there are lone-parents that also contribute to the total workforce across the two geographies.

Table 11: Employment Status

Employment Status of Parents in Couple Families	Fern Bay (%)	Fern Bay (No.)	Stockton-Fullerton Cove SA2 (%)	Stockton-Fullerton Cove SA2 (No.)	NSW (%)	NSW (No.)
Both Employed, Worked full-time	14.8	108	15.9	270	22.6	360,916
Both employed, worked part time	2.1	15	2.7	46	4.0	63,106
One employed full-time, one part time	15.3	112	18.6	315	20.6	329,567
One employed full time, other not working	10.7	78	10.7	181	15.0	240,084
One employed part time, other not working	4.1	30	4.9	84	6.1	96,933
Both not working	41.6	304	34.7	590	21.0	334,742
Other (includes away from work)	4.2	31	4.8	81	5.1	80,905
Labour force not stated (by one or both parents in a couple family)	7.3	53	7.7	131	5.7	90,630

13.3.1 Rationale for Selecting the Area of Social Influence

The task of developing the ASI was assisted by the fact that the Project has a long-term history. Operations began on the site during the 1970s. Boral acquired the site in 1992 and has developed strong connections with local residents and their Stockton based employees. The influence of the Project on social conditions locally is therefore well understood by Boral. This was evident during the semi-structured interviews conducted with Boral staff, which formed a basis for the ASI development. Refer to **Table 12** for a summary of the interview results.

Historical correspondence records maintained by Boral provide evidence of complaints or issues raised by nearby residents and/or business owners. The Annual Environmental Management Reports (AEMR) submitted by Boral in accordance with the existing development consent are one source of correspondence records. A review of the AEMRs from recent years indicate that no complaints were received about Boral's operations.

Traffic routes to be used by Project vehicles were considered during the ASI development. It is anticipated that most social impacts related to traffic will be experienced at the roundabout (Seaside Boulevard and Nelson Bay Road intersection). Technical assessments will confirm the likelihood of these impacts in the form of noise or traffic queuing. Furthermore, Coxs Lane and Nelson Bay Road from its intersection with Seaside Boulevard to its intersection with Cabbage Tree Road are the logical parts of the road network where social impacts derived from traffic are expected. On other roads, the volume of non-project related vehicles is expected to reduce the likelihood of a project-related social impact being created.

Aside from the Project history and traffic routes, the physical features of the site were also considered as part of the initial ASI development. Due to the natural topography and vegetation surrounding the site, the Project is isolated from both a physical (refer to **Section 2.2** for residential separation distances) and visual perspective. It is not visible from Nelson Bay Road or surrounding residential areas and as described earlier, a location on Stockton Bight Beach will be the only likely viewpoint of the Project. There are no designated wilderness areas within or close to the Project site, and the Project will not interfere with public access to Stockton Bight Beach. There are no formal public access points to Stockton Bight through Boral's holding. These observations influenced the constrained nature of the ASI.

Table 12: Summary of interviews with Boral staff

ASI Factor discussed during interview	Feedback obtained
Supply chains	The Project would have few linkages with firms at local and regional scales. Expanded operations at the site would require the procurement of specialist equipment at start-up from an overseas supplier. It is expected that operational expenditure following the initial start-up procurement activities would be exclusively for consumables (e.g. fuel) and maintenance. Manufacturing businesses and local or regional suppliers would not be influenced by the Project beyond existing arrangements. The workforce supply chain would not be influenced by the Project. The small, locally based workforce would remain to support the Project. The workforce would not generate considerable expenditure in any particular locality, or influence the supply of goods to the local area.
Haulage of sand and transport of other goods	The four main truck routes that would be used by the project are identified (refer **Section 12.1** for details). As the Project will increase sand transportation from the site by up to 500,000 tpa, the part of the truck routes most relevant to the creation of social impacts should be included in the ASI. Boral staff anticipate that truck movements would be the only aspect of the Project visible to the community.
Materials and equipment	Materials and equipment required by the Project would largely be limited to that which would support dredging operations. The dredge, a variety of pipes, and a wash bin would be the major items required. These items should have a minor influence on the extent of the ASI.
The movement of workers (drive-in-drive-out [DIDO] and fly-in-fly-out [FIFO] working arrangements	Six Boral staff currently work at the site. All are locally based. The Project would maintain the employment of the current staff and no increase to the workforce is forecast. The Project would not create links to regional localities via the movement of workers.
Natural features and recreational values (e.g. dunes at Stockton)	Boral has operated at the site over a long period of time and has not disrupted the natural and recreational values of the adjacent dune system. The Project operations would continue to co-exist with natural values and recreational features. Although not disruptive, Boral staff, the local community, and recreational users acknowledge the close proximity of the Project to the dune system.
Ancillary infrastructure	The Project would be a standalone site. There would be no ancillary infrastructure or secondary sites that would extend its footprint beyond the existing site.

ASI Factor discussed during interview	Feedback obtained
Reputation of other operations in area	There are other extractive industries operating in the area. These operations have generally attracted negative publicity in recent years in relation to traffic movements and waste. Community sentiment regarding other extractive operations is generally negative (see for example media about one operator including McCarthy (2016) and Environmental Protection Authority (2017).

13.3.2 Social Impacts Scoping Exercise

In accordance with the SIA guideline, social impacts are considered to be consequences of, or relating to, the lives, activities, relationships and networks of people and communities. This chapter outlines a range of life aspects that can be influenced by social impacts derived from a State significant resource project. The impacts to these life aspects can be both positive and negative.

An SIA scoping exercise was conducted to identify and assess social impacts associated with the Project. The purpose of the SIA scoping exercise was to highlight what aspects of the natural or human environment ('matters') are expected to be impacted upon by activities associated with the Project, how those impacts should be assessed and to what level of detail. The methodology adopted for the scoping exercise is described below.

13.3.3 Scoping Exercise Methodology

As a subset of the SIA guideline, DP&E released a Scoping Tool to guide proponents in conducting their SIA scoping exercise. The Scoping Tool is designed to ensure a consistent approach to identifying which of the social impacts associated with a project need to be investigated in the SIA component of the EIS. While providing a methodological guide and ready-made SIA template for this purpose, at the time of writing the Scoping Tool is in draft form and will remain as such until the parent DP&E EIS Improvement Project is complete. Therefore, the Scoping Tool itself was not utilised for this SIA scoping exercise. Instead, the overall process inherent in the Scoping Tool and its major elements were adopted by the Project team. The process involved:

1. considering each 'matter' (i.e. amenity, access, built environment, heritage, community and economic) and its subcategories, and determining how likely it is that Project activities will cause an impact to it;
2. for each matter, considering and assessing the material characteristics of any likely impact;
3. for each matter, considering stakeholder/community opinions and sentiment towards the Project activities;
4. for each matter, determining whether or not a social impact will arise from the Project activities, and then developing a rationale for the decision; and
5. for each matter, determining the following level of assessment (and engagement) which is required in the EIS preparation phase:

    - desktop - another specialist study or section of the EIS will provide all the information and analysis needed to predict, evaluate and develop a response to the social impact, including relevant primary and secondary research, qualitative and quantitative data, and appropriate engagement with potentially affected people, to establish a baseline and support predictions. If this is the case, the SIA component of the EIS only needs to review the data and findings from the other sources through a SIA lens and cross-reference and integrate them into the overall social baseline and assessment.

- standard - Most information and analysis needed to predict, evaluate and develop a response to the social impact will be provided by another specialist study or section of the EIS, but it will need to be supplemented with further evidence gathering and analysis to fill any gaps and obtain a complete picture from a SIA perspective.
- comprehensive - Only limited or no information and analysis will be provided by another specialist study or section of the EIS. If so, the author/s of the SIA component of the EIS will need to undertake the evidence gathering and analysis needed to predict, evaluate and develop a response to the social impact.

The early engagement methods implemented to support the above process included:

- a letter inviting feedback about Boral's operations via a link to an online survey. This was distributed to residents (via random sample) living near the Project in early March 2018;
- interviews with residents (via the random sample doorknock) living in Fern Bay and Fullerton Cove in early March 2018;
- a more substantial newsletter inviting feedback about Boral's existing operations, informing the community about the Project, and offering individual meetings with residents in Fern Bay and Fullerton Cove. This was distributed during May 2018;
- the office of Kate Washington MP; and
- a meeting with Port Stephens Council.

13.3.4 Scoping Exercise Outcomes

Outcomes of the Scoping exercise are listed below under the relevant matter contained in the DP&E Scoping Tool. In the Scoping Tool, each matter has a number of subcategories. For example, the Amenity matter contains subcategories including acoustic, visual, odour, and microclimate. For the purposes of this PEA, where it was determined that the Project would be unlikely to impact a particular subcategory, that subcategory is not discussed below. Only those applicable to the Project receive attention herein.

Matter 1: Amenity

The first Amenity sub-category determined to be applicable to the Project is 'acoustic' amenity. A preliminary assessment of potential noise impacts is made in **Section 11**. It states that activities associated with the Project will introduce additional noise sources from the site, potentially resulting in greater noise levels experienced at residences to the south of the site and west of Nelson Bay Road. A quantitative noise assessment will be conducted to more accurately ascertain acoustic impacts, derived from sources both within the project site and along transport routes. The transport routes have been described in detail in **Section 12.1** of the PEA. The majority of vehicles exiting the quarry will travel south along Nelson Bay Road to the intersection with Seaside Boulevard. The trucks will perform a U-turn at the roundabout before travelling north along Nelson Bay Road, west along Cabbage Tree Road and Tomago Road, and then left onto the Pacific Highway and M1 south towards Sydney via Hexham. Trucks may also proceed via the New England Highway to the Hunter Valley.

In terms of social impacts derived from the Project acoustics, early consultation with nearby residents suggests they are not significant. Residents did not raise any concerns about acoustic impacts from sources on site or from vehicles utilising the public road network. The following examples of feedback from residents in the residential area closest to the site (i.e. Fern Bay) highlight the comfort of the community in respect to noise impacts:

- Norfolk Street resident: "We can't hear a thing";
- Uralla Street resident #1: "I can't hear anything from your site, even in the early hours when coming home from night shift"; and
- Uralla Street resident #2: "We can't hear your operations from our house".

Confidence that social impacts would arise from the Project acoustics is further diminished by the fact that there is a moderate distance (approximately 500 m) between the Project site and its nearest receivers.

Taking both the early consultation results and the proximity of receivers into account, the scoping exercise has determined that there would be no requirement to conduct a SIA in regard to acoustic amenity, alongside the quantitative noise assessment required for the Project.

The second Amenity subcategory determined to be applicable to the Project is 'visual' amenity. **Chapter 13** describes the limited visual exposure of the Project to the community and nominates Stockton Bight Beach as an isolated viewpoint. This part of the beach may be occasionally visited by recreational dune users. The degree to which this visual perspective would cause a social impact is not known. More well known, courtesy of early consultation activities, is the sentiment that nearby residents hold towards the Project and its influence on visual amenity. The statements below offered by residents living near the Project during the doorknock activity were typical of those collected:

- Uralla Street resident #4: "We don't notice it [the quarry]"; and
- Uralla Street resident #5: "I notice absolutely nothing".

According to the above, the Scoping exercise has determined that a standard SIA would be required in relation to visual amenity. The SIA would focus exclusively on the perception of social impacts created for recreational dune users, in relation to the minor initial Stockton Bight Beach viewpoint.

Matter 2: Access

The scoping exercise determined that 'road and rail network' is a subcategory of Access that is applicable to the Project. The additional sand (approximately 250,000 tonnes per annum until the 2006 development consent lapses) transported both north and south on Nelson Bay Road will require the local and regional road network to support a larger quantity of truck movements. A standalone traffic and transport impact assessment will provide an analysis of the likely impacts to the road network. The quantitative assessment will determine the network access and capacity implications among other issues, much less the social impacts of increased traffic volumes.

From a social impact perspective, road users may experience irritation and adverse driving conditions if the volume of heavy vehicle traffic is excessive. The 2016 census data indicates that the majority of inhabitants of Fullerton Cove (64.8%) and Fern Bay (74%) utilised their cars (as the driver) to get to and from their place of employment (refer to **Table 13**). This dependency on private vehicular use over public transport, along with the increasing population in the Fern Bay area in particular, has the potential to impact negatively on the capacity of the local road network with the proposed increase in heavy vehicles associated with the quarry. This dependency on private vehicular use will increase the exposure of Fern Bay and Fullerton Cove residents to traffic along Nelson Bay Road in particular, potentially increasing their awareness of traffic volumes and congestion on the local road network.

Table 13: Method of travel to work

Method of Travel to Work	Persons	Percentage (%)
Fullerton Cove		
Car, as driver	103	64.8
Car, as passenger	4	2.5
Walked only	9	5.7
Worked from home	5	3.1

Method of Travel to Work	Persons	Percentage (%)
Public transport	4	2.4
Fern Bay		
Car, as driver	681	74.0
Car, as passenger	35	3.8
Walked only	17	1.8
Worked at home	38	4.1
Ferry, car as driver	12	1.3
Public transport	46	4.9

Capacity issues and reduced access to the road network (for example, if Fern Bay or Fullerton Cove residents experienced queuing at the Nelson Bay Road and Seaside Boulevard intersection roundabout) would create stress for the travelling public. However, this is a scenario (i.e. capacity issues and excessive traffic volumes) that would first need to be investigated in the traffic and transport impact assessment. Prior to the completion of this assessment, the comments from local residents collected during early engagement provide an insight into the lack of concern with the current Project related traffic situation. Examples of such comments include:

- The Cove (Over 55s 'gated' residential village) resident: "the quarry and its related traffic is not an issue";
- Spinifex Road resident #3: "We've never particularly noticed trucks as part of the Nelson Bay Road traffic flow"; and
- Spinifex Road resident #1: "I have noticed trucks in the traffic flow but I have no particular concerns with them".

Based on the fact that a standalone traffic and transport impact assessment will be completed for the EIS and that residents appear to have minimal concerns with quarry related traffic or the network capacity at present, the Scoping exercise has determined that a SIA would not be required to assess this matter. Nevertheless, an adaptive research approach will be adopted in relation to the results of the traffic and transport impact assessment. If results or ongoing community feedback isolate potential social issues, then more detailed social assessments will be required. It is anticipated that these may take the form of interviews with residents or other stakeholders, or participant observation activities to explore the matter more thoroughly.

Matter 3: Built environment

The 'public infrastructure' subcategory (as part of the Built Environment) was determined to be applicable to the Project during the scoping exercise. There are close similarities between this subcategory and the 'road and rail network' subcategory discussed above. The distinction is that the social impact in this case would likely be created by the condition of the road network (i.e. the road surface quality) rather than the volume of vehicles using it. The standalone traffic and transport impact assessment will to a degree investigate implications for the quality of public assets, however its scope would potentially exclude social impacts derived from the deterioration of such assets.

Public infrastructure or the condition of local roads was not raised by residents during the early engagement. This could be an indication that the current quality of local roads is satisfactory to the residents or further, that the residents do not consider that Project related vehicles substantially influence road quality. It is feasible to form an alternate view as to why the residents did not raise these topics. It is obvious that poor quality road infrastructure will

cause frustration and annoyance to any road users. Prior to the completion of the traffic and transport impact assessment however, it would be premature to predict the Project would significantly reduce the quality of public infrastructure. Accordingly, the scoping exercise concluded that a standard SIA is required.

Matter 4: Heritage

As a subset of the Heritage matter, the 'natural' features of the site were identified in the scoping exercise as being applicable to the Project. A small portion of the dune system adjacent to the Project site on Stockton Bight Beach (refer to the ASI in **Figure 5**) is the natural feature of interest. The Stockton Bight Beach and dune area is used for four-wheel driving, quad bike riding, hiking, horse riding and fishing among other recreational activities. Based on the fact that a clear majority of commercial operators advertise four-wheel driving and quad bike riding (see Worimi Conservation Lands, 2018), it is assumed that these activities would be most prominent in the subject dune location. There is no evidence to suggest that the site currently impacts the dune system or its recreational values. Ongoing operations should not alter this scenario but there may be an alternate perception that emerges in the community.

Considerations about this matter must also include the Aboriginal population and stakeholder group. Fern Bay contains a small Aboriginal and Torres Strait Islander population, which has been established as approximately 3.1% of the community (refer to **Table 14** below). The Worimi Local Aboriginal Land Council (WLALC) manage the Worimi Conservation Lands, which encompass the dune system adjacent to the Project.

Table 14: Characteristics of the Fern Bay Aboriginal and Torres Strait Islander Population

Aboriginal and Torres Strait Islander People Characteristics	Fern Bay	Percentage (%)	NSW	Percentage (%)
Male	39	47.0	107,368	49.6
Female	44	53.0	108,809	50.4
Median age	25	-	22	-

Boral has an existing relationship with the WLALC, however the views of this organisation and the broader traditional owner community towards the Project should be further understood and considered as part of the SIA. The scoping exercise recognised the potential social impact of the Project for this stakeholder group and suggested that further focussed engagement is required. Engagement will take the form of meetings with senior members of the WLALC and prominent recreational dune user groups, to adequately assess this Heritage matter.

Matter 5: Community

During the scoping exercise, 'safety' emerged as a Community subcategory applicable to the Project. **Table 15** lists the four potential Community safety matters of the Project that would be relevant from a social impact perspective and identifies the relevant section of the EIS where these matters will be addressed.

Table 15: Public Safety and Relevant Section of EIS

Environmental Matter	Relevant Section of EIS
Health risk and nuisance factors from particulate matter (dust)	Air Quality
Increased noise associated with extraction activities, including vehicular movements	Noise
Increased traffic volumes	Traffic and Transport
Unauthorised access	Hazards and Risks

Firstly, the continuation of quarrying activities has the potential to emit dust, primarily from vehicles movements on site. With the implementation of adequate dust control measures, the potential for significant negative air quality impacts from the Project are low, which is commensurate with the fact that no concerns were raised by the public on this matter. Therefore, this matter will be assessed in the air quality impact assessment section of the EIS.

Secondly, the site is surrounded by rural and environmental conservation land uses, which are generally characterised by low background noise levels. There is the potential for the Project to result in an increase in noise levels within the community with the recommencement of quarrying activities within an area of the site, where extraction activities have not been undertaken since 2007. No feedback has been received from residents regarding noise generated by the existing site or the proposed Project. Therefore, this matter will be assessed in the noise impact assessment section of the EIS.

Thirdly, the increased vehicle movements north and south on Nelson Bay Road have potential road safety implications. Historical safety records do not indicate this as a potential issue. Feedback obtained from residents during early engagement did however raise a safety concern:

- Coxs Lane Resident #1: “I have had a scare on the Nelson Bay Road off-ramp with a truck looking like it wasn’t going to brake”.

This or any similar fear in the community could be exacerbated by the introduction of an increased number of truck movements.

The manner in which potential traffic impacts associated with the Project would be assessed from a technical and social perspective are discussed under ‘Matter 2: Access’ above.

Finally, unauthorised access to the Project site by members of the public (refer **Section 21.1.4**), whether unintentionally or intentionally, presents a potential safety risk. Historical records indicate that the majority of past incidents relate to recreational vehicles and pedestrians entering the quarry to access the beachfront. Despite the efforts on site to prevent unauthorised access, there is the potential that the public would attempt to gain access to the property in the future, resulting in potential interaction with existing operations and proposed Project operations, which could cause a safety incident.

The outcome of the scoping exercise determined that an SIA is not required to assess these community safety matters. It is expected that the air quality, noise, and traffic and transport impact assessments, along with the hazards and risks chapter within the EIS will address these community safety matters. Nevertheless, as outlined in Matter 4, further engagement will be undertaken with the prominent recreational dune user groups to adequately assess this community safety matter. The hazards and risks chapter of the EIS will consider the rehabilitated post extraction landform and any new or additional potential community safety implications associated with unauthorised site access.

Matter 6: Economic

Following a consideration of the Economic matters in the SIA guideline, 'natural resource use' is expected to be positively impacted by the Project. Natural fine sand derived from the quarry is the relevant natural resource. There is a shortage of natural fine sand supply in the local and regional economy and the Project will provide a partial remedy to this situation. Natural fine sand is an essential component to construction materials and consequently, to local and regional development projects. The Project presents an opportunity to maintain supply at a cost-effective price.

The scoping exercise determined that a desktop SIA would be adequate to determine the positive social impacts created by the Projects natural resource use.

13.4 Further Assessment

A SIA will be undertaken as part of the EIS in accordance with the SIA guideline.

The scoping exercise, conducted in accordance with the draft DP&E Scoping Tool, isolated the matters (identified and discussed) above that require further assessment in the SIA. A summary of these matters is provided below in **Table 16**.

Table 16: Social matters and level of further assessment

Social matter (and relevant subcategory)	Level of assessment for the social impact in the SIA
Amenity (acoustic)	No requirement to conduct a SIA for acoustic amenity, alongside the quantitative noise assessment.
Amenity (visual)	Standard SIA concerned with social impacts created for recreational dune users, in relation to the Stockton Bight Beach viewpoint.
Access (road network)	No requirement to conduct a SIA in regard to road network impacts, alongside the standalone traffic and transport impact assessment. An adaptive research approach will be adopted in relation to the results of the traffic impact assessment. If results or ongoing community feedback isolate potential social issues associated with this matter, then more detailed social assessment will be required.
Built environment (public infrastructure)	Standard SIA concerned with social impacts created by changes to public infrastructure (roads).
Heritage (natural)	No requirement to conduct a SIA in regard to natural impacts. However, further engagement with recreational or Traditional Owners would be required to assess the social implications for the WLALC and their dune system conservation lands, arising from expanded site operations
Community (safety)	No requirement to conduct a SIA in regard to safety impacts, however further engagement will be undertaken with the prominent recreational dune user groups to adequately assess this community safety matter. The hazards and risks chapter of the EIS will consider the rehabilitated post extraction landform and any new or additional potential community safety implications associated with unauthorised site access.
Economic (natural resource use)	Desktop SIA would be required to determine the positive social impacts created by the Projects natural resource use.

14 SOILS & REHABILITATION

14.1 Existing Environment

14.1.1 Soils

Aeolian sands are located throughout the Project site with three soil landscapes: Stockton Beach, Hawks Nest and Boyces Track (ERM 2005).

The Stockton Beach landscape is characterised by beaches and the active unvegetated dune field in the eastern portion of Boral's holding. The soil in this landscape is deep unstratified fine to medium grained loose aeolian sand with shell fragment inclusions (ERM 2005).

The Stockton Beach soil landscape active transgressive dune is gradually engulfing the Boyces Track soil landscape and Hawks Nest soil landscape. Boyces Track is an aeolian landscape characterised by steep Quaternary Holocene sand dunes on the Tomago Coastal Plain, with tall open forest. Soils are deep (>300 centimetres (cm)) well-drained, weakly developed podzols (ERM 2005).

The soil landscape in the low-lying swales and low dunes immediately west of the active transgressive dune is the Hawks Nest soil landscape. Hawks Nest is an aeolian landscape characterised by low Holocene sandsheets and low transgressive dunes of the Tomago Coastal Plain, with dry scrubland, woodland and tall open forest. There are small shallow swamps that occur in the low-lying, poorly drained swales and depressions. Soils are deep (>300 cm) well-drained podzols and siliceous sands and podzols on dunes (ERM 2005).

The soils of the area are highly susceptible to wind erosion when exposed.

14.1.2 Biophysical Strategic Agricultural Land

According to the *Strategic Agricultural Land Map - Sheet STA_047* (DP&E, October 2013), the nearest Biophysical Strategic Agricultural Land is approximately 13.2 km to the north west of the Project site, west of Raymond Terrace.

14.1.3 Acid Sulfate Soils

Acid Sulfate Soils (ASS) generally occur in low lying areas in and around coastal swamps, estuaries, and other coastal water bodies. If these soils are disturbed or exposed to oxygen, they have the potential to oxidise over time, resulting in acidic water leaching from these soils and scalding vegetation or killing aquatic fauna. ASS can also react with concrete and steel infrastructure.

A review of the ASS maps contained within the Port Stephens LEP was conducted in May 2018. The majority of the Project site is positioned within risk Class 4, while pockets of the southern extent of the proposed extraction area are mapped within risk Class 3.

14.1.4 Rehabilitation

The Project site was previously quarried and subsequently rehabilitated.

The rehabilitation of disturbed areas is managed in accordance with the Rehabilitation and Landscape Management Plan (RLMP), approved as part of the 2006 development consent.

The RLMP outlines rehabilitation methods employed at the site, including species selection, weed and pest management measures, and monitoring and reporting requirements for rehabilitated areas.

14.2 Potential Impacts

Given the limited agricultural value of the soils and landscape within the Project site, the ground disturbance associated with the Project, will not have a significant impact on soil resources, land capability and agricultural suitability.

The Project is partially situated within areas mapped to have potential for ASS. Areas classified as Class 4 are likely to have ASS at depths of 2 m below the natural ground surface, while areas classified as Class 3 are likely to contain ASS at a depth of 1 metre below the natural ground surface. The Acid Sulfate Soils Assessment Guidelines (ASSMAC 1998), require ASS assessment where extraction activities are proposed to exceed these depths. As dredging activities and associated ground disturbance would extend to a maximum depth of 15 m below the water table and potentially expose sandy soils to oxygen, an ASS assessment is required.

14.3 Further Assessment

The EIS will include an assessment of potential impacts from the Project on soil and land resources and will include an assessment of final rehabilitation and closure of the Project site. Previous rehabilitation studies and key related documents will be reviewed during the EIS process and integrated into proposed rehabilitation designs. Given the historical success of rehabilitation practices on the site, it is unlikely the rehabilitation approach for terrestrial environments would be altered.

The EIS would include an ASS Assessment in accordance with the ASSMAC guidelines, to determine the potential for the Project to disturb ASS, and advise on appropriate management, treatment and/or disposal options for any potential ASS material encountered during dredging.

15 ABORIGINAL HERITAGE

15.1 Existing Environment

The Project site is in an area represented by the Worimi Local Aboriginal Land Council and Maaiangal Aboriginal Heritage Cooperative.

A search was undertaken of the Aboriginal Heritage Information Management System (AHIMS) on 28 May 2018 to determine whether any known Aboriginal sites are registered on or within 200 m of the Project site. No Aboriginal sites were identified within the search area.

The site is located in the outer barrier of the Stockton Bight dune barrier system that was formed by sand deposition during the last sea level stabilisation (ERM 2005).

Several periods of dune transgression have been identified in the outer barrier. The first occurred approximately 4000 - 4500 years ago, the second approximately 1200 - 2300 years ago and the third, which is still active and is overriding the 1200 year old dune, began approximately 300 years ago (ERM 2005).

ERM (1994) examined the age of the dune system within the previous extraction area. The study identified that the majority of the extraction area was positioned within the dune system estimated to be between 1200 and 2300 years old, with a small portion of the extraction area along the northern boundary of the site adjacent to Nelson Bay Road identified to be at least 4500 years old.

Historical Aboriginal heritage assessments undertaken of the site and surrounding areas by ERM (1994), Umwelt (2000), ERM (2001) and ERM (2005) suggest that there is a low

likelihood of Aboriginal heritage objects being encountered in the 1200 – 2300 year old dune system in which the Project is positioned.

15.2 Potential Impacts

Sand deposits within the Project site have previously been removed by quarrying activities to a depth of 5 m AHD. However, the Aboriginal heritage assessment of the previous extraction area did not assess the potential for Aboriginal heritage items to exist below 5 m AHD.

15.3 Further Assessment

Although historic studies suggest that there is a low likelihood of Aboriginal heritage items being encountered in the 1200 – 2300 year old dune system, in which the Project is positioned, further consideration will be given in the EIS on the potential for Aboriginal heritage items to be encountered both above and below the current ground level.

An experienced coastal geomorphologist, knowledgeable on the Stockton Bight dune barrier system and associated Aboriginal heritage occupation patterns, will investigate and report on the historical movement of the dune mass and the depth at which Aboriginal heritage items could potentially be encountered.

An Aboriginal heritage due diligence assessment would then be conducted as part of the EIS in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010) to determine the likelihood of Aboriginal heritage items occurring below 5 m AHD within the Project site.

The due diligence assessment would involve:

- review of the coastal geomorphologist's report;
- searches of the AHIMS database and other relevant Federal, State and local heritage lists; and
- review of previous Aboriginal heritage studies and assessments of the Project site and surrounding area.

If the due diligence process concludes that there is potential to encounter Aboriginal heritage items at depth, additional assessment would involve:

- consultation with Aboriginal heritage parties in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010);
- field survey of the Project site. This survey would be designed and executed in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010); and
- preparation of an Archaeological Report and Aboriginal Cultural Heritage Assessment Report in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Heritage* (OEH, 2011).

16 VISUAL

16.1 Existing Environment

The Project is predominantly sheltered from view from most potential nearby receptors due to the natural topography and vegetation, and is not visible from Nelson Bay Road or surrounding residential areas.

There are no designated wilderness areas within or close to the Project site.

The Project will not interfere with public access to Stockton Bight beach as there are no formal public access points to Stockton Bight through Boral's holding.

16.2 Potential Impacts

The Project site is not visible from Nelson Bay Road or surrounding residential areas.

The Project will not impact on recreational use of the beach and dune outside of Boral's land, although it will be visible to recreational users accessing the top of the remnant hind dune adjacent to Boral's consent boundary.

As such, the only likely viewpoint of the Project for the public will be along a discrete section of Stockton Bight beach. Recreational users of this section of the beach have become accustomed to extraction related activities with the windblown extraction activities that have been undertaken over the past 10 years. These extraction activities are in a far more visually prominent position than the Project extraction area which is sheltered behind dune topography and vegetation, with the exception of the highest elevation of the proposed extraction area. As this area is quarried, it is envisaged that the remainder of the Project would be entirely concealed from public view.

16.3 Further Assessment

As potential viewpoints of the Project site would be confined to a discrete position on Stockton Bight beach, it is proposed to assess visual impacts of the Project in a descriptive manner within a chapter in the EIS. A standalone visual impact assessment including view shed analysis, 3D modelling and photomontages is not considered necessary.

17 SURFACE WATER

17.1 Existing Environment

The site is positioned within a north east to south west oriented dune ridge that forms part of the outer barrier dune system and is composed of a thick deposit of fine to medium sand. Therefore, the sand has a high infiltration capacity likely to be in excess of 100 mm per hour resulting in approximately 90 to 95 percent of rainfall infiltrating directly to an underlying unconfined aquifer (ERM 2005).

No permanent streams or waterbodies are visible within the Project area indicating that surface runoff is negligible and infiltration occurs quickly through porous sands, thereby contributing to high groundwater recharge. Some temporary ponding of water is evident in the dune system within the Project area and along Stockton Bight to the south east of the site, however it is likely that this ponding is associated with naturally low lying interdunal swales where there is interaction with shallow groundwater. It is also possible that some surface runoff which does not infiltrate through the sand may also accumulate in these swale areas contributing to the ponding.

17.2 Potential Impacts

Dredging would occur in sands that are extremely porous. Therefore, it is likely that any rainfall that lands in the proposed extraction area would not result in overland flows due to the downward pressure gradient resulting in an equilibrium being maintained.

The proposed processing area will also be located on porous sands within the extraction area footprint. All process water associated with dredging would contain only natural fines and

organics that occur in the dredged sands, and this water will either percolate back through the porous sands or will drain back into the dredge pit preventing off site surface water runoff.

Therefore, an independent surface water assessment is not required and surface water management will be described qualitatively within the EIS.

18 HISTORIC HERITAGE

18.1 Existing Environment

A search of the National Heritage List, Australian Heritage Database, NSW State Heritage Register, State Heritage Inventory and Port Stephens Local Environmental Plan (LEP) was undertaken in May 2018

The only listed heritage item located within 500 m of the Project is the 'Stockton Beach Dune System', which is heritage listed on the Port Stephens LEP. The curtilage of the heritage listing lies directly adjacent (north east and south east) to Boral's property.

The heritage assessment conducted as part of the *Stockton Sandpit Windblown Sand Extraction*, *Environmental Impact Statement* (ERM 2005) identified no historic heritage items in the proposed extraction area or along the upgraded haul road route. A military bunker, known locally as the 'Sygna Hilton' was observed in the Boral land holding and appears to date from the early 1940s when the area was used for military training. The bunker is made of mass concrete and has small firing slits and twin doorways. It may have been either a defensive position built to repel Japanese invaders or may have been used for training. The bunker is approximately 70 m north of the windblown sand extraction area.

The bunker is located approximately 340 m south of the proposed extraction area and will not be affected by the Project.

18.2 Potential Impacts

The Project will not impact a registered heritage item/place afforded protection under the *Heritage Act 1977* or Port Stephens LEP.

The Project site has been subject to previous surface disturbance during the extraction of sand under the 1996 development consent and is unlikely to contain any unknown historic heritage items.

Therefore, an independent historic heritage assessment is not required and the management of unknown historic heritage, if discovered during dredging, will be addressed in the EIS.

19 LAND CONTAMINATION

19.1 Existing Environment

A search of the EPA's Contaminated Land Record and List of Contaminated Sites notified to the EPA was undertaken in May 2018 for the Port Stephens LGA. No recorded contaminated sites within proximity to the Project were identified in the search.

Historic excavation in the Project site did not involve contaminating activities or incidents, and the secure nature of the site has ensured that there has been no dumping or disposal of hazardous materials.

Mobile machinery is parked overnight within the depot compound. The concrete floor ensures no soil or groundwater contamination from oil leakage from vehicles.

All vehicles are refuelled off-site or within the bunded fuel storage and distribution facility within the on-site depot/garage.

Regular vehicle maintenance and checks by operators are carried out to minimise the risk of oil leakage from operating machinery.

19.2 Potential Impacts

It is unlikely that contaminated soil exists within the Project site. Other than an unforeseen localised hydraulic oil leak from vehicles or machinery associated with the proposed sand extraction, the Project is unlikely to result in contaminating activities.

Therefore, an independent contaminated land assessment is not required and the management of unexpected finds or hydraulic oil leaks, will be addressed in the EIS.

20 WASTE MANAGEMENT

20.1 Existing Environment

The main waste streams generated by existing quarry operations include general rubbish/waste generated from operations and servicing of equipment.

All waste generated at the site is separated, collected in designated waste disposal bins, reused where possible or disposed of at an appropriately licenced waste facility.

The existing site depot is serviced by a septic tank system that was installed to Port Stephens Council requirements. The effluent in the tanks is pumped out and collected by Council on a weekly basis.

20.2 Potential Impacts

There will be minor volumes of general rubbish/waste generated from operation and servicing of equipment. All waste generated at the site will be managed in accordance with the existing site waste management system. Waste streams generated will be classified according to the *Waste Classification Guidelines* (EPA, 2014) and may include general solid waste (non-putrescible e.g. glass, plastic, rubber, garden waste, wood waste, paper and cardboard), general solid waste (putrescible e.g. food waste) and general waste from litter bins.

21 HAZARDS & RISK

21.1 Existing Environment

21.1.1 Bushfire

The majority of the Project site and the heavily wooded adjacent environmental conservation areas to the north east and south west have been mapped as ‘Vegetation Category 1’, which is considered to be the highest risk for bush fire. This vegetation category has the highest combustibility and likelihood of forming fully developed fires including heavy ember production.

A Bushfire Risk Management Plan was developed in 2009 for the Lower Hunter region by the Lower Hunter Bushfire Management Committee. The plan identifies land areas and associated community assets within the Port Stephens LGA at risk of bushfire and recommends measures to reduce these risks. The quarry itself is not listed within the plan.

The bushfire season in the Lower Hunter region predominantly occurs during the hotter months of the year, between October and March. The prevailing weather conditions associated with the bushfire season are north westerly winds accompanied by high day time temperatures and relative low humidity.

The Lower Hunter region has an average of 200 bush fires per year, with 3 of these fires considered to be major fire events.

The main sources of bushfire ignition within the region include:

- arson;
- car dumping;
- fugitive embers from legal burn off events;
- fugitive embers from illegal burning; and
- arcs from power lines in high winds.

21.1.2 Unexploded Explosive Ordnance

The Project site was part of the Stockton Beach Artillery Proof Range that was used from 1942 to 1944 (ERM 2005). The Artillery Proof Range extended from just south of Boral's property to Lavis Lane. The majority of firing appears to have been from Snake Battery Gun Position (to the south of Boral's land holding), with the projectiles impacting on the beach and adjoining sand dunes. Artillery (18 pounder) was also fired from the Ypres observation post (near the depot) towards the beach with the main impact area expected to be at the northern end of Boral's property.

21.1.3 Hazardous Substances & Dangerous Goods

Minimal quantities of hazardous and dangerous goods, including fuels, are stored and used at the site.

Waste oils are collected and stored in a 600 litre bunded tank located within the fuel storage and maintenance shed.

All vehicles are refuelled off-site or within the bunded fuel storage and distribution facility within the on-site depot/garage.

21.1.4 Public Safety

A security gate is positioned at the entrance the quarry along Coxs Lane. This gate is closed and locked overnight when the site is unoccupied but left open during operation hours to permit the entry and exit of heavy and light vehicles from the site office and weighbridge.

The current security fencing arrangements for the windblown extraction area along Stockton Beach include the provision of high visibility line and bunting demarcating the Boral property boundary accompanied by warning signage.

Given the unsecured nature of the beachfront, Boral has experienced safety incidents associated with members of the public accessing the quarry haul road to gain access to and from the beach.

A total of nine incidents were recorded during the 2016-2017 reporting period, predominantly associated with recreational vehicles and pedestrians entering the quarry either unintentionally or deliberately to access the beachfront.

Security fencing and high visibility line and signage are inspected regularly by quarry personnel, with posts for signage and high visibility line made of flexible shatterproof plastic to prevent possible injury during possible collision.

The following management measures are currently employed at the quarry in an effort to manage and prevent public interaction:

- **Operation and maintenance of safe batters –** Boral maintain a working extraction face that does not produce a grade of greater than 1:3 (V:H) to blend the extraction area with the surrounding dune system to limit risks to recreational vehicles.
- **Equipment requirements –** Heavy earthmoving equipment operates with safety equipment including flashing beacons for visibility in all weather conditions, radio communication and rear cameras for reversing movements.
- **Operating Hours –** Boral currently elects to limit operations on Saturdays, unless in response to a supply demand. Although operations are approved on Saturdays between the hours of 6:15am and 12pm (extended to 3pm during major supply contracts), Boral reduce these hours of operation wherever possible to minimise the potential for contact with recreational users of the beach.
- **Trespassing Procedures –** Boral personnel are trained to inform site management in the event that any members of the public are observed as trespassing on the site. In response, the operation of all heavy machinery is ceased until the party is removed from site and it is safe to resume operations.

21.2 Potential Impacts

21.2.1 Bushfire

The majority of vegetation within the Project site consists of stands of replanted woodland, interspersed with grassland and exposed sand.

The land within the Project site is considered to pose a low to moderate risk of bushfire due to limited available fuel source, existing vegetation composition interspersed with disturbed areas, a large former open quarry pit and site infrastructure. Undisturbed vegetated areas surrounding the Project site, including environmental conservation areas to the north east and south west would represent a high risk of bushfire. These adjoining environmental conservation reserves would experience build-up of high fire fuel sources over time, associated with dense vegetation canopy contributing to leaf litter and tinder on the ground surface.

Activities associated with the Project may result in inadvertent bushfire ignition. Such activities may include grass fires sparked by the hot exhaust of vehicles driving or parking in long, dry grassland; fires sparked during hot work activities such as welding; clearing of vegetation; or stockpiling of removed vegetation and timber (prior to reuse in revegetation or rehabilitation) contributing to a fuel source for ignition.

However, mitigation and management measures will be developed to reduce the risk of the Project causing a bushfire and will be reported on in the EIS.

A combination of relatively low rainfall, dry nature of the landscape, topography, and dense vegetation and high fuel source in the adjacent environmental conservation areas could pose a bushfire risk to the quarry. Bushfires within the reserves would be managed by NSW Rural Fire Service along with the relevant land authority including National Parks & Wildlife Service. Boral would continue to work with the NSW Rural Fire Service and respective land authorities

to co-ordinate any scheduled burn off events, and monitor and report any fires, suspicious behaviour or hazardous fuel loads within proximity to the quarry boundary.

21.2.2 Unexploded Explosive Ordnance

ERM (2005) mapped the Project site as having no risk for unexploded explosive ordinance, as it has been previously disturbed by quarrying activities from 1996 to 2007.

21.2.3 Hazardous Substances & Dangerous Goods

As all hazardous substances or dangerous goods are stored in appropriately bunded areas and vehicles are refuelled off-site or within the bunded fuel storage and distribution facility, the risk of contaminating soil and water is low.

21.2.4 Public Safety

The Project would not result in any alteration to current public safety management or security measures.

21.3 Further Assessment

The EIS will assess the potential hazards and risks associated with the Project, including potential risks to public and worker safety and potential risks associated with bushfire events, along with strategies and management measures which, when implemented, would reduce these hazards and risks to acceptable levels.

Additionally, the EIS will provide an assessment on the handling, transport, storage and use of dangerous goods within the Project site, and the implications of these dangerous goods with respect to State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33).

Whether SEPP 33 applies to the Project will be determined by applying the screening process specified in *Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines* (NSW Department of Planning, 2011).

22 SUSTAINABILITY

The provisions of adequate, reliable and affordable resources is a pre-requisite to meeting the needs of existing and future populations as required under the principles of ecologically sustainable development (ESD). A balance is required between the promotion and coordination of the orderly and economic use and development of land, the proper management and development of our resources and the protection of the environment. The effective integration of economic, social and environmental considerations is a requirement of ESD.

22.1 Existing Environment

ESD describes the principles used to undertake development to maintain and improve the total quality of life, in a way that maintains ecological processes to support current and future generations.

ESD requires a combination of sound planning and an effective and environmentally sensitive approach to design, operations and management of a project. The principles of ESD are defined in Schedule 2 of the Environmental Planning and Assessment Regulation 2000:

"The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical, economic and social considerations, including the following principles of ecologically sustainable development:

(a) the precautionary principle,
(b) inter- generational equity,
(c) conservation and biological and ecological integrity,
(d) improved valuation, pricing and incentive mechanisms"

During the environmental impact assessment phase of the Project, sustainable development decision making will be used by placing equal importance on social, environmental and economic considerations.

22.2 Potential Impacts

If not developed in an ecologically. economically or socially sustainable manner, the Project has the potential to result in long term impacts to the natural environment or community that contravene ESD principles.

22.3 Further Assessment

The environmental assessment would consider various elements of sustainability including:

- how the Project and its elements address the principles of ESD;
- the environmental impacts of the Project;
- the social impacts of the Project;
- the principles of the waste hierarchy shall be applied in relation to resource management. Life-cycle assessment will also be analysed in relation to the design and materials selection, energy and water demand management, and site management policies and strategies for the Project considering both cost and environmental impacts. This process will recognise the inter-relationships between sustainable development and would contribute to minimise the Projects ecological footprint; and
- a broad range of sustainable development factors including dust, visual amenity, traffic and noise will all be assessed from an ESD perspective.

23 CONCLUSION

This PEA has been prepared by Element Environment Pty Ltd on behalf of Boral Resources (NSW) Pty Ltd, who are seeking SSD approval under Part 4 of the EP&A Act for the extraction of an additional 500,000 tonnes of natural sand per annum from a resource of approximately 8 million tonnes at the Stockton Sand Quarry. However, in order to reduce resultant heavy vehicle movements on local roadways, Boral is proposing to limit the total exportation of sand product via road transportation to 750,000 tonnes per annum until the 2006 windblown sand development consent lapses.

This PEA has been prepared for use by DP&E to brief Government agencies and other stakeholders (if considered necessary) and to prepare environmental assessment requirements that will guide the environmental assessment process and the preparation of an EIS.

This PEA identifies environmental factors that will require further detailed investigations as part of the environmental impact assessment that will be detailed in the EIS.

During the preliminary environmental assessment process, no environmental factors have been identified that would cause the Project to result in significant or unacceptable

environmental impacts (assuming the implementation of appropriate environmental controls and management measures).

This PEA also identifies potential social impacts associated with the Project by undertaking a SIA scoping exercise in accordance with the SIA guidelines. The SIA scoping exercise involved engagement with the local community to help define key social matters that require further assessment in the EIS. The SIA scoping exercise did not identify any significant or unacceptable social matters that would prevent the Project from proceeding.

The Project would allow continued operations at the quarry after the windblown sand resource is exhausted along the eastern boundary of the site and would provide the following key benefits:

- supply of essential natural sand to major infrastructure and associated development projects;
- continued employment of six full time employees and truck/transportation drivers, with further jobs created through flow-on effects;
- optimal use of a regionally-significant resource; and
- economic benefits to the local community through the purchase of goods and services and local expenditure both directly and indirectly through employee wages.

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25 ABBREVIATIONS

Abbreviation	Definition
AEMR	Annual Environmental Management Report
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AIP	NSW Aquifer Interference Policy
BOM	Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land
DA	Development Application
DECCW	Department of Environment Climate Change and Water (now OEH)
DP	Deposited Plan
DP&E	Department of Planning and Environment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environment Protection Authority
EP&A Act	The NSW Environmental Planning and Assessment Act 1979
EP&A Regulation	The NSW Environmental Planning and Assessment Regulation 2000
EPBC Act	Commonwealth Environmental Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
GDE	Groundwater Dependent Ecosystems
ha	Hectare
ICNG	Interim Construction Noise Guideline (DECC 2009)
INP	Industrial Noise Policy
km	Kilometre
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
m	Metre
MNES	Matters of National Environmental Significance
NGERS	National Greenhouse and Energy Reporting Scheme
NPfI	NSW Noise Policy for Industry (EPA, 2017)
NPI	National Pollutant Inventory
NSW	New South Wales
OEH	Office of Environment and Heritage
PEA	Preliminary Environmental Assessment
$PM_{2.5}$	Particulate matter less than or equal to 2.5 micrometres in aerodynamic diameter
PM_{10}	Particulate matter less than or equal to 10 micrometres in aerodynamic diameter
POEO Act	Protection of Environment Operations Act 1997
RMS	NSW Roads and Maritime Services
RNP	NSW Road Noise Policy (EPA 2011)
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SWL	Sound Power Level
tpa	Tonnes Per Annum
TSP	Total Suspended Particulate
VENM	Virgin Excavated Natural Material