

Final

Prepared for:

Boral Bricks Pty Ltd

Badgerys Creek

Preliminary Environmental Assessment

Proposed Continuation of Operations Quarry and Brickworks - Boral Badgerys Creek

AECOM

15 October 2009

Document No.: S30248_FNLPEA_15Oct09

Environment

Distribution

**Preliminary Environmental Assessment
Proposed Continuation of Operations Quarry and Brickworks - Boral Badgerys Creek**

15 October 2009

Copies	Recipient	Copies	Recipient
4 Copies	David Kitto Director, Major Development Assessment Department of Planning 23-33 Bridge Street Sydney, NSW, 2001		
1 Copy	AECOM		
1 Copy	Michael Gow Plant Manager Boral Bricks		

By
AECOM
ABN: 34 060 204 702
Level 5, 828 Pacific Highway Gordon NSW 2072
PO Box 726 Pymble NSW 2073
Ph: +61 2 8484 8999 Fax: +61 2 8484 8989

Alexandra Frolich
Environmental Scientist

Erin Saunders
Associate Planner

Technical Peer Reviewer:	Date:
Catherine Brady Principal Environmental Planner	

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1.0 Introduction

1.1 Background

Boral Bricks Pty Ltd (Boral) currently carries out quarrying and brickmaking activities at Badgerys Creek within the Liverpool Local Government Area (LGA) to the west of Sydney. The Boral Badgerys Creek facility operates under consent issued by the Local Government Appeals Tribunal on 27 September 1976 (Council Ref: 1024/ 1976), as modified on 7 September 2006 (Council Ref: 921/2006).

The 1976 consent refers to a Deed of Agreement (the Deed) between Liverpool City Council (LCC) and Pacific Brick Company Pty Limited dated 30 September 1976. The Deed refers to the Tribunal award and contains conditions regulating extractive activities on the site and financial arrangements between the Company and LCC.

The Deed imposes a 30 year lifespan for activities on the site from 27 September 1976 (cl. 12) and restoration of the land to the *'reasonable satisfaction of Council when operations on said land in connection with the development have been completed'* (cl. 10). During 2006 HLA Envirosiences Pty Limited (now trading as AECOM) assisted Boral with a Section 96(1A) application under the *Environmental Planning and Assessment Act 1979* (EP&A Act), to modify the consent to enable operations to continue on the site. A modification was granted by Council on 7 September 2006 for continued operations for a further four years. The modified consent will expire on 27 September 2010.

Boral is now seeking approval for continued quarrying and brickmaking operations on the site beyond September 2010, the subject of this Preliminary Environmental Assessment (PEA).

1.1.1 The Proponent

The Proponent for the proposal is Boral Bricks Pty Ltd.

Boral Limited is Australia's largest building and construction materials supplier. Boral produces and distributes a broad range of construction materials, including quarry products, cement, flyash, pre-mix concrete and asphalt; and building products, including clay bricks and pavers, clay and concrete roof tiles, concrete masonry products, plasterboard, windows and timber.

1.1.2 Planning History

An outline of the planning history including modifications to consent and more recent development applications is shown in **Table 1** below.

Table 1: Planning History of Boral Badgerys Creek

Name/Item	Issued by	Description	Status	Date
Consent 1024/1976	Government Appeals Tribunal	Consent granted subject to conditions of Deed of Agreement	Approved	27 September 1976
Mod. Consent 921/2006	Liverpool City Council	Modification to 1976 consent to extend operations on the site for a further four years.	Approved	7 September 2006

Name/Item	Issued by	Description	Status	Date
DA 764/2009	Liverpool City Council	Development Application (DA) lodged for the upgrade of the production building to include new additions including a new brick unloading machine (Dehacker).	Approved	31 March 2009

The original consent/Deed of Agreement covered the extraction and brick plant components of the development, described as 'clay extraction and brick and clay products industry'. The Deed and associated consent was clearly issued prior to the gazettal of *Liverpool Local Environmental Plan 2008* (LLEP 2008) and the preceding instrument, *Liverpool Local Environmental Plan 1997* (LLEP 1997) under which the zoning of the site is/was established. Under both the current and previous zoning of the site, whilst the quarry component of the development is clearly permissible, the brick making component is prohibited.

Conditions of the Deed relating specifically to the brickmaking plant indicate that the brick making component has always been considered an intrinsic part of 'the development'. It has always been Boral's intent to continue exploration and brick making until the resource on the site is exhausted.

Boral is therefore seeking approval to continue quarrying and brick making activities on the site beyond the expiry of the existing consent.

1.1.3 Existing Works and Infrastructure

The existing operations on the site involve the quarrying of clay and shale for the production and packing of bricks and their dispatch to offsite locations. Current on site operations involve the following activities and infrastructure:

- Three existing quarry pits;
- A brick handling and production facility;
- A storage yard with operating forklifts;
- Stockpiling;
- Sedimentation ponds; and
- Access roads.

The quarrying activities currently yield approximately 250,000 tonnes per annum (tpa) for brickmaking activities. Dispatch of bricks from the site is in the order of 200,000 tpa.

Further detail on existing operations is provided in **Section 2.2** of this PEA.

1.2 Project Context

The existing extraction and brickworks facility is a profitable operation for Boral and, subject to appropriate approvals, the facility is expected to continue to operate for many years into the future. The brickworks would therefore require a continuing source of feedstock material to make bricks.

A substantial amount of valuable clay resource remains on the site and it is important that this resource be fully utilised to ensure a steady ongoing supply of building materials for the construction industry. This is becoming increasingly vital given the rapid uptake of land containing prime brick-making resources to facilitate urban development in Western Sydney and the expanding future development of Greenfield land in the vicinity of the subject site under the *Sydney Metropolitan Strategy City of Cities: A Plan for Sydney's Future* (Sydney Metropolitan Strategy).

Boral is therefore seeking approval to continue operations on the site beyond September 2010 to meet the continued demand for its products. Boral proposes to continue extraction across the site, including the continued extraction of raw materials from an existing pit located in the south eastern section of the site known as the Phase 3 Pit, moving north to establish a new pit (Phase 4 Pit) and expanding operations in the future to land in the northern and eastern portions of its landholding subject to both geological and environmental considerations. Boral has commissioned AECOM to prepare this PEA in support of an application for approval for the continuation of operations on the site as described in **Section 2.3**.

1.3 Location

The site is located in the suburb of Badgerys Creek within Liverpool LGA. Badgerys Creek is approximately 41 km south west of Sydney and 17 kilometres west of Liverpool. It is a small community comprising rural residences, agricultural activities, quarrying and industry. The locality supports a number of small rural residential holdings and a limited number of larger agricultural properties, agricultural enterprises (chicken farms, nurseries) and market gardens. The region forms part of the South West Growth Centre under the *Sydney Metropolitan Strategy* with Liverpool identified as a major centre and the site earmarked for 'future industrial' development. The regional context of the site is shown in **Figure 1**.

The site is bound by Badgerys Creek to the west, Inghams Chicken to the south, South Creek to the east and a large commercial nursery and rural residential properties to the north. The site location is shown in **Figure 2**.

1.4 Approval Regime

The Project would involve the extraction of clay, shale, and sandstone, associated brick making and ancillary activities as per current operations, however there would be some expansion of activities. The Project broadly comprises:

As described above, the Proponent is seeking Concept Approval and Concurrent Project Approval for the continuation of operations on the site, comprising:

- Extraction in the order of 420,000 tpa;
- Brick making in the order or 252,000 tpa; and
- Ancillary activities as described in **Section 1.4.2** below.

The Project falls within the definition of an 'extractive industry' under Group 2, Clause 7 of Schedule 1 of the *State Environmental Planning Policy (Major Development) 2005* (SEPP 2005), being:

- (1) *Development for the purpose of extractive industry that:*
- (a) *extracts more than 200,000 tonnes of extractive materials per year, or*
 - (b) *extracts from a total resource (the subject of the development application (or other relevant application under the Act)) of more than 5 million tonnes.*

The Project is therefore eligible for assessment under Part 3A of the EP&A Act, subject to declaration by the Minister for Planning.

1.4.1 Concept Plan Approval

The subject site is zoned RU1 under the relevant local environmental plan, being *Liverpool Local Environmental Plan 2008* (LLEP).

Under LLEP 2008, the quarry component of the project would be defined as 'extractive industry', a permissible use within the RU1 zone. The brick making component is undefined under LLEP 2008 and is subsequently prohibited in the RU1 zone. However, the brick making facility has always been considered an intrinsic part of the development on the site and was, prior to LLEP 2008 considered part of the development, although it was also prohibited development within the relevant zone under the preceding LEP – *Liverpool Local Environmental Plan 1997* (LEP 1997).

It is contended that the brickworks was considered an integral part of the development and that the existing use was allowed to continue through the development of a number of environmental planning instruments applying over time to the land. As such, it is considered likely that the site benefits from existing use rights. However, in order to remove any ambiguity with regard to the permissibility of the brick making component of the project and to provide certainty for Boral regarding the future operations at the site, it is proposed that a Concept Plan Approval be sought for the project to resolve the permissibility issues surrounding the brick making facility.

Part 3A of the *EP&A Act* allows the Minister for Planning to issue Concept Approval for certain Major Projects. As part of this approval process the Minister has the discretion to consider the compliance of the proposal with EPI's, including proposals that would otherwise be prohibited by an EPI. However, the Minister may not approve a Concept if the *EP&A Regulation* precludes approval of Concepts that are otherwise prohibited by an EPI.

AECOM is not aware of any provision in the *EP&A Regulation* that precludes approval of a Concept that would otherwise be prohibited by an EPI. Section 75O, sub clause (3) is the relevant provision of the *EP&A Act* that enables the Minister to provide Concept Approval for a proposal that would otherwise be prohibited by an EPI, as follows:

75O Giving of approval for concept plan

- (1)
- (2)
- (3) *In deciding whether or not to give approval for the concept plan for a project, the Minister may (but is not required to) take into account the provisions of any environmental planning instrument that would not (because of section 75R) apply to the project if approved. However, the regulations may preclude approval for a concept plan for the carrying out of a class of project (other than a critical infrastructure project) that such an instrument would otherwise prohibit.*

The Proponent is therefore seeking authorisation for the submission of a Concept Plan for the project.

1.4.2 Concurrent Project Approval

As described above, the Proponent is seeking Concept Approval and Concurrent Project Approval for the continuation of operations on the site, comprising:

- Extraction from existing and future new pits across the site in the order of 420,000 tpa;
- Brick making in the order or 252,000 tpa.

Key works and ancillary activities included in the project are:

- Continuation of extraction of raw materials from the Phase 3 Pit;
- Establishment of new quarry areas commencing with the Phase 4 Pit to the north of the existing Phase 3 Pit and potentially extending into areas further to the north and east subject to geological and environmental considerations;
- Stockpiling of raw and waste materials;
- Water management works (sediment ponds);
- Brick making operations; and
- Other support activities such as loading/unloading, brick storage and delivery and receipt of raw materials as described in **Section 2** of the PEA.

1.5 Purpose of this Report

This PEA forms the preliminary scope for the detailed environmental assessment (EA) of the Project. The purpose of the PEA is to provide the Minister with outline information and background environmental data on the site and the proposed operations, sufficient to establish the key environmental issues of significance and the level of environmental assessment required for the application.

1.6 Structure of Report

To inform relevant government agencies and local councils of the level of environmental assessment required, the PEA has been structured to provide information on broad areas as outlined in **Table 2**.

Table 2: Outline of Report Structure

Section	Issues Addressed
Section 1 Introduction	Provides a background to the Project, including information about the proposal such as location, previous approvals, and existing operations and infrastructure. The purpose and structure of the PEA is also outlined.
Section 2 Project Description	An overview and description of the subject site and the works and activities comprising the Project.
Section 3 Statutory Planning	Relevant legislation is investigated and presented, and relevant Environmental Planning Instruments (EPIs) are addressed.
Section 4 Consultation	Discussion of formal procedures proposed and/or undertaken with other agencies, as well as the community, stakeholders, and relevant authorities for input into the Project and the EA.
Section 5 Physical Effects	Reports on the environmental implications in terms of physical effects, including baseline studies and anticipated impacts. Environmental issues such as noise and vibration, air quality, water, rehabilitation, geology and soils and hazard and risk are considered.

Section	Issues Addressed
Section 6 Biological Effects	Reports on the environmental implications in terms of biological effects (ecology), including baseline studies and anticipated impacts.
Section 7 Community Effects	Outlines the potential community effects, including the social, heritage, cultural and economic implications.
Section 8 Resource Implications	Provides an overview of expected impacts and the implications of brick making and extractive industry on societal and natural resources, such as transportation infrastructure.
Section 9 Prioritisation of Environmental Issues	Prioritises environmental issues for further assessment in the EA.
Section 10 Findings	Focuses on the key impacts of the environmental factors addressed earlier in the report.
Section 11 Concluding Statement	Outlines recommendations to be considered as part of an EA, and also outlines recommendations in respect of the level of assessment and approvals process.
Section 12 References	A list of references used in preparing the PEA.

1.7 Sources of Information

A variety of site specific sources of information were used to produce this PEA including:

- Deed of Agreement, 1976, issued by Liverpool City Council, 1976
- Environmental Protection Licence #684, issued to Boral Bricks Pty Ltd
- *Badgerys Creek Brick Works Soil and Water Management Plan* – ERM, 2002
- *Boral Clay and Concrete Badgerys Creek Site – Rehabilitation Plan 2005/2006*, HLA Envirosciences, 2005
- *Restoration Strategy – Pit 2, Boral Brickworks* – HLA Envirosciences, 2005
- *Plan of Management, Boral Clay and Concrete* – HLA Envirosciences, 2005
- *Geotechnical Assessment* by D. Katauskas, letter dated 20th September 2005
- *Boral Clay and Concrete Badgerys Creek Site – Rehabilitation of Western Waste Stockpile, March 2006* – HLA Envirosciences, 2006
- *Boral Badgerys Creek – S96 Modification Statement of Environmental Effects*, HLA Envirosciences, 2006
- *Boral Badgerys Creek – Proposed Dehacker Building Upgrade Statement of Environmental Effects* – ENSR Australia Pty Ltd, 2009
- *Boral Badgerys Creek - Alterations and Additions Statement of Environmental Effects* – AECOM, 2009

2.0 Project Description

2.1 Introduction

The Proponent is seeking approval for continued quarrying and brickmaking operations at the Boral Badgerys Creek quarry and brickworks.

Given predicted market demand and the location of the site in the vicinity of expanding future development under the *Sydney Metropolitan Strategy*, it is vital that the remaining onsite resources are fully utilised to ensure ongoing supply of building materials for the construction industry.

Assuming that economic conditions remain reasonably favourable, it is expected that the existing brickworks operation on the site would continue to operate for at least another 20 years beyond the expiry of the existing consent on 27 September 2010.

2.2 Overview of Existing Activities

Boral currently operates a quarry involving clay and shale extraction and associated brickmaking activities within the site, which has an area of approximately 198.98ha. Current quarrying operations are located in the south east portion of the site. Other key components of the existing development are shown on **Figure 3** and include:

- Administration area and a staff and visitor car park;
- Brick production and handling facility (henceforth referred to as the Production Facility);
- Brick product storage area;
- Phase 1, Phase 2 and Phase 3 Pits;
- Raw material stockpiles;
- Overburden stockpiles;
- Five sediment basins;
- A heavy vehicle storage area;
- A diesel tank and fill point; and
- Internal road/access network.

Quarrying activities have previously been focused in the south west area of the site (Phase 1 and Phase 2 Pits). Extraction from Pits 1 and 2 has been completed and extraction is currently occurring in the Phase 3 Pit to the south east (see **Figure 3**). The pits generally range in depth and size, pit excavation extending to approximately 35 m below ground surface (bgs) at which a hard, sandstone layer is reportedly present. Boral has advised that although significant resource occurs beneath the hard, sandstone layer, quarrying activities at the site have not exploited this resource to date. A portion of the area of land of the Phase 1 and 2 Pits has been rehabilitated in accordance with the original consent.

The quarrying activities at the site currently yield approximately 250,000 tpa of clay and shale for brickmaking purposes. Material is stored in layered stockpiles to the south of the Production Facility and supplementary material for brick making is brought in by truck as required.

Martin Road provides the primary access to the site, adjoining the north-eastern corner. The Production Facility is accessed from a secure gate adjoining the visitor car park located at the north eastern extent of the entrance driveway.

2.3 The Project

The Project involves the continuation of operations on the site beyond September 2010. Operations would involve continued extraction across the site, including extraction of raw materials from the Phase 3 Pit in the south east and would likely involve quarrying progressing north to the location of the Phase 4 Pit located in the eastern portion of the site (**Figure 4**).

In addition, quarrying could occur on the remaining part of the site, subject to geological and environmental considerations.

Activities on the site would be largely as per current operations comprising quarrying, brick production and packaging for export and associated delivery and receipt of raw materials, however quarrying and brick making activities would be increased generally within the following limitations:

- Extraction of on site reserves in the order of 420,000 tpa; and
- Brick making at the existing Production Facility of some 252,000 tpa.

The Project also seeks an extension to the current operating hours of the brickmaking component of the development from the current operating hours of 6am to 6pm to 6am to 10pm Monday to Friday.

The proposed extension of operating hours would be limited to certain activities related to the loading and unloading of vehicles with other activities associated with the brickmaking facility remaining within existing operating hours. Saturday operating hours are to remain unchanged from 6am-6pm.

Works required as part of the Project are shown on **Figure 4** and include:

- Continuation of extraction of raw materials from the Phase 3 Pit;
- Establishment of new quarry areas commencing with the Phase 4 Pit to the north of the existing Phase 3 Pit and potentially extending into areas further to the north and east subject to geological and environmental considerations;
- Stockpiling of raw and waste materials;
- Stormwater drainage works including construction of new sediment basin(s) where required.

2.4 Location of Proposed Works

The Project operations would be fully contained within the bounds of the existing landholding as described in **Section 1.3** of this report and illustrated in **Figure 3**. The site is owned by Boral, and is largely utilised for its quarrying and brick making operations with some areas leased for agricultural operations.

2.4.1 Site Layout

The proposed site layout is shown in **Figure 4**. As described above, the Project would include new quarry areas and upgrade of stormwater drainage systems where required.

The layout of the Production Facility is shown in **Figure 5** and discussed in **Section 2.5.2**.

2.5 Project Components

2.5.1 Quarry

As previously mentioned, extraction is to continue on land to the north and east of the Production Facility. General quarrying activities/processes include:

- Breaking up raw materials using a bulldozer with ripping attachment;
- Collection of raw materials in articulated scraper trucks or dump trucks loaded by an excavator;
- Transport of raw materials to the stockpile area to the South of the Production Facility; and
- Deposit of raw materials in existing stockpiles.

Works involved in commissioning new quarry areas include:

- Transfer of topsoil and overburden to other parts of the site; and
- Creation of new stormwater drainage systems (where required) to be incorporated into and consistent with the existing Soil and Water Management Plan (SWMP) for the site.

It is expected that extraction from the Phase 3 Pit would have a lifespan of some 15 years, with the life span of future pits likely to be similar dependant upon their size.

2.5.2 Production Facility

The Production Facility accommodates the brick making process and is shown in **Figure 5**. The primary machinery and equipment involved in the process include:

- Clay preparation equipment (crushing and grinding);
- Brick forming and handling equipment;
- Gas-fired kiln;
- Brick dryer;
- Brick unloading machine (Dehacker); and a
- Compressor building.

The brick making process is generally described as follows:

- The as-mined clay material is crushed from -500 mm to -1 mm through a four stage crushing process. This includes a profiled roll crusher, a wet pan and two sets of high-speed smooth rolls. Water is added at the wet pan to take the material from 6-10% moisture content to 12-14% moisture content.
- To make bricks, the crushed raw material has more water added to bring the mixture to 14-15% and is then extruded. Various sands, frits and clay suspensions are applied to the column to add aesthetic appeal. The extruded column is cut into brick sized units and fed into drying racks on trays. The drying racks pass through an eight-laned drying chamber over the course of three days during which the moisture content is reduced to <1%. The dry bricks are stacked 16-rows high onto a refractory decked kiln car.

- The bricks are fired using kiln cars stacked with dry stock, which are fed into the entrance of a gas-fired tunnel kiln at the rate of one half car every 20-30 minutes. One kiln car holds approximately 6000 bricks (or 10 brick stacks) stacked with gaps between them to allow the hot air to circulate between them and fire evenly. The stock is then raised to above 1000°C and cooled back to room temperature in less than two days. Waste heat is drawn from the initially produced heat and is used in the dryer to dry the bricks.
- The fired stock is unloaded from the kiln car and split into brick packs by the Dehacker which also packages them before being driven along a conveyor to be transported to the storage yard for dispatch. All equipment is housed within the Production Facility with the exception of the unloading conveyor.

The proposed operations would produce bricks at a rate of some 252,000 tpa. The existing Production Facility has sufficient capacity to produce bricks at this rate without the need for upgrade.

Proposed additions and alterations to the Production Facility have been approved by LCC to enable an increase in the efficiency of the existing brick making process. The proposed additions and alterations include a dust collector, air receiver and brick dipping tanks. The additions and alterations are aimed at reducing dust in the brick making process and reducing the incidence of cracking in bricks, hence yielding a higher quantity and quality of product for export.

2.5.3 Brick Packaging, Storage and Dispatch

Packaging of the bricks is also undertaken by the Dehacker within the Production Facility. The Dehacker unpacks the bricks into individual units and then repacks them into pallet size packs for transport to customers, then straps them together with plastic belly strap. Once the belly strap is attached the complete brick packs travel along a driven roller conveyor where they are picked up by forklift and transported to the storage yard. The unloading conveyor is external to the Production Facility.

The brick product storage yard is located to the north east of the Production Facility and covers an approximate area of 41,500 m². The storage yard accommodates the packaged bricks once they have been prepared and packaged by the Dehacker. Forklifts move around the storage yard in order to transport the bricks from the Production Facility to the yard, and to load the bricks from the yard on to trucks for transport off site. The storage yard is shown in **Figures 3 and 4**.

Deliveries and dispatch occur by truck with approximately 60 pick-ups/deliveries per day during the week and 12 on a Saturday. Occasionally, raw materials are delivered and/or received at the site for brick making purposes.

2.5.4 Other Components

Within the site layout of the brickworks are several stockpile areas including:

- Raw material stockpiles which provide the feed for the brick making process;
- Overburden stockpiles which contain upper level excavated materials that are not suitable for brick making;
- Waste stockpiles which contain deeper level excavated materials that are not currently suitable for brick making but may be suitable in the future if upgrades were made to the clay preparation equipment; and
- Rehabilitated stockpiles.

The site contains a number of sedimentation basins for surface water management (see **Figure 3**).

According to the *Soil and Water Management Plan* (SWMP) (ERM 2002) prepared for the site, surface run-off reportedly flows via roads and open grassed drains from parts of the site to the Phase 1 Pit during periods of peak rainfall. Rainfall also contributes directly to water stored in the Phase 1 Pit. Surface water detained in the Phase 1 Pit is either transferred to a sediment basin, remains stored within the pit or is used for dust suppression across the site.

Future stockpiling on the site would be subject to the Rehabilitation Plan to be prepared as part of the EA.

2.5.5 Rehabilitation

Some areas of the site have undergone rehabilitation in accordance with the original consent/Deed of Agreement. A Rehabilitation Plan (RP) was prepared and implemented at the site and outlined the rehabilitation strategy for:

- Progressive rehabilitation of the site;
- Final land use planning;
- Pit rehabilitation; and
- Rehabilitation monitoring and maintenance.

The RP also outlines the design and final landform of stockpiles, vegetation establishment and soil management. Existing rehabilitated areas are shown on **Figure 3**.

The RP is primarily focussed on areas which require rehabilitation works to assist with reduction in erosion and sedimentation and to plan long-term rehabilitation of disused waste stockpiles. However, the RP would be revised and updated and a section included in the EA on rehabilitation, to reflect the proposed Project and to consider the longer term rehabilitation and future use of the site once quarrying operations have ceased.

2.5.6 Hours of Operation

Brick manufacturing occurs continuously, including public holidays and weekends. The current dispatch yard and quarrying operating hours are 6am-6pm Monday to Saturday.

As part of the Project, an extension of the current brickmaking operating hours is proposed, to 6am-10pm to Monday to Friday. This extension of hours would apply to restricted activities only with general operation of the brickworks remaining under current operating hours. Operating hours for Saturdays are to remain unchanged.

2.5.7 Workforce

There are currently 55 people employed in the Production Facility and 20 in the office, sourced mainly from the local area. Up to ten contractors work two to four months per annum on a campaign basis to complete the quarrying activities. These numbers are forecast to remain largely unchanged by the Project.

2.6 Environmental Controls

2.6.1 Soil and Water Management

The existing brickworks are managed under a SWMP. The SWMP investigated the existing stormwater catchment areas and identified management measures which have since been, and continue to be, implemented. These management measures include bunding, silt fences, an emergency spill kit, as well as stormwater reporting sheets for monitoring purposes.

The site currently maintains both major and minor sediment basins for the control and management of surface water. The sediment basins vary in volume and catchment size, with the Phase 1 Pit having the largest catchment area of 37.2 ha. Minor sediment basins are located at the bottom and downstream of each stockpile in order to contain runoff.

The SWMP would be revised and updated to reflect the Project if required and would include further mitigation measures where required.

2.6.2 Air Quality

The existing facility operates under a range of management practices to encourage dust suppression and other air quality controls. Current environmental controls include such measures as the use of water trucks along access tracks and working areas during mining campaigns and regular dust deposition monitoring. These controls would be maintained as part of the ongoing operations proposed by the Project.

In addition, potential impacts, preventative measures, monitoring and reporting requirements, and responsibilities are documented in an environmental effects register kept on-site.

Potential impacts and further mitigation measures in relation to air quality are outlined in **Section 5.1** of this PEA.

2.6.3 Rehabilitation Plan

Progressive rehabilitation of the site would occur in accordance with the RP to assist with the management of soil and water and the overall environmental performance of the site. As part of the EA, an additional rehabilitation plan will be prepared for the site and will consider the long term rehabilitation of the site with respect to potential future land uses.

3.0 Statutory Planning

3.1 Local Matters

3.1.1 Liverpool Local Environmental Plan 2008

LLEP 2008 is the primary local environmental planning instrument applying to the site.

Zoning

The subject land is zoned RU 1 Primary Production under LLEP 2008.

The objectives of the RU 1 Primary Production zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within the zone and land uses within adjoining zones.*
- *To ensure that development does not unreasonably increase the demand for public services or public facilities.*
- *To ensure that development does not hinder the development or operation of an airport on Commonwealth land in Badgerys Creek.*
- *To preserve bushland, wildlife corridors and natural habitat.*

Characterisation of Project

The existing development on the site was approved prior to the gazettal of LLEP 2008 as a 'clay extraction and brick and clay products industry'.

The most fitting definition for the quarrying component of the Project under LLEP2008 is 'extractive industry', defined as:

'the winning or removal of extractive materials (otherwise than from a mine) by methods such as excavating, dredging, tunnelling or quarrying, including the storing, stockpiling or processing of extractive materials by methods such as recycling, washing, crushing, sawing or separating, but does not include turf farming'.

The above definition does not, however describe the brick making component of the Project. There is no specific definition for a brick making facility under LLEP 2008 and this part of this Project is therefore undefined.

Permissibility

Extractive industries are permissible with consent in the RU 1 zone, therefore the quarrying component of the Project is permissible with consent.

As discussed above, the brick making component of the Project is undefined under LLEP 2008. As there is no fitting definition for the brick making component listed as permissible development in the RU1 zoning table, the brick making part of the Project is deemed to be prohibited development within the RU1 zone.

It is, however, contended that the brickworks was considered an integral part of the development approved on the site by the 1976 consent and Deed of Agreement, and that this use was allowed to continue through the development of a number of EPIs applying over time to the land. It is therefore considered likely that the brickworks would benefit from existing use rights as defined under Section 106 of the EP&A Act.

Authorisation for the submission of a Concept Plan is sought to provide a greater level of certainty to Boral with regard to future operations at the site. Concurrent Project Approval is also sought for the project as described in **Section 1.4** of this PEA.

3.2 State Matters

The following provides an overview of State legislation and policies of relevance to the Project. A more detailed examination of the provisions of these instruments would be provided in the EA for the Project.

It is noted that, as of 1 July 2009, Regional Environmental Plans (REPs) are no longer part of the hierarchy of EPIs in NSW. Therefore REPs are not included in the following discussion with the exception of REP 9 – Extractive Industries which is considered to be of historical relevance to the Project.

3.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act and the EP&A Regulation provide the framework for environmental planning in NSW and include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment, and provide opportunity for public involvement.

As outlined in **Section 1.4** of this PEA, approval is required for the proposed Project under Part 3A of the EP&A Act, subject to the Minister's declaration. The Minister for Planning would be the approval authority for the Project.

3.2.2 State Environmental Planning Policy (Major Development) 2005

SEPP 2005 was gazetted on 25 May 2005 and amended on 1 August 2005. The primary aim of SEPP 2005 is:

'to identify development of economic, social or environmental significance to the State or regions of the State so as to provide a consistent and comprehensive assessment and decision making process for that development'.

SEPP 2005 identifies classes of development which are defined as 'major development' under Part 3A of the EP&A Act. The class considered applicable to this Project is:

Group 2, Clause 7 (Extractive Industries) of Schedule 1 being:

(1) *Development for the purpose of extractive industry that:*

- (a) *extracts more than 200,000 tonnes of extractive materials per year, or*
- (b) *extracts from a total resource (the subject of the development application (or other relevant application under the Act)) of more than 5 million tonnes*

The proposed works constitute development for the purpose of extractive industry, extracting up to 420,000 tpa. The Project is therefore deemed to be a project to which Part 3A of the EP&A Act applies.

3.2.3 State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007

On Friday 16 February 2007, the SEPP (*Mining, Petroleum Production and Extractive Industries*) 2007 was gazetted.

The aims of this Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries:

- a) *to provide for the proper management and development of mineral, petroleum and extractive material sources for the purpose of promoting the social and economic welfare of the State, and*
- b) *to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and*
- c) *to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.*

Clause 7(3) of SEPP 2007 identifies development which can be carried out only with consent and includes the following of relevance to the Project:

'Extractive industry development for any of the following purposes:

- a) *extractive industry on land on which development for the purposes of agriculture or industry may be carried out (with or without development consent),*
- b) *extractive industry in any part of a waterway, an estuary in the coastal zone or coastal waters of the State that is not in an environmental conservation zone.*

The subject site is located on land zoned RU1 where agriculture is a permissible use. The quarry component of the Project is therefore deemed to be permissible with consent pursuant to Clause 7(3) of SEPP 2007.

The EA to be prepared in respect of the Project will address the relevant provisions of SEPP 2007.

3.2.4 State Environmental Planning Policy (Sydney Region Growth Centres) 2006

SEPP (Sydney Region Growth Centres) 2006 was gazetted on 28 July 2006 and provides for the coordinated release of land for residential, employment and other urban development in the North West and South West growth centres of the Sydney Region.

SEPP 2006 provides land use zones, objectives and land use tables which identify the permissibility of development and matters for consideration by the consent authority. The proposal site is within an area marked as Future Industrial Precinct of the South West Growth Centre therefore the provisions of the SEPP apply. More detailed consideration of the provisions of SEPP 2006 will be provided in the EA.

3.2.5 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

SEPP No. 33 – Hazardous and Offensive Development (SEPP33) aims to ensure that due consideration is given to the potential off-site risks of proposals for potentially hazardous or offensive industries in terms of the surrounding environment, amenity and health.

The Department of Urban Affairs and Planning (now Department of Planning (DoP)) has produced a set of guidelines entitled '*Applying SEPP33*' providing advice to consent authorities, industry, consultants and other government agencies on whether SEPP 33 applies to a proposal. The Guidelines recommend a 'risk screening' method for determining whether a proposal is hazardous and provide guidance on assessing potentially offensive development proposals. The screening process considers the class and volume of waste materials to be stored on the site and the distance of the storage area to the nearest site boundary.

The guidelines state that the first consideration in this respect is whether the proposed use falls within the definition of 'industry' adopted by the planning instrument which applies to the application. As discussed in **Section 3.1.1** of this PEA, the proposal does not fall within the definition of 'industry' and therefore the provisions of SEPP 33 do not strictly apply. A consideration of the hazards and risks associated with the Project would however be presented as part of the EA for the Project.

3.2.6 State Environmental Planning Policy No. 44 – Koala Habitat Protection

SEPP No. 44 (SEPP 44) applies to a range of LGAs listed in Schedule 1 of the SEPP. SEPP 44 applies to the Boral site as it lies within the Liverpool LGA which is listed in Schedule 1.

The policy applies to land which is the subject of a DA and which is greater than 1 hectare in area. Whilst the proposed Project is not the subject of a DA, it is assumed that the policy is intended to apply to Part 3A Projects and the provisions of the SEPP will therefore be considered in relation to the proposal as part of the EA.

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

SEPP 55 aims to provide a Statewide approach to the remediation of contaminated land, and in particular, promotes the remediation of contaminated land for the purpose of reducing risk of harm to human health or any other aspect of the environment.

The Project does not involve a change of use of the land but a continuation of the existing operations at the site. An investigation of the Department of the Environment, Climate Change and Water (DECCW) Contaminated Land records was undertaken for the site and showed no record. The subject land is considered to be suitable for the Project and it is not anticipated that remediation of land would be required in order for the Project to take place.

3.2.8 Sydney Regional Environmental Plan 9 – Extractive Industry

SREP 9 aimed to facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area, by identifying land which contains extractive material of regional significance. Despite the repeal of this plan, it is worth noting that Schedule 1 of SREP 9 identified Boral Bricks, Badgerys Creek as land containing extractive material of regional significance.

3.2.9 The Sydney Metropolitan Strategy

The *Sydney Metropolitan Strategy* is a framework developed to promote and manage Sydney's growth and outline a vision for the future to 2031. It includes directions and strategies on how growth and change will be managed in Sydney into the future and identifies two 'growth centres' in the South West and the North West where new Greenfield development will be directed. Land use planning for the strategy is still in the early stages and Draft Structure Plans are still being prepared for these areas.

The subject site is located in the South West Growth Centre (SWGCG), within a precinct earmarked for "future industrial" development. The aims and objectives of the Metropolitan Strategy will be considered as part of the EA.

3.3 Commonwealth Matters

3.3.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* came into effect in July 2000 and requires the approval of the Commonwealth Minister for the Environment and Heritage for actions that may have a significant impact on matters of National Environmental Significance (NES). Approval from the Commonwealth is in addition to any approvals under NSW legislation.

Approval under the EPBC Act is triggered by a proposal which has the potential to have a significant impact on a matter of NES or by a proposal which has the potential to have a significant impact on the environment of Commonwealth land or which involves the Commonwealth. The EPBC Act lists eight matters of NES which must be addressed when assessing the impact of a proposal.

A search of the Department of Environment, Water, Heritage and the Arts (DEWHA) protected matters database was undertaken in August 2009, based on a 10km buffer around the Project area. The following provides a preliminary assessment of the proposal and its potential impacts on matters of NES.

- **World Heritage properties:** There are no world heritage properties proximate to the proposed project, or that would potentially be affected by the proposal.
- **National Heritage Places:** There are no Commonwealth Heritage Places identified within the search area, however a total of 7 places listed on the Register of the National Estate (RNE) were identified within the search area which are protected by the provisions of the Act. Guiding principles for the continued operations will be detailed in the EA.
- **Wetlands of National Importance:** The search identified the proposed project would be located within the same catchment as a Ramsar site, Towra Point Nature Reserve, which is located approximately 16 km south of the Sydney CBD. However, given the nature of the proposal and the distance of the site from the Towra Point Nature Reserve, it is not anticipated that there will be a significant impact on the Ramsar Wetland.

- **Commonwealth-listed Threatened species:** 25 Commonwealth listed threatened species (15 fauna and 10 flora) were identified within the search area and therefore, potential exists for the project to impact on threatened species listed under Commonwealth legislation. A greater level of assessment will be provided within the EA, and environmental safeguards detailed to minimise potential impacts on these species.
- **Commonwealth-listed Migratory Species:** 14 migratory species were identified within the search area. Given the nature of the proposed project, significant impacts on protected migratory species are not expected. Notwithstanding this, a greater level of assessment will be provided in the EA and appropriate mitigation measures identified if deemed necessary.
- **Nuclear Action:** The proposed project will not involve a nuclear action as defined under the EPBC Act 1999.
- **Commonwealth Marine Area:** There are no Commonwealth Marine Areas proximate to the proposed project, or that would potentially be affected by the proposal.
- **Commonwealth Land:** Three Commonwealth Land sites were identified within the search area. However, the proposed project is not on or adjacent to Commonwealth land, nor is Commonwealth land likely to be significantly affected by the proposal.

Based on this preliminary assessment, the Project is not anticipated to have a significant impact on matters of NES and referral to the Commonwealth Minister for Environment and Heritage is not expected to be required.

3.4 Other Approvals

3.4.1 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) prohibits any person from causing pollution of waters, or air, and provides for penalties for air, water and noise pollution offences. Schedule 1 of the POEO Act identifies “scheduled activities” which are required to be licensed by the DECCW.

The existing quarry and brickworks are covered by an Environment Protection Licence (EPL) EPL Ref. 684. Any required variation to this licence to reflect the proposed Project would be sought pending project approval.

4.0 Consultation

4.1 Introduction

Consultation was carried out as part of this PEA with LCC and DoP and centred on discussions regarding the proposed continuation of operations at Boral Badgerys Creek and the appropriate approvals pathway. Further consultation will be carried out as part of the EA as discussed below.

4.2 NSW Formal Procedures

The EA for the Project will be prepared in accordance with Part 3A of the *EP&A Act* and its Regulation. Part 3A of the *EP&A Act* ensures that the potential environmental effects of the proposal are properly assessed and considered in the decision making process.

In preparing the EA, the requirements of the Director-General will be addressed as required by Clause 75F of the *EP&A Act*.

A number of methods of consultation with key stakeholders have been identified, including:

- Individual meetings with agencies and stakeholders; and
- Planning Focus Meeting (PFM) with statutory agencies (if required).

4.3 Consultation with Stakeholders and Other Relevant Authorities

The Proponent has already discussed the Project with LCC and DoP.

The project is defined as a 'major development' and therefore, written comments from relevant statutory agencies will be requested by DoP, to assist with the preparation of the Director-General's Requirements (DGRs) and during exhibition of the EA. Key agencies of relevance to the assessment of the Project include:

- Department of Primary Industries – Mineral Resources (DPI);
- DECCW; and
- Department of Water and Energy (DWE).

4.4 Community Consultation

The Proponent regularly engages with adjoining landowners and as a consequence has in the past received few complaints in relation to operations.

As part of the EA process, Boral intends to undertake a program of targeted land owner consultation involving face to face meetings with potentially impacted landholders, particularly those land holders residing on Martins Road and Lawson Road. The consultation process would endeavour to inform and discuss with local landowners, planned quarrying activities including the continued extraction of raw materials from the Phase 3 Pit, progression of quarrying activities into the proposed Phase 4 Pit and the potential for quarrying activities to commence in the north and east areas of the site. Feedback from the consultation process will be taken into consideration and will be incorporated into the EA.

Notwithstanding, where appropriate, landowner consultation would also be undertaken in the future on a needs basis as quarrying activities progress across the site.

Further detail regarding community consultation will be provided in the EA.

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5.0 Physical Effects

5.1 Air Quality

5.1.1 Existing Environment

Air quality monitoring including dust gauging and stack testing is conducted annually in the vicinity of the site in accordance with DECCW EPL. Monitoring is undertaken for:

- coarse particulates;
- fine particulates;
- fluoride;
- nitrogen oxides;
- sulfur dioxide; and
- sulfur trioxide.

Monitoring results indicate that emissions are consistently below the standards set by the DECCW.

The primary air pollutant emitted from the site is dust. Current management measures include:

- A water truck is used at the site (during mining campaigns)
- A dust minimisation project which involves the reuse of wastewater at the base of the Phase 1 Pit for dust suppression purposes; and
- Dust deposition monitoring. There are currently four dust gauges positioned within the site.

5.1.2 Issues for Consideration

Approval to continue operations at the quarry and associated brick making and handling works would involve activities largely identical to that currently carried out at the site. Dust emissions generated would be of a similar type and scale to existing emissions, however the impacts would continue for a longer period than originally envisaged and potentially affect different residential receptors due to the location of the proposed new quarry (Phase 4 Pit) and potential quarry areas in the north and east of the site. Potential impacts would include:

- Dust emissions resulting from internal access roads;
- Dust emissions from quarry areas;
- Emissions from onsite and offsite vehicles; and
- Emissions from Production Facility operations.

Whilst greenhouse gas emissions from the site are expected to be minimal, they will be considered as part of the EA.

Impacts on air quality and associated mitigation measures (if required) would however require confirmation through a detailed assessment as part of the EA. The EA would specifically consider the potential impacts of proposed quarrying activities in the Phase 4 Pit and the potential quarry areas in the north and east of the site.

5.1.3 Summary and Recommendations

An air quality impact assessment (AQIA) is required to assess existing background air quality data and adequately assess the air quality impacts of the proposal on the surrounding environment. The AQIA assessment would generally involve:

- Background data analysis;
- Development of an emissions inventory;
- Dispersion modelling;
- Assessment against regulatory guidelines; and
- Appropriate mitigation recommendations.

The AQIA would be undertaken as part of the EA.

5.2 Noise and Vibration

5.2.1 Existing Environment

Noise pollution sources have been identified as they relate to each activity currently occurring at the site. This includes the use of earthmoving equipment during clay winning and stockpiling, use of front-end loaders and use of exhaust fans for drying and firing. Other sources include nearby industry such as traffic from Elizabeth Drive and Badgerys Creek Road, as well as noise exposure from Hoxton Park Airport. The Boral Badgerys Creek site borders the Australian noise exposure forecast of 20 to 25 units according to the LLEP 2008 Airport noise map, however it is believed these contours were based on predicted noise from the now abandoned Badgerys Creek Airport plan.

Potential noise receivers have been identified and include:

- Rural Residential housing to the east and south east;
- Agricultural Research Station to the east; and
- Other industrial users (to the north).

An internal audit undertaken in February 2005 assessed whether noise from the site (excluding the mobile plant) exceeded the following noise emission criteria (taken from the existing EPL):

- an LA10(15 minute) noise emission criterion of 55 dB(A)(0700 to 2200) Monday to Saturday and 0800 to 2200 Sundays and Public Holidays; and
- an LA10(15 minute) noise emission criterion of 40 dB(A) at all other times.

An assessment was also undertaken to ascertain whether the noise from operating the mobile plant exceeded the following criteria:

- an LA10(15 minute) noise emission criterion of 50 dB(A)(0700 to 2200) Monday to Saturday and (0800 to 2200) Sundays and Public Holidays; and
- an LA10[15 minute) noise emission criterion of 40 dB(A) at all other times.

The assessment concluded that there were no exceedances of the relevant noise criteria and that noise measured was attributable to natural causes, aircraft or activities of the neighbours. The assessment also stated that the plant was barely audible and had not received any noise related complaints. Thus, noise emissions from the existing operation are not considered to be a significant issue.

Given the distance to the nearest residential receivers, current noise levels comply with the EPL requirements.

5.2.2 Issues for Consideration

Although continuation of the existing quarrying activities and brick handling activities would not change the scope of operations at the site, future quarry activities would involve extraction in a different location on the site resulting in potential changes in terms of noise levels. Potential noise impacts include:

- Construction earthworks and quarrying of the new area;
- Operation of forklifts and other machinery in the storage yard;
- Operation of exhaust fans and Dehacker (brick loading machine);
- Other general operating machinery; and
- Noise implications from traffic generation as a result of the works.

Noise impacts and mitigation measures (if required) would however require confirmation through a detailed noise study as part of the EA.

5.2.3 Summary and Recommendations

A noise assessment is required to establish existing background noise levels and adequately assess the noise impacts of the Project. The noise assessment would ideally follow the general methodology:

- 1 Measure existing noise levels
- 2 Predict noise impacts
- 3 Establish noise criteria using relevant regulations
- 4 Recommend noise management and control measures

The full assessment would be provided with the EA.

5.3 Water Management

5.3.1 Existing Environment

Surface Water

The site is located within the South Creek and Badgerys Creek catchments which are part of the greater Hawkesbury catchment area. The eastern property boundary adjoins South Creek and western property boundary adjoins Badgerys Creek. A small tributary of Badgerys Creek is located in the south-western portion of the site, between the western stockpile and the Phase 2 Pit (see **Figure 3**).

Current quarrying operations on the site are outside of the flood prone areas identified on Council's flood maps and the South West Growth Centre Flood Zoning Map.

The SWMP developed for the site in 2002 is integral to site operations. The SWMP identified the following drainage features:

- the site is relatively flat;
- the majority of the site is surrounded by an earthen bund that ranges in height from 0.5m to 5m;
- the majority of the site is a disturbed catchment;
- 'clean' roof run-off from the Production Facility drains separately to Sediment Basin 3; and
- minor rainfall events are likely to result in standing water in a number of areas.

Within the quarry and brickworks area, there are seven sub catchments which would be further detailed in the EA. The catchments as per the SWMP are:

- Sediment Basins 1 & 2;
- Phase 1 Pit;
- Phase 2 Pit;
- Production Facility;
- Western Stockpile;
- South East Drain; and
- East Drain.

There is no discharge of water off site. The brickworks waste water is retained onsite as per the SWMP, and all stormwater is retained onsite in an existing disused quarry.

Groundwater

Quarrying activities on the site generally target shale and sandstone units within the upper 35 m of the subsurface. Boral have advised that insignificant quantities of groundwater have been encountered during quarrying to date.

A search of registered groundwater bores located within an approximate 5 km radius of the site has been undertaken. The search identified 14 registered groundwater bores in the vicinity of the site, one of which is reportedly owned by Boral and is registered for industrial purposes. The remaining 13 bores are generally registered for either monitoring or domestic stock purposes. Of the limited information available, registered bores in the vicinity of the site have encountered groundwater between approximately 24 and 45 m below ground surface (m bgs) within either shale or sandstone units. It is anticipated that groundwater is likely to occur within the underlying bedrock.

Groundwater conditions on the site will be considered further and will be discussed in the EA.

5.3.2 Issues for Consideration

Approval to continue the operation of the quarry and brickworks would involve activities largely the same as those currently carried out on the site and would therefore generate impacts in relation to water of a similar type and scale to those existing. However, these impacts would continue over a longer period.

In addition, future quarry activities would involve extraction in a different location on the site and rehabilitation of existing quarries once exhausted. These future activities may result in potential changes to stormwater runoff and onsite catchments and would therefore need to be considered as part of the EA.

Sediment basins and stormwater detention ponds exist on the site to contain runoff and discharge from extraction pits within the site boundaries. Changes to the existing water catchment environment may require relocation or construction of new sedimentation ponds.

5.3.3 Summary and Recommendations

A review of water management reporting and data is required to assess the existing stormwater management regime on the site including the SWMP, the site EPL and any other relevant documentation and plans, particularly those relating to the future use of the site. The review would also consider the effectiveness of existing onsite structures. Mitigation measures would also be recommended as part of the review.

Water management would be further investigated as part of the EA.

5.4 Soils and Geology

5.4.1 Existing Environment

Geology

The site is geologically located within the Sydney Basin. The underlying geology of the site is generally characterised by the Liverpool Sub-Group of Wianamatta shales. The Liverpool Sub-Group is described as shale with some sandstone beds, these layers being Bringelly Shale, Minchinbury Sandstone and Ashfield Shale. The site is predominately underlain by the Bringelly Shale formation (Katauskas, 2005).

Areas of the site adjacent to Badgerys Creek are also likely to encounter alluvium deposits, gravel, sand, silt and clay as described by the Sydney Geological Map Sheet 1:25000.

Soil Landscapes

A review of the Soil Conservation Service maps was undertaken to determine the distribution of soil landscapes within the area. Based on the Penrith Soil Landscape Series Sheet 9030, two soil groups apply to the study area, the characteristics of which are summarised below.

Blacktown Soil Landscape

- The landscape is described as gentle undulating with the general fertility of the soils moderate to low.
- Vegetation is described as extensively cleared eucalypt low open-forest and eucalypt low woodland with sclerophyllous shrub understorey.
- Erosion hazard for non-concentrated flows is generally moderate and may range from slight to extreme.

South Creek Soil Landscape

- Landscape is described as flat to gently sloping alluvial plain with floodplains, valley flats and drainage depressions.
- Vegetation is described as mainly cleared with some tall shrubland on elevated streambanks.
- Limitations associated with this soil type include flood hazard and very high to extreme erosion hazard.

Soil management at the site is generally well established, with controls in place to ensure erosion is minimised and sediment is captured on site.

5.4.2 Issues for Consideration

The areas containing the potential for soil erosion are the pits in which quarrying has occurred or is currently occurring, the raw material and waste stockpiles and the unsealed access roads. The main pollutants arising from these areas are coarse to fine sediments. Boral has implemented a range of mitigation measures on the site to ensure the control of coarse particulates in addition to the existing SWMP.

Soil contamination, erosion potential and underlying geology would be considered in respect of future quarrying and stockpiling as part of the EA.

5.4.3 Summary and Recommendations

Further assessment of the potential issues relating to the management of soils and geology in respect of continued and expanded quarrying activities would be undertaken as part of the EA.

5.5 Hazard and Risk

5.5.1 Existing Environment

The brickworks operate under an existing risk management policy and maintain a reasonably incident free record over the past 20 years of operation.

Areas of bushfire prone land have been identified on the site with areas of Category 1 vegetation present along the creek lines in the far west and far east of the Boral property. Active works, however, do not operate in close proximity to these areas.

5.5.2 Issues for Consideration

As previously mentioned in **Section 3.2.5**, SEPP 33 is aimed at ensuring hazard and risk for potential hazardous and offensive industries is assessed. Although the proposal does not fall within the definition of an 'industry' under LLEP 2008 and therefore SEPP 33 does not strictly apply, hazard and risk would be assessed as part of the proposal.

Operations on site including quarrying, brick production and handling and general transport movements have the potential for risk. Other risk factors include stability of stockpiles and individual risk to employees. As the site has areas of bushfire prone land, the risk of bushfire would also need to be considered.

A screening of potential hazards and existing mitigation measures would provide likely risk factors for future development purposes.

Legislative and regulatory guidelines would be considered in the assessment along with the provisions for fuel storage.

5.5.3 Summary and Recommendations

A discussion of hazard and risk would be included as part of the EA and would generally involve:

- Identification of hazards, including storage of Dangerous Goods;
- Identification of proposed safeguards;
- Estimation of the magnitude of the consequences of incidents; and
- Comparison of risk against the relevant guidelines and criteria.

Risks associated with the extension of operation of the brickworks are expected to be manageable provided mitigation measures are implemented.

6.0 Biological Effects

6.1 Ecology

6.1.1 Existing Environment

The investigation area is located in south-west Sydney within the Liverpool LGA and covers an area of approximately 200 ha. The areas currently utilised for brickwork operations have been cleared of natural vegetation. The surrounding paddocks largely comprise pasture, with some scattered stands of vegetation and isolated trees. The majority of undisturbed vegetation occurs along the property boundaries adjacent to Badgerys Creek and South Creek, where quarrying and brick making works do not take place.

6.1.2 Issues for Consideration

As part of the Project, the Proponent does not propose to clear large stands of trees or other vegetation. The potential impacts of the Project on the ecology of the area would be therefore be largely indirect, related to the potential for uncontained surface water runoff and coarse particulates from stockpiles and quarrying activities and transport over the unsealed access roads. The potential for impacts upon Badgerys Creek and South Creek will be considered, however as all stormwater is controlled on site, it is unlikely that potential impacts would be significant.

Other potential impacts on the ecology of the area include noise disturbance, weed invasion and sedimentation and erosion.

6.1.3 Preliminary Assessment

A review of existing records for threatened flora and fauna and communities within a 10km radius of the site was conducted to determine those that might be present within the site area. These records were obtained from the NSW DECCW *Atlas of NSW Wildlife*. A search of the Commonwealth EPBC Act *Protected Matters Database* was also conducted (August 2009) to determine the potential for impacts upon matters of NES.

These records are used as a guide to the possible existence of the species or its potential habitat within a study area (i.e. the species most likely to inhabit an area). They are not, however, exclusive of other threatened species listed under the NSW *Threatened Species Conservation Act 1995 (TSC Act)* or the EPBC Act which may be present but not previously recorded in a study area.

A review of the NSW National Parks and Wildlife Service (NPWS) 1:25 00 Maps of Native Vegetation of the Cumberland Plain was also undertaken, the results of which are described under *Native Vegetation of the Cumberland Plain*.

Endangered Ecological Communities

The *Cumberland Plain Vegetation Mapping Project* undertaken by the DECCW identifies the vegetation adjacent to Badgerys Creek and South Creek as *Alluvial Woodland*, with small portions of *Shale Plains Woodland* and *Shale Hills Woodland*. *Alluvial Woodland* is a component of the *Sydney Coastal River Flat Forest* Endangered Ecological Community (EEC), while *Shale Plains Woodland* and *Shale Hills Woodland* form part of the *Cumberland Plain Woodland* EEC.

The search of the *Protected Matters Database* also identified *Cumberland Plain Woodland* as an EEC likely to occur within the area.

Threatened Flora

Through the utilisation of the DECCW Atlas of NSW Wildlife Atlas and the DEWHA Protected Matters Database search, several species of threatened flora were identified as having previously been recorded, or have the potential to occur, within 10km of the Project Area. These threatened flora are listed in **Appendix B** and include:

- Ten species listed under the *EPBC Act*, comprising of:
 - One species listed as critically endangered;
 - Three species listed as endangered; and
 - Six species listed as vulnerable.
- 13 species listed under the *NSW TSC Act*, comprising of:
 - Nine species listed as endangered; and
 - Four species listed as vulnerable

Threatened Fauna

Several species of threatened and/or migratory fauna were identified in the *DECCW Atlas of NSW Wildlife Atlas* and the *DEWHA Protected Matters Database* search as having previously been recorded, or have the potential to occur, within 10km of the site. These threatened fauna are listed in **Appendix B** and include:

- 13 species listed under the *EPBC Act*, comprising of:
 - Four species listed as endangered (one amphibian, two birds, one mammal);
 - Nine species listed as vulnerable (three amphibians, one reptile, one bird, four mammals);
- 16 species listed under the *NSW TSC Act*, comprising of:
 - Four species listed as endangered (one amphibian, two birds, one invertebrate); and
 - 12 species listed as vulnerable (five birds, seven mammals)

The DEWHA on-line EPBC Act *Protected Matters Database* search also identified two threatened aquatic species with the potential to occur in the study area should suitable habitat be present - the Macquarie Perch (Endangered) and Australian Grayling (Vulnerable). The search also identified five migratory birds that have the potential to occur or the potential for suitable habitat to occur in the area.

Native Vegetation of the Cumberland Plain

Review of the NSW NPWS native vegetation maps has identified the presence of a number of ecological communities located adjacent to Badgerys Creek and South Creek and both scattered stands and isolated trees within the site itself. Adjacent to South Creek, *Alluvial Woodland* occurs along the full length of the creek adjoining the site. This community also occurs adjacent to Badgerys Creek and its tributary in the south west portion of the site. Scattered stands of *Shale Plains* occur in the east and south west portions of the site. Other scattered vegetation communities are noted in the north and central portions of the site.

Summary and Recommendations

A flora and fauna assessment would be undertaken as part of the EA to determine the potential impacts to threatened species, populations and endangered ecological communities as a result of the proposed continuation of quarrying and brick making activities across the site, and to establish appropriate mitigation and management measures to ensure that identified impacts are minimised.

The flora and fauna assessment would involve the following:

- Data Collation and Literature Review;
- Site Assessment and Targeted Field Survey (including habitat potential and listed threatened and vulnerable species);
- Mapping (where relevant);
- Consideration of relevant legislative requirements;
- Identification of potential impacts and key threatening processes; and
- Recommendations for management.

A full ecological report would be provided with the EA.

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7.0 Community Effects

7.1 Socio-economic

7.1.1 Liverpool LGA

Liverpool LGA is located in Sydney's outer southwest approximately 41 km from the Sydney CBD and is bounded by several different LGAs including Penrith and Fairfield to the north, Bankstown to the east, Sutherland to the south-east, Campbelltown City and the Camden to the south, and Wollondilly to the west. Liverpool LGA stretches over some 305km² and comprises rapidly growing residential areas whilst maintaining large industrial, commercial and rural areas.

7.1.2 Population Characteristics

Liverpool had a total population of 164,603 people according to 2006 ABS Census data with a population density of some 5.38 people per hectare. Recent trends show a growing population in the west and south west areas to which Liverpool is no exception. Liverpool experienced a population growth of approximately 1.4% per annum between Census years 2001 and 2006, and 1.9% in 2007-2008 (ABS, 2009). Liverpool was the fourth largest growth LGA for the period 2007-2008 within the State (ABS, 2009).

The area has a predominately younger population when considered against State averages with a mean age of 32 compared to the State average of 37. The percentage of people under the age of 54 was consistently higher than that of the NSW average also supporting a young and growing population.

7.1.3 Dwelling Characteristics

As part of the *South West Growth Plan*, 155,000 new dwellings are proposed to support population growth within the South West subregion, of which Liverpool LGA forms a part, over the next 25 years.

Compared to the Sydney statistical region, Liverpool comprises generally larger households with 40.7% having three or more persons living in the home, compared to Sydney's 28.9%.

Analysis of the housing tenure of the population of LCC compared to the State average from the 2006 Census shows there is a smaller percentage of people who owned their dwelling; a larger proportion of people purchasing their dwelling; and an average proportion of people renting (LCC, 2009). Between 2001 and 2006, the most significant tenure change was an increase in the number of households being purchased, growing by approximately 7.2% per annum.

7.1.4 Employment

Full-time employment in the area is above the State average however, the overall unemployment rate (7.1%) is significantly higher than NSW average (5.9%) according to the 2006 Census.

Compared to the State, Liverpool has a higher proportion of people working as technicians and trades workers, labourers, and machinery operators and drivers.

Boral currently employs 55 workers from the local area to work in brick production and handling. Up to ten contractors work in the quarrying areas onsite. Boral provides direct employment benefits to staff working onsite as well as indirect employment benefits through flow on effects in the local community.

7.1.5 Issues for Consideration

The potential socio-economic impacts of the proposed continuation of quarrying and brick making operations relate to the direct and indirect employment impacts and benefits and the future implications of growth in the south west as part of the SWGC.

The continued quarrying and brick making at the site would ensure a continued and local supply of an important source of construction material to facilitate the development of the SWGC. The *Boral Limited Annual Review 2008* reported that demand for concrete in Australia were at record levels with infrastructure activity driving industry concrete volumes up 7%. To meet this growing demand, Boral is investing in further construction materials capacity to supply growing markets in the local and wider area.

As development in the south west accelerates, it will be increasingly vital that the supply of product is able to meet the growing demand. Should works at Boral Badgerys Creek cease, this supply to the local community would be lost. Also as a result of closure, jobs would be lost not only directly at the site, but indirectly through flow on effects.

7.1.6 Summary and Recommendations

Although the site has been identified as 'future industrial', future residential development is proposed within the vicinity and regional area of the works and hence has the potential to influence, or be influenced by, the quarrying and brickmaking operations. Production demand may be affected by residential growth as new dwellings are constructed and require a supply of construction materials to facilitate the growth. A more detailed assessment of the potential socio-economic impacts of the proposal would be undertaken as part of the EA.

7.2 Traffic and Transport

7.2.1 Existing Environment

Traffic generated as a consequence of the existing operations at the site is in the order of 120 truck movements (including pick-ups and deliveries) on weekdays with around 24 movements occurring on Saturdays. Employees account for 150 movements (includes in and out). The site provides for adequate truck loading and unloading facilities and includes 50 on-site employee parking spaces and 12 visitor spaces.

Access to the site is via Martins Road which intersects with Elizabeth Drive some 2 kilometres to the north. Elizabeth Drive is a main B-double route within the Liverpool LGA.

As part of the proposal, Boral is seeking approval to extend its current operating hours from 6am to 6pm to 6am to 10pm to allow for continued loading and unloading of goods outside the current operating hours. Traffic management protocols would be established to manage traffic and haulage routes as well as driver behaviour during these extended hours.

7.2.2 Issues for Consideration

The proposed works are not expected to result in a significant increase in the number or frequency of truck movements to and from the site. Similarly, the number of employees on the site would remain largely unchanged and therefore there would be no need for additional on-site parking. No changes to the access arrangements of the site are being proposed and it's therefore expected that the overall traffic impacts would remain unchanged from the existing development. However, the proposed extension to operating hours, subject to compliance with the appropriate guidelines would result in prolonged traffic impacts on a daily basis.

Traffic generation as a result of the proposed continuation of operations at the site is expected to be minimal.

7.2.3 Summary and Recommendations

A traffic impact assessment is required to assess traffic conditions on site and adequately assess the cumulative traffic impacts of the proposal in relation to significant existing and future proposed development in the area. The EA would provide an accurate picture of traffic movements related to the proposal and the potential impacts of these upon the local and regional road networks.

It would also take account of both existing and future transportation infrastructure.

7.3 Cultural Heritage

7.3.1 Existing Environment

The site is largely disturbed in nature and there are no previous records of items of cultural heritage within the site boundary. Schedule 5 of LLEP 2008 and the associated Heritage Map identifies two heritage items in the vicinity of the site being St John's Anglican Church Group (church and cemetery) and the Badgerys Creek Public School. Neither of these sites are affected by the quarry and brickworks.

No previous heritage surveys have been undertaken at the site.

7.3.2 Issues for Consideration

Aboriginal heritage items are resilient to past rural land use impacts and, if present prior to farming, will still be present although somewhat displaced. Historic heritage features may be present in association with past farming practices or early signs of settlement in the area.

No records of items of cultural significance have been observed at the site and it is unlikely any Aboriginal heritage items are present within the operational area of the site as it has undergone extensive quarrying and is highly disturbed. Surrounding land use is pastoral and is also unlikely to maintain items of cultural significance. However, as no previous surveys have been undertaken, a heritage assessment would be undertaken as part of the EA.

7.3.3 Summary and Recommendations

It is considered unlikely that items of cultural significance exist throughout the site however an investigation would be undertaken as part of the EA. The heritage assessment would generally involve the following:

- Archaeological literature and database review;
- Field survey and heritage inspection;
- Assessment of significance of identified items;
- Mapping heritage constraints; and
- Identification of management procedures.

7.4 Visual

7.4.1 Existing Environment

The topography of the land surrounding the site is gently undulating. Land to the west of the site rises to a spot height of 93m AHD west of Badgerys Creek. Further to the south-west near The Northern Road land rises to 110m AHD and to the east the land is undulating to flat, at a level of between 50 -70m AHD.

The landscape of the site is dominated by the existing quarry pits, stockpiles, sedimentation basins and structures associated with the brickworks. Overburden mounds, bunds and vegetation provide screening of the site from surrounding properties.

Development in the surrounding area is characterised by rural residential development interspersed with some agricultural enterprises and rural industry. Generally, land surrounding the site has been cleared for these purposes. Rural-residential land holdings are of varied sizes and other surrounding land uses include a chicken farm, market gardens, greenhouses, horse farms, grazing and other agricultural activities.

The landscape of the general area is predominantly agricultural pastures and grasslands with some remnant or regrowth vegetation, particularly along drainage lines and creeks which include Badgerys Creek, South Creek and tributaries.

The recent rehabilitation of the Western Stockpile received planted local native woodland tubestock as well as direct seeding in order to act as visual screening in some areas.

7.4.2 Issues for Consideration

The visual impacts of the proposed operations are expected to be largely unchanged from the existing visual environment of the site as the proposed operations would be generally consistent with the existing features of the site. The future proposed quarry area to the north and east of the Production Facility and associated stockpiles would be the most significant change to the appearance of the site. Quarry areas are to be located on land currently leased as a dairy farm and would therefore result in a change in the character and landscape of this portion of the site, as well as views across this area of the site.

Screen tree planting and bunding would be implemented where appropriate to minimise any visual impact as a result of future extraction and new overburden mounds associated with new pits would be located such that surrounding properties are adequately screened. Any visual impact would however be viewed in the context of the existing quarry landscape and infrastructure associated with the brickworks.

The potential visual impacts associated with the proposed project, particularly those related to the proposed new quarry areas would be further assessed as part of the EA. It is expected that the overall visual character of the site would remain largely unchanged and would be consistent with the future industrial development earmarked for the site and surrounds under the *Sydney Metropolitan Strategy*.

7.4.3 Summary and Recommendations

An assessment of the visual impacts of the proposed works and mitigation measures would be detailed as part of the EA.

7.5 Land Use

7.5.1 Existing Environment

Existing land use in the vicinity of the site includes farming and grazing, chicken farming to the south, agricultural enterprises including a large commercial nursery to the north in addition to rural residential properties to the north and east. The area is generally rural in nature and largely cleared.

The site is zoned as Rural RU1 (Primary Production) which is consistent with the land to the north and south of the site. Land to the west of the site (otherside of Badgerys Creek) is zoned as Special Activities SP1 (Commonwealth activities), and land to the east of the site (otherside of South Creek) zoned as Rural RU4 (Rural Small Holdings).

7.5.2 Issues for Consideration

The *Sydney Metropolitan Strategy* identifies several growth centres including the SWGC located within the boundaries of three LGAs- Liverpool, Camden and Campbelltown. It comprises of 18 Precincts and is approximately 17,000 hectares with an approximate capacity for around 110,000 new homes. Badgerys Creek is located within the Liverpool LGA and forms part of the SWGC. Planning of the SWGC and its precincts is ongoing.

The subject site is earmarked under the *Sydney Metropolitan Strategy* as 'future industrial'. This precinct has not yet been released and it is not known when release of this land is planned to occur.

7.5.3 Summary and Recommendations

As the site is located within the SWGC, the proposed extension of operations will consider compatibility with future land use as an important component of the EA. Although the site has been identified as 'future industrial' and not a future residential area, the SWGC still has the potential to impact on the development. Boral Badgerys Creek is not expected to be inconsistent with the objectives of the SWGC and *Sydney Metropolitan Strategy* but will be further considered as part of the EA.

7.6 Rehabilitation

7.6.1 Existing Environment

As mentioned previously in this report (**Section 2.5.5**) some areas of the site have undergone rehabilitation in accordance with the site's original consent (shown in **Figure 3**), as well as the RP.

The RP prepared provided some general principles on the progressive rehabilitation of the site and also included more specific rehabilitation strategies related to the western stockpile, including the reshaping and revegetation of the stockpile and erosion and sediment control in its vicinity.

As part of the EA, a broad, strategic rehabilitation plan would be provided, taking into consideration potential future land uses at the site following the cessation of quarrying activities.

7.6.2 Issues for Consideration

Whilst the RP provides a strategy, design and landform for progressive rehabilitation and outlines final land use planning, no long term strategic rehabilitation plan exists for the closure and final landform and use of the site.

As previously mentioned, the subject site is earmarked as 'future industrial' to which the final land use of the site must be consistent.

7.6.3 Summary and Recommendations

Progressively rehabilitation has been undertaken on the site as part of existing operations and original consent, however, no long term strategy has been developed. A detailed RP would be developed as part of the EA to consider the longer term rehabilitation and future use of the site once quarrying operations have ceased. The Rehabilitation Plan would include closure and final rehabilitation plans for:

- Quarrying activities including the currently operational and future operational pits;
- Waste, overburden and raw material stockpiles;
- Sediment basins;
- Infrastructure including the brick handling building and office facility;
- Existing hardstand areas; and
- Other ancillary infrastructure as part of the operation.

Existing rehabilitated areas would also be considered in the final landform planning in the development of the RP. The final land use will consider future release areas as part of the SWGC and be further detailed in the EA.

8.0 Resource Implications

8.1 Introduction

An overview of the expected impacts on community, natural and transportation resources is provided in the following sections.

8.2 Community

It is unlikely the proposed works would have a significant impact on community resources during the commissioning phase of the new quarrying area. The existing workforce is utilised in both construction and operation phases of works onsite. The existing workforce is absorbed from the local skills pool and that of the wider south west region. It is expected the workforce as part of the continued operations would remain consistent.

Impacts of the proposed works are expected to be similar to existing impacts in terms of community resources, however would occur for an extended period of time. Existing impacts include community impacts on local goods and services and the local transport infrastructure and environment.

Given the minor changes in operational employment opportunities, it is unlikely there would be a significant increase in demand for community resources.

8.3 Natural

The proposed Project is seeking to continue the extraction of a natural resource, being clay, shale and sandstone, to produce bricks for commercial supply. In this regard, the proposal would impact on this resource, through its proposed extraction and subsequent consumption. The extraction of resources would be in line with market demand, however management and mitigation measures would ensure impacts are minimised. The area would be satisfactorily rehabilitated using methods identified in the site RP once activities have been completed.

Other natural resources utilised in the works include water resources. Water is required for dust suppression measures on site, as well as being part of the brick making process as described in **Section 2.5**. The proposal is not expected to impact significantly on water resources given that the site would operate under a closed cycle water system where water is recycled and reused at different areas on site. In addition, appropriate management and mitigation measures would be implemented on the site in accordance with the existing SWMP and any additional measures recommended by the EA. The EA would describe water management practices proposed as part of the works.

8.4 Transportation

The proposed works has the potential to generate some additional traffic during the commissioning of future pits within the landholding. Some additional traffic may also be generated as a result of minor increases in output from the site.

It is not expected that significant additional demands would be placed on existing roads and routes. The proposed Project is not expected to generate significant additional traffic, however existing heavy and light vehicle traffic associated with the quarry and brickworks operations would continue over a longer period. A traffic assessment would be undertaken as part of the EA to provide an accurate picture of traffic movements related to the proposal and the potential impacts of these upon the local and regional road networks. The assessment would also consider the cumulative traffic impacts of the proposal in relation to significant existing and future proposed development in the area. The assessment would take into account both existing and future transportation infrastructure.

9.0 Prioritisation of Environmental Issues

9.1 Issues Identification

As identified in **Sections 5 to 8** of this report, the list of issues associated with the Project include:

- Air quality;
- Noise and vibration;
- Water;
- Transport and traffic;
- Land use;
- Visual impact;
- Ecology;
- Heritage;
- Rehabilitation;
- Hazard and risk; and
- Social and economic.

9.2 Prioritisation of Issues

9.2.1 Approach

The prioritisation of issues for the proposed continued operations is based on the need to recognise that the higher the potential severity of adverse environmental effects and the greater the consequence of those unmanaged effects, the higher the degree of environmental assessment required.

Where a high potential effect was identified, the attribute or issue was allocated a higher priority for assessment.

Table 3 provides the Issues Prioritisation Matrix upon which the ranking of environmental issues has been based. This method assesses priority on the basis of the potential severity of environmental effects and the likely consequences of those potential effects if unmanaged. The potential severity and consequence of the environmental effect are each given a numerical value between 1 and 3. The numbers are added together to provide a result which is then ranked and shaded in the matrix by the level of priority being High, Medium or Low.

Table 3: Issues Prioritisation Matrix

Severity Of Effects	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)

9.2.2 Assessment

The prioritisation of environmental issues related to the Project is shown in **Table 4**. This assessment aims to allow the prioritisation of issues for assessment and does not consider the application of mitigation measures to manage environmental effects. In all cases, appropriate and proven mitigation measures, chosen based upon the experience of regulators and other similar projects would be used to minimise potential impacts. These measures would be described in detail in the EA prepared for the proposed extension of operations.

The allocation of risk is based upon the following considerations:

Severity of Risk

- Low: localised implications; imperceptible or short term cumulative impacts.
- Medium: regional implications; modest or medium term cumulation of impacts.
- High: inter-regional implications: serious or long term cumulation of impacts.

Consequences of Unmanaged Effects

- Low: minor environmental change; offsets readily available.
- Medium: moderate adverse environmental change; offsets available.
- High: important adverse environmental change, offsets not readily available.

Table 4: Prioritisation Analysis

Issue	Severity	Consequence	Priority
Aspect: Air Quality			
Quarry related impacts on air quality such as dust generation and vehicle emissions	2	2	4 (Medium)
Dust generation and vehicle emissions during brick making and handling activities	1	2	3 (Low)
Community concern regarding degradation of air quality.	1	2	3 (Low)
Regional and inter-regional impacts upon air quality.	1	2	3 (Low)
Aspect: Water			
Degradation of surface water quality in the local area during quarrying activities.	1	2	3 (Low)

Issue	Severity	Consequence	Priority
Degradation of surface water quality in the local area during operation of brickworks	1	2	3 (Low)
Release waters into the surface drainage, including the potential for saline waters or sediment laden waters	2	2	4 (Medium)
Release of surface water runoff into Badgerys Creek or South Creek	1	2	3 (Low)
Dewatering and disruption to groundwater aquifers due to activities	1	2	3 (Low)
Aspect: Noise and Vibration			
Noise nuisance to local residents during quarrying activities	1	2	3 (Low)
Noise nuisance to local residents during brick making and handling	1	2	3 (Low)
Noise nuisance to local residents as an effect of traffic and transport movements	2	2	4 (Medium)
Aspect: Geology and Soils			
Erosion and sedimentation during quarrying activities	1	2	3 (Low)
Erosion and sedimentation during brick making and handling activities	1	1	2 (Low)
Potential geotechnical impacts as a result of quarrying activities	1	2	3 (Low)
Contamination and sterilisation of land for future uses.	1	2	3 (Low)

Issue	Severity	Consequence	Priority
Aspect: Hazard and Risk			
Exposure of surrounding land uses to risks and hazards during quarrying.	1	1	2 (Low)
Exposure of surrounding land uses to risks and hazards during brick making and handling	1	1	2 (Low)
Exposure of employees to risks and hazards	1	2	3 (Low)
Aspect: Ecological			
Loss of habitat due to clearing and quarrying	1	1	2 (Low)
Reduction in biodiversity due to loss of habitat for native species	1	1	2 (Low)
Spread of weeds and feral animals	1	1	2 (Low)
Impact upon threatened species	1	1	2 (Low)
Impact upon aquatic ecology of Badgerys Creek and South Creek	1	2	3 (Low)
Aspect: Socio-Economic			
Demand upon community, natural or transport resources	1	1	2 (Low)
Impacts upon amenity of surrounding properties such as noise, visual, etc	1	2	3 (Low)
Job creation during construction	1	1	2 (Low)
Job creation during operation	1	1	2 (Low)
Aspect: Traffic and Transportation			
Impact on traffic on local road network due to continued operations	2	2	4 (Medium)
Impact on regional road network	1	1	2 (Low)

Issue	Severity	Consequence	Priority
Aspect: Cultural Heritage			
Impacts on Non-Indigenous heritage	1	1	2 (Low)
Impacts on Indigenous heritage.	1	1	2 (Low)
Visual Impacts			
Visual impacts during quarrying activities	1	2	3 (Low)
Visual impacts during brick making and handling activities	1	1	2 (Low)
Aspect: Land Use			
Inappropriate use of land	1	1	2 (Low)
Incompatibility of land use with surrounding environment	1	2	3 (Low)
Incompatibility of land use with new land uses proposed for area	2	2	4 (Medium)
Aspect: Rehabilitation			
Impacts on soils and water quality as a result of rehabilitation works	1	2	3 (Low)
Impacts on air quality (dust) as a result of rehabilitation work	2	1	3 (Low)
Compatibility of final land use with future environment	2	2	4 (Medium)

Table 5 identifies that the prioritisation of environmental issues, and therefore the focus of assessment for the proposed project should be as follows:

Table 5: Prioritisation of Issues

Low	Medium	High
Hazard and Risk Ecology Socio-Economic Cultural Heritage Visual Geology and Soils (Soil erosion impacts)	Air quality Water Noise and Vibration Traffic and Transportation Land Use Rehabilitation	None

10.0 Findings

The EA for the continued operations of Boral Badgerys Creek would focus on the key impacts of the environmental factors addressed in **Sections 5 to 8**. This PEA has identified the key environmental issues as being:

- Air Quality;
- Water;
- Noise and Vibration;
- Land Use;
- Traffic and Transport; and
- Rehabilitation.

10.1 Air Quality

As previously mentioned, Boral currently undertakes annual monitoring in compliance with the existing EPL consent conditions. It has been indicated that coarse particulates and dust is the primary air quality issue to be taken into consideration for assessment. It will be important for the EA to address the impact on both the existing and future environment, and to take into account potential impacts, and to identify appropriate mitigation measures (such as watering and dust suppression) to manage potential impacts.

The existing operation has demonstrated existing management plans are capable of mitigating potential impacts. The EA will consider successfully integrating further mitigation measures for future works to ensure minimal air quality impacts on the site and local area. Rehabilitation and design planning measures would ensure adequate landscaping and soil amelioration post closure of quarry and stockpile locations.

Air quality impacts are expected to be manageable given management and mitigation measures are implemented.

10.2 Water

The site is located within the South Creek and Badgerys Creek catchments which are part of the greater Hawkesbury catchment area. The site has internal surface stormwater catchments which drain to sediment ponds for re-use on site.

Boral has advised that insignificant quantities of groundwater have been encountered during quarrying to date and historically, no groundwater monitoring has been conducted on the site.

As the continued operations are likely to impact existing water conditions, the EA will investigate onsite water catchments and potential impacts on the surrounding environment including direct and indirect impacts on Badgerys Creek and South Creek.

Impacts on surface and groundwater associated with commissioning of new quarry areas and continued operation of brickwork activities are expected to be manageable given no discharge occurs offsite and provided appropriate mitigation measures are developed.

10.3 Noise and Vibration

The existing environment within which the operations are located is predominantly rural in nature with agricultural and residential use and areas planned for future industrial development. In this regard, co-existence of the proposed project and future development will be considered in the EA.

Noise impacts from the continued operations are primarily expected to be from the future commissioning of pit areas. In addition to the existing noise environment created from the brickworks, impacts resulting from the further quarrying are expected to be associated with site preparation, earthworks, and truck movements.

As noise impacts from the site are expected as a result of a slightly modified continued operational environment, identification and implementation of specific noise mitigation will be addressed in a detailed assessment.

A noise report will be undertaken as part of the EA to establish background noise levels, potential impacts and identification of mitigation measures.

10.4 Land Use

Existing land use in the area is generally for agricultural purposes including chicken farming in the south, dairy farming in the north and scattered market gardens associated with rural residential properties in the vicinity of the site. The area is generally rural in nature and is largely cleared.

The subject site is earmarked under the *Sydney Metropolitan Strategy* as 'future industrial'. This precinct has not yet been released and it is not known when release of this land is planned to occur. The compatibility of the proposed extension of operations with the future land use is considered an important component of the EA and will be taken into consideration in conjunction with the objectives of the SWGC.

10.5 Traffic and Transport

Existing traffic is generated from deliveries to and from the site associated with operation of the Production Facility and from employees commuting to the site. No previous traffic impact assessments have been undertaken for the site. Boral is seeking approval to extend its current operating hours from 6am to 6 pm to 6am to 10pm. An extension to the site operating hours has the potential to prolong daily traffic impacts.

A traffic assessment will be undertaken as part of the EA, to establish the existing traffic environment and capacity levels, potential impacts and identification of mitigation measures.

10.6 Rehabilitation

Progressive rehabilitation of the site is already underway, however the longer term rehabilitation following closure of the quarry is a key consideration to ensure that the land is returned to a productive use, compatible with existing and future planned land uses in the area. This issue is of even greater importance given the location of the site within the SWGC under the DoP's Metropolitan Strategy. A long term RP would be prepared as part of the EA for the Project to address these issues.

10.7 Other Environmental Issues

In addition to the key environmental issues, other environmental issues have been identified as follows:

- Soils and Geology;
- Hazard and Risk;
- Flora and fauna;
- Socio-economic
- Cultural heritage;
- Visual impacts; and
- Land Use.

The impacts associated with these other environmental issues are not expected to be significant and/or are confined primarily to existing levels of impact of the site. The impacts are likely to be able to be managed through the design of the project and the implementation of standard and proven mitigation.

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11.0 Concluding Statement

11.1 Level of Assessment

This PEA has undertaken an initial appraisal of potential effects associated with the activities proposed as part of the Project and has identified key environmental issues for the project which are:

- Air Quality;
- Water;
- Noise and Vibration;
- Land Use;
- Traffic and Transport; and
- Rehabilitation.

These issues would be considered in detail in the EA. Other environmental issues would be addressed as part of the EA, although such issues are not expected to have significant effects and would be managed through the implementation of appropriate mitigation measures and consultation with landowners.

11.2 Approvals Process

As discussed in **Section 3.2.2**, the Project meets the criteria of SEPP 2005 and is therefore a candidate for assessment under Part 3A of the EP&A Act, subject to the Minister declaring the project as a 'major development'. Concept Plan and Concurrent Project Approval is sought for the project, subject to the Minister authorising the submission of a Concept Plan. On the basis of the Minister's decision on this PEA, authorisation for the submission of a Concept Plan and the DGRs for this project would be requested.

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12.0 References

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Figures

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Figure F1: Boral Badgerys Creek - Project Location

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Figure F2: Boral Badgerys Creek - Existing Site Layout

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Figure F3: Boral Badgerys Creek - Proposed Site Layout

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Figure F4: Boral Badgerys Creek - Brick Production and Handling Facility Layout

Appendix A

Flora and Fauna database search findings

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Table 6: Threatened flora recorded or potentially occurring within 10 km of the site

Family Name	Scientific Name	Common Name	Status EPBC Act ¹	Status TSC Act ²	DECC NSW Wildlife Atlas record	DEWHA Protected Matter result
Apocynaceae	<i>Cynanchum elegans</i>	White-flowered Wax Plant	E	E1	✓	✓
Apocynaceae	<i>Marsdenia viridiflora</i>	Marsdenia viridiflora	-	E2	✓	-
Fabaceae (Faboideae)	<i>Dillwynia tenuifolia</i>	-	-	V	✓	-
Fabaceae (Faboideae)	<i>Dillwynia tenuifolia</i>	Dillwynia tenuifolia, Kemps Creek	V	E2	✓	✓
Fabaceae (Faboideae)	<i>Pultenaea parviflora</i>	-	V	E1	✓	✓
Fabaceae (Mimosoideae)	<i>Acacia pubescens</i>	Downy Wattle	V	V	✓	✓
Lobeliaceae	<i>Hypsela sessiliflora</i>	-	-	E1	✓	-
Myrtaceae	<i>Eucalyptus scoparia</i>	Wallangarra White Gum	-	E1	✓	-
Myrtaceae	<i>Eucalyptus benthamii</i>	Camden White Gum, Nepean White Gum	V	-	-	✓
Myrtaceae	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	-	E1	✓	-
Orchidaceae	<i>Thelymitra</i> sp <i>Kangaloon</i> (D.L.Jones 18108)	Kangaloon Sun-orchid	CE	-	-	✓
Proteaceae	<i>Grevillea juniperina</i> ssp. <i>juniperina</i>	Juniper-leaved Grevillea	-	V	✓	-
Proteaceae	<i>Grevillea parviflora</i> ssp. <i>parviflora</i>	Small-flower Grevillea	V	V	✓	✓
Proteaceae	<i>Persoonia nutans</i>	Nodding Geebung	E	E1	✓	✓
Rhamnaceae	<i>Pomaderris brunnea</i>	Rufous Pomaderris	V	-	-	✓
Thymelaeaceae	<i>Pimelea spicata</i>	Spiked Rice-flower	E	E1	✓	✓

Table 7: Threatened fauna recorded or potentially occurring within 10 km of the site

Family Name	Scientific Name	Common Name	Status EPBC Act ¹	Status TSC Act ²	DECC NSW Wildlife Atlas record	DEWHA Protected Matter result
Amphibians						
Hylidae	<i>Litoria aurea</i>	Green and Golden Bell Frog	V	E1	✓	✓
Hylidae	<i>Litoria raniformis</i>	Southern Bell Frog, Green and Golden Frog	V	-	-	✓
Myobatrachidae	<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	-	-	✓
Myobatrachidae	<i>Mixophyes iteratus</i>	Giant Barred Frog, Southern Barred Frog	E	-	-	✓
Reptiles						
Elapidae	<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	V	-	-	✓
Birds						
Acanthizidae	<i>Pyrholaemus sagittatus</i>	Speckled Warbler	-	V	✓	-
Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew	-	E1	✓	-
Estrildidae	<i>Stagonopleura guttata</i>	Diamond Firetail	-	V	✓	-
Meliphagidae	<i>Xanthomyza phrygia</i>	Regent Honeyeater	-	E1	✓	-
Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	E	-	-	✓
Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin	-	V	✓	-
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	-	V	✓	-
Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	E	-	-	✓
Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	V	-	-	✓
Scolopacidae	<i>Limosa limosa</i>	Black-tailed Godwit	-	V	✓	-

Family Name	Scientific Name	Common Name	Status EPBC Act ¹	Status TSC Act ²	DECC NSW Wildlife Atlas record	DEWHA Protected Matter result
Invertebrates						
Camaenidae	<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	-	E1	✓	-
Mammals						
Dasyuridae	<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spotted-tailed Quoll	E	-	-	✓
Macropodidae	<i>Petrogale penicillata</i>	Brush-tailed rock wallaby	V	-	-	✓
Molossidae	<i>Mormopterus norfolkensis</i>	Easter Freetail-bat	-	V	✓	-
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	-	V	✓	-
Potoroidae	<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo	V	-	-	✓
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	✓	✓
Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	-	-	✓
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	-	V	✓	-
Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	-	V	✓	-
Vespertilionidae	<i>Myotis adversus</i>	Large-footed Myotis	-	V	✓	-
Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	-	V	✓	-

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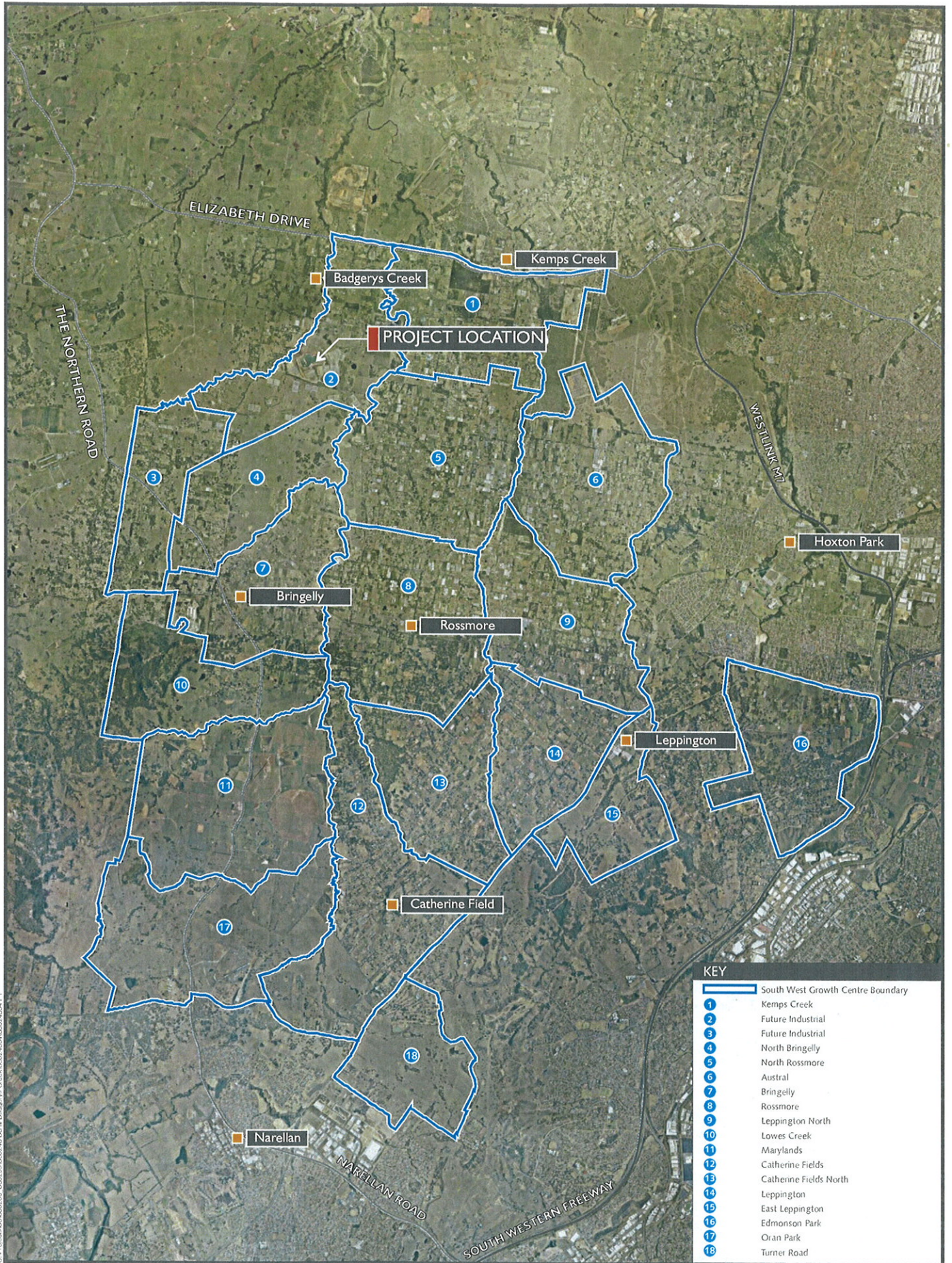
Worldwide Locations

Australia	+61-2-8484-8999
Azerbaijan	+994 12 4975881
Belgium	+32-3-540-95-86
Bolivia	+591-3-354-8564
Brazil	+55-21-3526-8160
China	+86-20-8130-3737
England	+44 1928-726006
France	+33(0)1 48 42 59 53
Germany	+49-631-341-13-62
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Malaysia	+603-7725-0380
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Philippines	+632 910 6226
Scotland	+44 (0) 1224-624624
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Turkey	+90-312-428-3667
United States	+1 978-589-3200
Venezuela	+58-212-762-63 39

Australian Locations

Adelaide
Brisbane
Canberra
Darwin
Melbourne
Newcastle
Perth
Singleton
Sydney

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KEY	
	South West Growth Centre Boundary
1	Kemps Creek
2	Future Industrial
3	Future Industrial
4	North Bringelly
5	North Rossmore
6	Austral
7	Bringelly
8	Rossmore
9	Leppington North
10	Lowes Creek
11	Marylands
12	Catherine Fields
13	Catherine Fields North
14	Leppington
15	East Leppington
16	Edmonson Park
17	Oran Park
18	Turner Road

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ENVIRONMENT

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Regional Context

Boral Bricks
 Preliminary Environmental Assessment
 Badgerys Creek

Figure F1



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KEY

- 1 Inghams
- 2 Australian Native Landscapes

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Site Location

Boral Bricks
 Preliminary Environmental Assessment
 Badgerys Creek

Figure
F2

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KEY

1	Sediment Basin 2
2	Sediment Basin 1
3	Brick Product Storage Area
4	Boral Brick Plant Raw Material Stockpile
5	Eastern Stockpile
6	Waste Stockpile
7	Rehabilitated Stockpile
8	Overburden Stockpile
9	Recent Waste Stockpile
10	Waste Stockpile
11	Phase 1 Pit
12	Phase 2 Pit
13	Western Stockpile
14	Phase 3 Pit

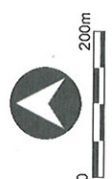


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Existing Site Layout

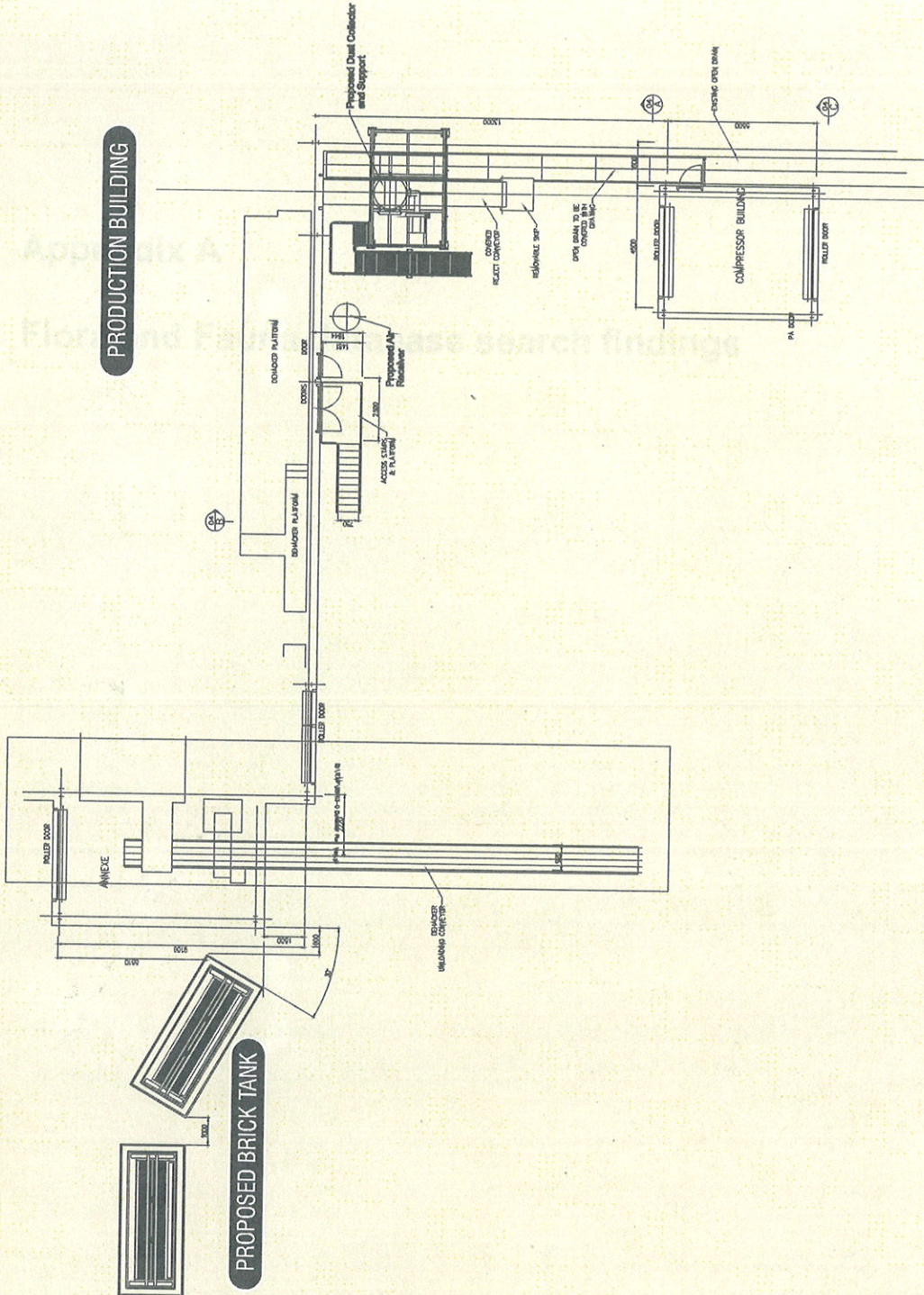
Boral Bricks
 Preliminary Environmental Assessment
 Badgerys Creek
Figure F3



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Future Pit Location
 Boral Bricks
 Preliminary Environmental Assessment
 Badgerys Creek
Figure F4

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NOT TO SCALE

Proposed Alterations and Additions
to Existing Brick Handling Building -
Plan Layout

Boral Bricks
Preliminary Environmental Assessment
Badgerys Creek

Figure
F5

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