



Badgerys Creek Brick Making Facility | Modification 2

ENVIRONMENTAL ASSESSMENT

Prepared for CSR | November 2017





Badgerys Creek Brick Making Facility

MODIFICATION 2 - ENVIRONMENTAL ASSESSMENT

Prepared for CSR Building Products Limited
November 2017

PR30

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1 INTRODUCTION

1.1 Background

In October 2016, CSR Building Products Limited (CSR) acquired Boral Bricks Pty Limited (Boral) brick business along the eastern seaboard of Australia and with it, the Badgerys Creek Brick Making Facility site ('the site'), which is strategically placed in the Western Sydney Priority Growth Area and borders on the proposed Western Sydney Airport precinct.

To realise the full potential of the Badgerys Creek site and to allow the site to meet the strategic needs of their brick, roof products and other building product manufacturing businesses, CSR requires modifications to the existing Project Approval (PA10_0014). CSR are proposing three separate modifications to their Project Approval as outlined in the following sections.

1.1.1 Modification 2

The existing Project Approval does not allow for the exportation of material extracted on-site. Due to recent and forecasted closure of many quarries in the region, reducing the availability of raw materials, CSR needs to be able to export raw material (clay) from the site. This is important for the sustainability of CSR's brick manufacturing business and to ensure an immediate and ongoing supply of raw material to other CSR brick factories.

Although the existing Project Approval allows for the storage of finished brick products in the hard stand storage yard, to the east of the brick factory, this storage area will not be used for the storage of bricks manufactured at the site, until planning approval has been granted for the upgrade of the existing brick factory and the upgrade has been completed (refer to Modification 3). In the interim CSR urgently requires additional finished product storage capacity in the greater Sydney region and therefore wishes to make use of this valuable space for the temporary storage of finished building products from other CSR manufacturing facilities e.g. autoclaved aerated concrete panels or roof products.

As the ability to export clay from the Badgerys Creek site and temporarily store finished building products is required as a matter of urgency, CSR intends to lodge a separate modification application under Section 75W of the *Environmental Planning & Assessment Act 1979* (EP&A Act) for these two activities.

This modification application is Modification 2 to the existing Project Approval and is described in detail in **Section 3.1**.

1.1.2 Modification 3

CSR has lodged a separate modification application (Modification 3) to permit the following changes to the approved project:

Advanced Manufacturing - Brick Production

- Removal of majority of the existing brick manufacturing equipment (Commons Plant) and replacement with new brick manufacturing equipment (High Grade Face Plant) in the existing brick making facility;
- Increase in the building footprint of the existing brick making facility; and
- Increase in the building footprint of the existing office to develop a NATA (National Association of Testing Authorities) Accredited Advanced Testing Laboratory.

Advanced Manufacturing - Roof Production

- Construction and operation of a roof products manufacturing facility on CSR owned land, outside the approved project boundary, immediately east of Pit 4;
- Modification to the approved project boundary to include the proposed roof products manufacturing facility, located on the adjacent property; and
- The processing of sandstone (overburden material not used in brick production) and other raw materials from approved quarry pits on-site for use in the manufacture of roof products on-site.

General

- An increase in the importation of raw materials from off-site for use in both the brick making and roof products manufacturing facilities;
- Amendment to the extent of Pit 5 to remove the buffer zone to neighbouring residential properties required under the *Mining Act 1992*;
- Improvements to the approved approach to water management on-site; and
- Modifications to the approved noise bunds.

1.1.3 Modification 4

CSR will be lodging a further separate modification application (Modification 4) to permit the following additional changes to the approved project:

- The dewatering of Pit 1 and the extraction of the remaining clay resource to a depth of 35 metres below the pre-existing natural surface of the ground;
- The importation of Virgin Excavated Natural Material (VENM) to backfill Pit 1 and potentially other pits, to rehabilitate the site and facilitate future development; and
- The establishment of a grid connected solar farm. This will allow energy security through a more diverse energy mix, initiate a clean renewable energy source on-site, reduce the greenhouse gas emissions that contribute to global warming and improve the land utilisation on the eastern flank, outside of the approved project boundary.

1.1.4 The Applicant

CSR Building Products Limited is the Applicant for the proposed modification. As CSR owns the land on which the modification to the existing Project Approval is proposed, landowner consent is not required.

CSR is an international building and construction materials group, headquartered in North Ryde, Australia. CSR's competitive position is underpinned by being a market leader in production and supply of building products for residential and commercial construction markets in Australia and New Zealand. Notable products produced by CSR include Gyprock plasterboard, Hebel, insulation, bricks and pavers, roof tiles and glass.

1.2 Site Description

As described in the *Environmental Assessment – Continuation of Operations – Quarry and Brick Making Facility, Badgerys Creek* (AECOM, 2010), the site is located at 235 Martin Road in the suburb of Badgerys Creek within Liverpool Local Government Area (LGA). Badgerys Creek is approximately 41 km south west of Sydney and 17 km west of Liverpool. Badgerys Creek is currently a small community comprising rural residences, agricultural activities, quarrying and industry. The locality supports many small rural residential holdings and a limited number of larger agricultural properties, agricultural enterprises (chicken

farms, nurseries), composting and resource recovery facilities and market gardens. The region falls within the Western Sydney Priority Growth Area under the new Sydney Metropolitan Strategy *A Plan for Growing Sydney* (December 2014). The proposed Western Sydney Airport precinct lies to the west of the site. The regional context of the site is shown in **Figure 1**.

The site and surrounds are zoned RU1 - Primary Production zone under the Liverpool Local Environmental Plan (LEP) 2008.

The approximately 200-hectare (ha) site is bound by Badgerys Creek to the west, Ingham's Chicken to the south, South Creek to the east and Australian Native Landscapes and rural residential properties to the north (refer to the local context of the site in **Figure 2**). Sensitive residential receivers identified in the original EA are also presented in **Figure 2** and includes some residences that have since been demolished in preparation for the new Western Sydney Airport. The Blue Mountains National Park is located approximately 16 km to the west of the site.

The underlying topography of the site is relatively flat, however historical quarrying activities on the site have substantially altered the natural landform with various voids and elevated stockpiles present in the western part of the site. The most prominent of these landforms is a rehabilitated stockpile in the far west of the site, known as the 'Western Stockpile'. This stockpile of unusable material is approximately 200m x 125m, with an average height of 10m and has been revegetated with native grasses and trees. Other significant landforms on the site include the raw material stockpile in the centre of the site, as well as unusable materials stockpiles in the south and centre of the site.

Existing voids on the site comprise Pits 1, 2 and 3. The largest of these, Pit 1, is in the west of the site and is used as the main water storage for the site. Pit 2, adjacent to Pit 1 is complete and was previously partially backfilled and rehabilitated. Pit 3 is an active pit where quarry campaigns were focused, prior to the site being mothballed. Three large sediment basins are in the north and east of the site, along with two smaller dams near these basins.

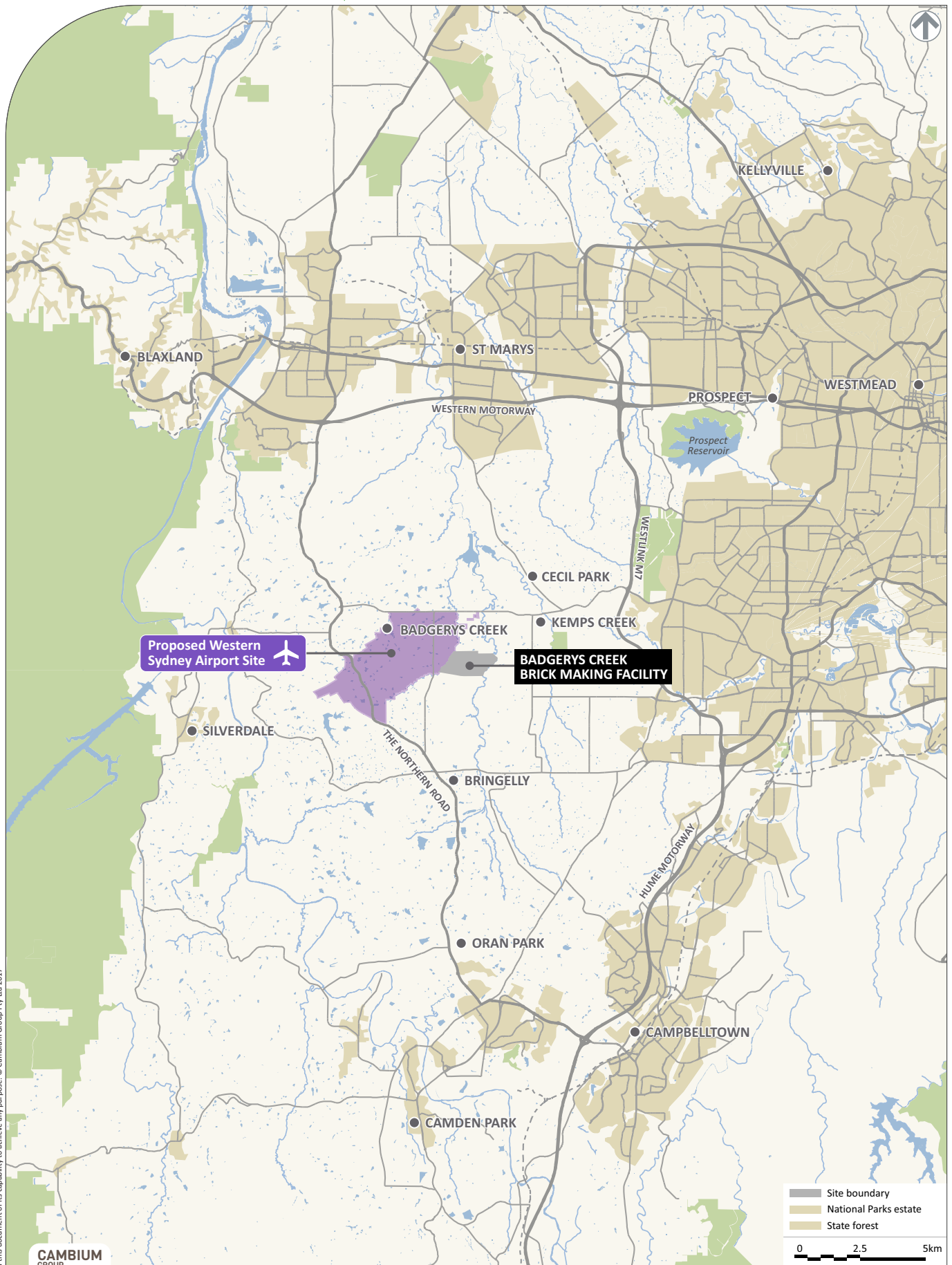
Remaining land at the site is vacant, of which areas to the north and east of the brick making facility are leased for livestock grazing. The site is generally cleared of native vegetation except for the creek lines and some isolated stands of trees scattered across the site.

Access to the site is via a private road off Martin Road which runs off Elizabeth Drive (a designated B-double route). The internal road network consists of several unsealed haul roads.

FIGURE 1
Regional context
ENVIRONMENTAL ASSESSMENT



BADGERYS CREEK BRICK MAKING FACILITY | MODIFICATION 2





This aerial map illustrates the proposed Western Sydney Airport site, highlighted in a large purple area on the left. The site is bordered by Luddenham Road to the north and Adams Road to the west. To the east of the airport site is the Badgerys Creek Brick Making Facility, outlined in white. Surrounding the airport and brick making facility are several other locations: Kems Creek Resource Recovery Park to the north, Elizabeth Drive Landfill to the northeast, Andreasens Green Nursery to the east, Australian Native Landscapes to the southeast, and Inghams Enterprises to the south. The map also shows the town of Luddenham to the northwest, Bringelly to the south, and Rossmore to the southeast. Key roads include Luddenham Road, Adams Road, Elizabeth Drive, Martin Road, Western Road, Devonshire Road, Fifteenth Avenue, Greendale Road, Bringelly Road, and Allenby Road. Water features include Badgerys Creek, South Creek, and Kems Creek. A legend in the bottom right corner identifies the site boundary and project area boundary, and a scale bar indicates distances from 0 to 1.5 km. The Cambium Group Pty Ltd logo is in the bottom left corner.

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2 EXISTING OPERATIONS

2.1 Operational and Planning Approval History

Boral Bricks Pty Limited (Boral) owned and operated the Badgerys Creek Quarry and Brick Making Facility at Badgerys Creek for over 30 years.

On 27 September 2011, project approval was issued under Section 75J of the EP&A Act for the ongoing production of bricks and the expansion of the existing quarrying operations at the Badgerys Creek site.

Due to uncertain economic conditions and a downturn in residential housing activity, Boral reviewed its bricks production capacity in NSW. Following this review, Boral determined to 'mothball' its operations at Badgerys Creek effective from 30 March 2012. Shutting down the site gave Boral the option to review its commercial position at a future stage and, if market conditions and business needs allow, recommence production. During the shutdown period, the Boral Bringelly Brick Making Facility (now owned by CSR) supplied the Sydney market.

Because of the shutdown, Boral was unable to comply with the conditions of approval and applied to modify the Project Approval under Section 75W of the EP&A Act.

Modification application (10_0014 Mod 1) requested that post-March 2012 activities be limited to:

- Minor maintenance and inspection (e.g. water management, equipment testing);
- Operation of the retail display facility; and
- Irregular and occasional dispatch of bricks from the inventory remaining on-site.

The Project Approval for the site as modified on 9 May 2013 is attached as **Appendix A**.

In 2015, Boral and CSR formed a joint venture brick business called Boral CSR Bricks Pty Ltd. The assets held by the respective companies were transferred into the joint venture. At the end of October 2016, CSR acquired Boral's share of the brick business and with it, the Badgerys Creek Brick Making Facility.

2.2 Approved Project

The approved quarrying and brick making activities, outlined in the Project Approval are to:

- Extract 420,000 tonnes of clay per calendar year;
- Produce 252,000 tonnes of bricks per calendar year;
- Extract any clay shale or carry out any work in the extraction area no deeper than 35 metres below the pre-existing natural surface of the ground; and
- Receive 20,000 tonnes of raw material for brick making per calendar year.

Product from the quarry and brick making facility is approved for transport entirely by road. The Project Approval limits the number of truckloads/heavy vehicle movements that can exit the site per day to:

- A maximum of 60 laden brick trucks (i.e. 120 movements), Monday to Friday; and
- A maximum of 20 laden brick trucks (i.e. 40 movements) on Saturdays.

FIGURE 3

Approved project
ENVIRONMENTAL ASSESSMENT

BADGERYS CREEK BRICK MAKING FACILITY | MODIFICATION 2



2.2.1 Quarry Activities

Approved quarrying activities involve the eastward progression of Pit 3 (where quarrying had already commenced), followed by the establishment of Pit 4 and then Pit 5. The establishment of a new pit involves the following works:

- Exploratory core drilling to a depth of 35 m below ground surface (bgs) across a 50m square grid;
- Assessment of cores for suitability for brick making;
- If the core is suitable, the area is fenced off and appropriate signage placed around the area;
- Removal of overburden and topsoil;
- Breaking up raw materials using a bulldozer with ripping attachment;
- Collection of raw materials with an excavator and placement into a 40-tonne dump truck;
- Transport and deposit of raw materials to the Raw Materials Stockpile area to the south of the brick making facility;
- Transport and deposit of unusable material to either the Central Stockpile or to an open void (Pit 2); and
- Creation of new stormwater drainage systems and/or drainage pathways (where required) to be incorporated into and consistent with the Water Management Plan for the site.

Upon completion of quarrying in the nominated areas, the disturbed area would be rehabilitated.

2.2.2 Brick Production

The primary machinery and equipment involved in the approved brick manufacturing process includes:

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

The brick manufacturing process is generally described as follows:

- The as-mined clay material is crushed from approximately 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; and

- The fired stock is unloaded from the kiln car and split into brick packs by the Dehacker within the brick making facility. The Dehacker was previously installed at the plant to improve efficiencies in the packing and transportation of bricks. It allows for a greater number of bricks to be transported per truckload, thereby reducing the number of truck movements needed to dispatch the same amount of product. The Dehacker unpacks the bricks into individual units and then repacks them into pallet size packs for transport to customers, strapping 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 brick making facility. All equipment is housed within the brick making facility except for the unloading conveyor.

Previous additions and alterations to the brick making facility were approved by Liverpool City Council to enable an increase in the efficiency of the existing brick making process. The additions and alterations included a dust collector, air receiver and brick dipping tanks. The additions and alterations were 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.

2.2.3 Transport of Raw Materials and Finished Product

Raw materials required for brick making that cannot be extracted on site, were imported by truck and stockpiled in the Raw Materials Stockpile area to the south of the brick making facility.

The brick product storage yard is located to the north-east of the brick making facility and covers an approximate area of 41,500m². Forklifts loaded the bricks from the yard on to trucks for transport off site.

2.2.4 Stockpiles

Stockpile areas within the site include:

- Raw material stockpiles situated in the centre of the site, which provided the feedstock for the brick making process;
- Overburden stockpiles which contain upper level excavated materials that was not suitable for brick making;
- Unusable material stockpiles which contain deeper level excavated material that was not suitable for brick making, but may be suitable in the future if upgrades were made to the clay preparation equipment; and
- Rehabilitated stockpiles in the far west and along the southern boundary of the site.

2.2.5 Operating Hours and Workforce

Approved operating hours for the site are outlined in detail in **Table 1**.

Table 1 Approved Operating Hours

Activity	Day	Time
Removal of overburden and construction of noise bunds	Monday-Friday	7:00am to 6:00pm
	Saturday	8:00am to 1:00pm
	Sunday and public holidays	None
Quarrying	Monday-Saturday	7:00am to 6:00pm
	Sunday and public holidays	None
Brick making facility and Storage Yard	Monday-Sunday	24 hours
Deliveries and dispatch	Monday-Friday	6:00am to 10:00pm
	Saturday	6:00am to 6:00pm
	Sunday and public holidays	None

At the height of previous operations, there were 56 people employed in the brick making facility and 20 in the administration/sales office. Up to ten contractors worked two to four months per annum on a campaign basis to complete the quarrying activities.

2.2.6 Environmental Protection Licence

The *Protection of the Environment Operations Act 1997* provides for an integrated system of licensing and contains a core list of activities requiring Environmental Protection Licences (EPL) from the NSW Environment Protection Authority (EPA). The activities are called 'scheduled activities' and are listed in Schedule 1 of the Act.

The site currently operates under EPL No. 684, for the scheduled activities of ceramic works, extractive activities and mining for minerals.

2.2.7 Environmental Management

An Environmental Management Strategy and the following associated management plans, were previously prepared in accordance with PA10_0014:

- Environmental Management Strategy;
- Noise Management Plan;
- Air Quality & Greenhouse Gas Management Plan;
- Water Management Plan which includes:
 - Site Water Balance;
 - Surface Water Management Plan; and
 - Ground Water Management Plan.

- Aboriginal Heritage Management Plan;
- Transport Management Plan;
- Waste Management Plan;
- Rehabilitation Strategy; and
- Rehabilitation Management Plan.

The Environmental Management Strategy and associated management plans will need to be reviewed, revised and submitted to the Department of Planning and Environment (DP&E) for approval, prior to recommencing operations at the site.

3 PROPOSED MODIFICATIONS

3.1 Description of Modifications

CSR propose to modify the Badgerys Creek Brick Making Facility Project Approval (PA10_0014), under Section 75W of the EP&A Act, for the:

- exportation of 275,000 tonnes of raw material per calendar year; and
- temporary storage of finished building products.

3.1.1 Exportation of Raw Material

The existing Project Approval does not allow for the exportation of material extracted on-site. Due to recent and forecasted closure of many quarries in the region, reducing the availability of raw materials, CSR needs to be able to export raw material from the site. This is important for the sustainability of CSR's brick manufacturing business and to ensure an immediate and ongoing supply of raw material to other CSR brick factories.

CSR are seeking approval to extract up to 275,000 tonnes of raw material per calendar year from Pit 3, and to export this material off-site to other CSR brick making facilities. The on-site activities would involve:

- Stripping overburden in the eastern half of Pit 3 and hauling to Pit 2;
- Extracting raw material in Pit 3 and hauling to raw material stockpiles;
- Loading clay into trucks and exporting off-site; and
- Engineered fill of Pit 2.

Further details of these activities, their location on the site and the machinery to be used, are presented in **Table 2** and **Figure 4**.

Table 2 Activities associated with the exportation of raw material

Activity	Process	Plant / Machinery
Overburden Stripping and hauling to Pit 2.	Overburden stripped in eastern part of Pit 3 to a maximum depth of 4m by excavator.	Excavator (Cat 349E - 49 tonne).
	Overburden loaded into dump trucks (x 3) and transported to Pit 2.	Dump truck (40 - 50 tonne).
	Water tanker on site to suppress dust on haul roads.	Water tanker (20 - 30KL).

Activity	Process	Plant / Machinery
Raw Material Extraction and hauling to raw material stockpiles.	<p>Raw material extracted from Pit 3 from a depth of 4m and below (down to a maximum depth of 35m).</p> <p>Raw material ripped by dozer and pushed into stockpiles for excavator to load into dump trucks (x 2).</p> <p>Excavator picks up raw material and loads into dump truck, which hauls material and tips into raw material stockpile area.</p> <p>Dozer leaves pit and travels to raw material stockpile area now and then to shape raw material stockpiles, then returns to the pit and continues to rip/push.</p> <p>Water tanker suppressing dust on the haul roads.</p>	<p>Dozer (D9 or D10).</p> <p>Excavator (Cat 349E). Dump Truck.</p> <p>Water Tanker.</p>
Loading raw material from raw material stockpiles and dispatching off-site.	Clay of the same colour loaded into road trucks (Truck and Dog or B-Double Trucks) x 2, by Komatsu 500 or 980 Cat Front End Loader (~9 tonne bucket) at the raw material stockpile area and transported off site.	Komatsu 500 or 980 Cat Front End Loader (~9 tonne bucket); Truck and Dog or B-Double road truck.
Engineered filling of Pit 2.	<p>An alternative to back tipping into the eastern half of Pit 2, is to fill Pit 2 with an engineered approach. This would involve:</p> <ul style="list-style-type: none"> - dewatering Pit 2 into Pit 1; - removing the existing fill material from the northern third of Pit 2 that was emplaced historically. Depending on how compact the fill has become, the machinery used to excavate and remove the existing fill material is likely to be similar to that used to strip overburden. - emplaced overburden material excavated by excavator and loaded into dump trucks (x 2); - dump trucks haul material and dump it into central and southern section of Pit 2; - pad foot compactor spreads fill into 200-300mm layers and compacts; - water tanker applies water to compacted fill area as required to aid compaction. 	<p>Excavator (Cat 349E).</p> <p>Dump Truck.</p> <p>Pad foot Compactor.</p> <p>Water Tanker.</p>

All quarrying activities associated with the extraction of clay would be conducted in accordance with the approved quarrying hours (7am - 6pm, Monday - Saturday). The exportation of clay material would be conducted between 7am and 10pm, Monday to Saturday, which is within the approved deliveries and dispatch hours.

3.1.2 Temporary Storage of Finished Building Products

In addition to the proposed quarrying and exportation of raw materials, CSR is also seeking approval to temporarily store finished building products e.g. autoclaved aerated concrete panels or roof products on the hardstand area in the brick storage yard, to the east of the existing brick factory. The finished building products would be transported by flat-bed trucks, typically truck and dog articulated vehicles (occasionally a B-Double configuration), from other CSR factories and unloaded by forklifts. On demand, flat-bed trucks would transport the finished building products to customers after being loaded by forklifts in the storage yard.

All activities associated with the proposed finished building products delivery, unloading, storage, loading and dispatch would be conducted between 7am and 10pm, Monday to Saturday, within the approved deliveries and dispatch hours.

CSR would carefully manage the total number of truckloads per day, associated with both raw material exportation and the delivery and dispatch of finished building products, to ensure they do not exceed the approved daily truckload limit.

3.2 Comparison against Approved Project

A comparison of the approved operations at the site and the proposed modification to the approved project is set out in **Table 3** and **Table 4**.

Table 3 Comparison of approved project and proposed modifications

Aspect	Existing Project Approval	Proposed Modification	Variance to Approved Project
Brick Production	252,000 tonnes of bricks per calendar year	No change to brick production volumes required as part of Modification 2. No brick production is to take place during operations proposed under Modification 2	No change
Quarrying	Extraction of 420,000 tonnes of clay shale per calendar year	Extraction of raw material under Modification 2 is only likely to reach 275,000 tonnes of clay shale per calendar year. When brick production recommences, extraction will increase to 420,000 tonnes per calendar year	No change
Importation of raw materials	Importation of 20,000 tonnes of raw materials for brick production per calendar year	No change to raw material importation volumes required as part of Modification 2. No raw material importation or brick production is to take place during operations proposed under Modification 2	No change
Exportation of raw materials	Nil	Exportation of 275,000 tonnes of raw materials per calendar year	Increase of 275,000 tonnes of raw materials exported from the site per calendar year
Truck Movements	Maximum of 60 laden brick trucks (i.e. 120 vehicle movements) exiting the site	Maximum of 60 heavy vehicles exiting the site per day Monday to Friday	No change

Aspect	Existing Project Approval	Proposed Modification	Variance to Approved Project
	per day Monday to Friday Maximum of 20 laden brick trucks (i.e. 40 vehicle movements) exiting the site per day on Saturday	Maximum of 20 heavy vehicles exiting the site per day Saturday	No change
Duration of Project Approval	27 September 2031	Importation, temporary storage and exportation of finished building products will cease when brick production recommences Exportation of 275,000 tonnes of raw materials will continue for the life of the Project Approval. Potential cumulative impacts of this activity combined with the approved project will be considered under Modification 3	No change

Table 4 Comparison of approved hours of operation and proposed modifications

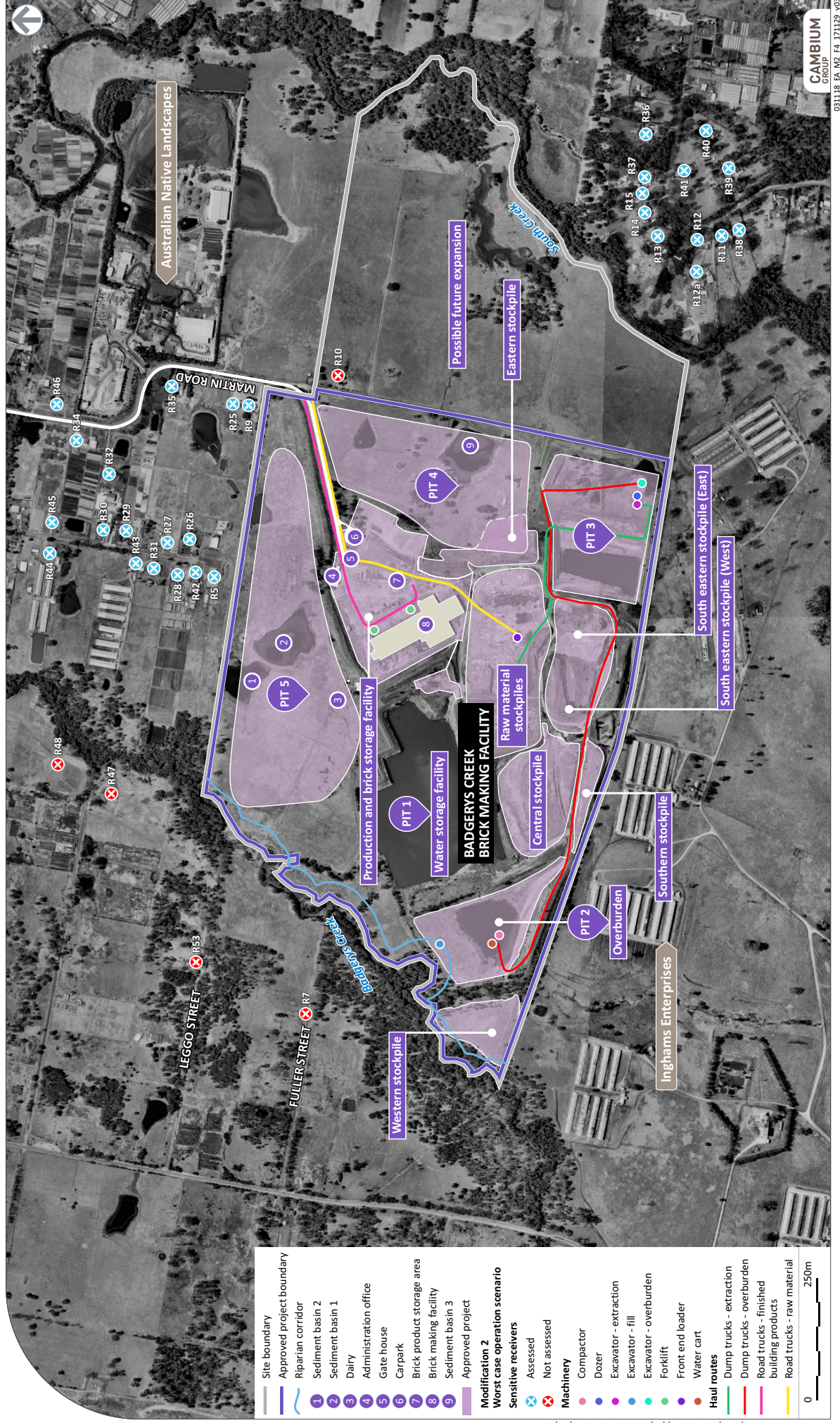
Activity	Existing Project Approval	Proposed Modification	Variance to Approved Project
Removal of overburden and construction of noise bunds	Monday-Friday 7:00am to 6:00pm Saturday 8:00am to 1:00pm Sunday and public holidays None	Construction of noise bunds will not occur under Modification 2 operations (refer to Section 4.3). Overburden and raw material (clay/clay shale) extraction to take place in Pit 3 during approved quarrying hours: Monday-Saturday 7:00am to 6:00pm Sunday and public holidays None	Removal of overburden in Pit 3 under Modification 2 to be undertaken for an additional five (5) hours on a Saturday (1:00pm – 6:00pm)
Quarrying	Monday-Saturday 7:00am to 6:00pm Sunday and public holidays None	Monday-Saturday 7:00am to 6:00pm Sunday and public holidays None	No change

Activity	Existing Project Approval	Proposed Modification	Variance to Approved Project
Brick making and storage yard	Monday-Sunday 24 hours	All activities associated with the temporary unloading, storage and loading of finished building products in the storage yard would be conducted between: Monday - Saturday 7:00am to 10:00pm Sunday and public holidays None	Temporary storage of finished building products under Modification 2 will not be undertaken during the night time period (10:00pm – 7:00am) from Monday to Saturday or 24 hours on Sundays and public holidays
Deliveries and dispatch	Monday-Friday 6:00am to 10:00pm Saturday 6:00am to 6:00pm Sunday and public holidays None	The temporary delivery and dispatch of finished building products would be conducted between: Monday - Saturday 7:00am to 10:00pm Sunday and public holidays None	Temporary deliveries and dispatch hours for finished building products under Modification 2 will only be undertaken during the day and evening periods (7:00am – 10:00pm) from Monday to Saturday

FIGURE 4

Proposed project
ENVIRONMENTAL ASSESSMENT

BADGERYS CREEK BRICK MAKING FACILITY | MODIFICATION 2



4 ENVIRONMENTAL ASSESSMENT

4.1 Assessment of Impact

The original EA assessed a number of environmental issues. The potential impacts of the proposed modification in relation to the environmental issues identified in the original EA are considered in **Table 5**.

Table 5 Assessment of Impact

Environmental Issue	Consideration	Potential Impact
Noise and Vibration	<p>Although the proposed modification involves activities that were assessed in the original EA, CSR is seeking approval to not construct noise bunds for the duration of operations outlined in this modification application.</p> <p>A specialist noise consultant has been appointed to assess the potential noise impacts associated with this modification, the results of which have been included in Section 4.3.</p>	No impact greater than assessed in the original EA.
Air Quality	<p>Air quality impacts associated with the extraction and transportation of raw materials and the delivery, temporary storage and dispatch of finished building products, include dust and vehicular emissions. The proposed modification does not increase the volume of extracted material, the disturbance footprint associated with quarrying, overburden emplacement, raw material stockpiling or the transportation limits of the Project Approval or introduce any new types of air pollutants. Therefore, no additional air quality impacts greater than those reported in the EA are predicted.</p> <p>The proposed modification does not seek to alter the air quality criteria applicable to the site, as stipulated in Condition 11 of Schedule 3 of the Project Approval, therefore there is no change in the air quality performance criteria for the site.</p> <p>Therefore, the proposed modification is unlikely to result in any additional air quality impacts and does not substantially alter the development for which Project Approval was granted.</p> <p>The Air Quality and Greenhouse Gas Management Plan will be implemented to minimise air quality impacts from the proposed modification.</p>	No impact greater than assessed in the original EA.
Surface Water	<p>The proposed modification does not increase the disturbance footprint associated with approved quarrying, overburden emplacement, raw material stockpiling or finished product storage.</p>	No impact greater than assessed in the original EA.

Environmental Issue	Consideration	Potential Impact
	<p>The proposed modification will not require changes to the sites surface water management, nor would it require changes to water access or increase the area of impermeable surfaces (hardstand) on the site.</p> <p>The building products that are proposed to be temporarily stored within the existing storage yard, will be finished products such as autoclaved aerated concrete panels or masonry roof products e.g. tiles. These products are similar to bricks that are approved to be stored in the storage yard and will not release pollutants that will contaminate stormwater runoff from the site.</p> <p>The proposed modification does not seek to introduce water discharge limits of any Environment Protection Licence.</p> <p>Consequently, the proposed modification would not result in any additional impacts on surface water runoff quantity or quality and does not substantially alter the development for which Project Approval was granted.</p> <p>The Water Management Plan will be implemented on site, to minimise surface water quality impacts from the proposed modification.</p>	
Traffic	<p>The Project Approval limits the number of truckloads/heavy vehicle movements that can exit the site per day to:</p> <ul style="list-style-type: none"> ▪ A maximum of 60 laden brick trucks (i.e. 120 movements), Monday to Friday; and ▪ A maximum of 20 laden brick trucks (i.e. 40 movements) on Saturdays. <p>While the Project Approval does not allow for the export of raw material, or the delivery and dispatch of finished building products not produced on the site, CSR would carefully manage the total number of truckloads per day, associated with these proposed activities, to ensure they do not exceed the approved daily truckload limit.</p> <p>The proposed modification will also not alter the approved days and hours of deliveries and dispatch.</p> <p>Therefore, the proposed modification will not alter the intersection performance or carrying capacity of the approaching roads and does not introduce any new heavy vehicles as assessed in the EA.</p> <p>The requirements of the Transport Management Plan will be adhered to under the proposed modification.</p> <p>In accordance with Schedule 3, Condition 28 (b), prior to</p>	No impact greater than assessed in the original EA.

Environmental Issue	Consideration	Potential Impact
	<p>recommencing quarry operations, CSR will enter into a formal agreement with Council for the:</p> <ul style="list-style-type: none"> ▪ upgrade and widening of Martin Road from the site entrance to the entrance of Australian Native Landscape; and ▪ annual road maintenance contributions to be paid to Council, based on the weight of brick products and associated materials transported from and to the site, for the life of the project, to the satisfaction of the Director-General. <p>CSR have consulted regularly with Council during the preparation of modification applications for the site and are currently in discussions with Council over what their requirements are for the upfront upgrade and ongoing road maintenance contributions for Martin Road and whether these can be staged for each of the proposed modification applications. Over the coming months, CSR is aiming to reach an agreement with Council on road upgrade and maintenance contributions associated with Modification 2 and will provide a copy of the formal agreement between CSR and Council once signed.</p>	
Aboriginal Heritage	<p>The proposed modification does not increase the disturbance footprint associated with approved quarrying, overburden emplacement, raw material stockpiling or finished product storage. While Aboriginal sites identified during the EA were located in and around Pit 5, quarrying under Modification 2 will be limited to Pit 3.</p> <p>The proposed modification will take place within the approved site boundary and will not impact known Aboriginal heritage items or sites.</p> <p>The proposed modification will not impact on any Aboriginal heritage values or land not previously assessed as part of the approved project.</p> <p>Operations under Modification 2, will be managed in accordance with the Aboriginal Heritage Management Plan.</p>	No impact greater than assessed in the original EA.
Bush Fire	<p>Liverpool City Council's Bushfire Prone Land Map (Sheet 8), identifies parts of CSR's property bordering along both South Creek and Badgerys Creek as containing bushfire prone land ('Vegetation Category 1' and 'Vegetation Buffer'). No new development is proposed in proximity to bushfire prone land associated with either South Creek or Badgerys Creek that is not included in the Project Approval.</p> <p>The proposed modification will not impact on any land not</p>	No impact greater than assessed in the original EA.

Environmental Issue	Consideration	Potential Impact
	previously assessed as part of the approved project.	
Visual	<p>The proposed modification does not increase the disturbance footprint associated with approved quarrying, overburden emplacement, raw material stockpiling or finished product storage.</p> <p>The proposed modification does not require any changes to existing buildings, or infrastructure on site.</p> <p>A height restriction hasn't been applied in the Project Approval or the original EA to raw material stockpiles or the height of stacked finished products in the storage yard. Under Modification 2, material extracted for exportation will be stockpiled in the approved raw material stockpile area at a height similar to the existing stockpiles on site. Finished building products, stored in the storage yard will also typically be stacked to a similar height as bricks. No highly reflective finished building products will be temporarily stored in the storage yard.</p> <p>Consequently, the proposed modification would not result in any additional visual impacts to the approved project and does not substantially alter the development for which Project Approval was granted.</p>	No impact greater than assessed in the original EA.
Biodiversity	<p>The proposed modification does not increase the vegetation or ground disturbance footprint associated with approved quarrying, overburden emplacement, raw material stockpiling or finished product storage.</p> <p>The proposed modification does not alter the number of truck movements within or to and from the site and therefore would not increase the potential for fauna vehicle strikes.</p> <p>Consequently, the proposed modification would not result in any additional biodiversity impacts.</p>	No impact greater than assessed in the original EA.
Historic Heritage	<p>The proposed modification will not impact known historic heritage areas within the site or result in new ground disturbance.</p> <p>Consequently, the proposed modification would not result in any additional impacts on historic heritage.</p>	No impact greater than assessed in the original EA.
Groundwater	<p>The proposed modification does not involve any changes to the approved quarrying activities. Raw material extraction under Modification 2 will be limited to Pit 3 and will not exceed 35 metres in depth.</p> <p>Excavation and emplacement associated with the</p>	No impact greater than assessed in the original EA.

Environmental Issue	Consideration	Potential Impact
	<p>engineered filling of Pit 2 will not involve extraction or work greater than 35 metres below the pre-existing natural surface of the ground.</p> <p>Therefore, the proposed modification is unlikely to result in a change to the groundwater impacts assessed as part of the approved project.</p>	
Socio-economic	<p>The proposed modification does not alter the number of truck movements (transportation limits) of the Project Approval or result in any additional environmental, social or economic impacts than those identified and thoroughly assessed in the EA.</p> <p>Consequently, the proposed modification would not result in any additional social or economic impacts and does not substantially alter the development for which Project Approval was granted.</p>	No impact greater than assessed in the original EA.
Waste	<p>The proposed temporary storage of finished building products would typically not generate waste, other than if product is damaged during unloading or loading.</p> <p>Any waste generated from the temporary storage of finished building products or from general site operations associated with Modification 2, will be managed in accordance with the site's Waste Management Plan.</p>	No impact greater than assessed in the original EA.
Rehabilitation	<p>As no change is proposed to extraction areas or overburden stockpiles and the proposed modification does not increase the vegetation or ground disturbance footprint associated with approved quarrying, overburden emplacement, raw material stockpiling or finished product storage, rehabilitation for the purposes of Modification 2 will be consistent with the approach previously described in the original EA.</p> <p>Although already approved, it should be noted that during the process of extracting raw material for exportation, overburden material from Pit 3 will be transported to Pit 2. Therefore Pit 2 will be rehabilitated by re-engineering existing material (previously tipped into Pit 2) to stabilise the fill, then adding new overburden from Pit 3 through a process of layering and compaction. The engineered filling of Pit 2 and final revegetation will meet one of the rehabilitation objectives of Condition 34 of Schedule 3 of the Project Approval, which involves returning Pit 2 to natural ground level and revegetating (Condition 34 (c)).</p> <p>All rehabilitation will be undertaken in accordance with the Rehabilitation Strategy and Rehabilitation Management</p>	No impact greater than assessed in the original EA.

Environmental Issue	Consideration	Potential Impact
	Plan for the site.	
Land Contamination	<p>The proposed modification does not increase the disturbance footprint associated with approved quarrying, overburden emplacement, raw material stockpiling or finished product storage.</p> <p>All activities associated with Modification 2 will take place within the approved project boundary.</p> <p>The proposed modification will not impact on any land not previously assessed as part of the approved project. Therefore, the likelihood of encountering contamination when undertaking activities associated with Modification 2 is low.</p>	No impact greater than assessed in the original EA.
Hazards	<p>The proposed modification does not introduce new hazards to the site that have not previously been considered in the original EA. The raw materials extracted on site for exportation, nor the finished building products proposed to be temporarily stored on site are considered to be dangerous goods.</p> <p>Consequently, the proposed modification is not considered a hazardous activity and does not substantially alter the development for which Project Approval was granted.</p>	No impact greater than assessed in the original EA.
Greenhouse Emissions	<p>The proposed modification will not increase the extent or extraction volume of the approved quarry and will therefore not result in a change in greenhouse gas emissions from quarry operations.</p> <p>The proposed modification does not alter the number of truck movements (transportation limits) of the Project Approval and therefore would not increase the amount of diesel usage assessed in the EA.</p> <p>Consequently, the proposed modification is unlikely to result in a significant change in greenhouse gas emissions from extraction or transportation of raw materials and does not substantially alter the development for which Project Approval was granted.</p>	No impact greater than assessed in the original EA.

4.2 Noise

Although the proposed modification involves activities that were assessed in the original EA, CSR is seeking approval to not construct noise bunds for the duration of operations outlined in this modification application.

Therefore, a specialist noise consultant Wilkinson Murry (PTY) Ltd, was appointed to assess the potential noise impacts associated with this modification.

The following sections provide a summary of the results of the noise impact assessment. The full noise impact assessment report is included as **Appendix B**.

CSR has provided the noise impact assessment report to the Environment Protection Authority (EPA). If any comments are received from the EPA, CSR will provide these to DP&E with a response.

4.2.1 Existing Environment

The site is located within a rural area, which is generally characterised by low background noise levels. Noise sources in the local area include natural sources (birdsong, insects, and livestock), commercial and industrial operations within proximity to the site such as Inghams and Australian Native Landscapes, nearby agricultural land uses and operations at the site itself (when in production).

Traffic noise along Martin Road and Elizabeth Drive are also dominant influences upon background noise levels within the locality. Heavy vehicle movements are common along Martin Road and Elizabeth Drive associated with the existing site and Australian Native Landscapes.

It should be noted that future background noise levels in the local area would be subject to drastic change following construction and commissioning of the new Western Sydney Airport proposed immediately west of the site.

The local context and neighbouring land uses are further discussed in **Section 1.2**.

The nearest and most potentially affected receivers are rural residential properties surrounding the site. These receivers were previously identified in the *Noise Assessment Report - Addendum Report* (AECOM, 31 May 2011) included in the *Submissions Report* (AECOM, 10 June 2011) for the original Project Approval. These receivers are shown on **Figures 2 and 4** and summarised in **Table 5**.

Most residential dwellings on the Western Sydney Airport site, on the western side of Badgerys Creek have been demolished, and it is understood that none of these buildings would be used as residential dwellings in the future. Although these receivers were identified in the noise assessment for the approved project and are shown on **Figure 4**, operational noise levels associated with the proposed modification are not assessed at these receiver locations.

Review of aerial photography indicates that a second dwelling may be located on the same property as existing receiver R12. This dwelling has been identified as receiver R12a and included in this assessment.

Receiver R10 is situated on land owned by CSR. Therefore, operational noise levels at R10 have not been assessed.

Table 6 Sensitive Receivers

Receiver	Address	Lot/DP Number
R5	255 Lawson Road, Badgerys Creek	19 DP 3050
R7 ^a	Lot 77 Fuller Street, Badgerys Creek	1 DP 838361
R9	217 Martin Road, Badgerys Creek	3 DP 589918
R10 ^b	225 Martin Road, Badgerys Creek	16 DP 28050
R11	22 Victor Avenue, Kemps Creek	17 DP 28050
R12	50 Victor Avenue, Kemps Creek	19 DP 28050
R12a	50 Victor Avenue, Kemps Creek	19 DP 28050
R13	70 Victor Avenue, Kemps Creek	20 DP 28050
R14	80 Victor Avenue, Kemps Creek	21 DP 28050
R15	82 Victor Avenue, Kemps Creek	3 DP 589918
R25	211 Martin Road, Badgerys Creek	2 DP 589918
R26	210 Lawson Rd, Badgerys Creek	1 DP 589918
R27	200 Lawson Road, Badgerys Creek	18 DP 3050
R28	245 Lawson Road, Badgerys Creek	1 DP 237229
R29	190 Lawson Road, Badgerys Creek	2 DP 237229
R30	180 Lawson Road, Badgerys Creek	BORAL
R31	235 Lawson Road, Badgerys Creek	17 DP 3050
R32	180 Martin Road, Badgerys Creek	2 DP 237229
R34	170 Lawson Road, Badgerys Creek	3 DP 237229
R35	195 Martin Road, Badgerys Creek	4 DP 589918
R42	245 Lawson Road, Badgerys Creek	18 DP 3050
R43	225 Lawson Road, Badgerys Creek	16 DP 3050
R44	205 Lawson Road, Badgerys Creek	14 DP 3050
R45	160 Lawson Road, Badgerys Creek	4 DP 237229
R46	170 Martin Road, Badgerys Creek	1 DP 567860
R47 ^a	255 (Lot 60) Longleys Road, Badgerys Creek	1 DP 838361
R48 ^a	42 Longleys Road, Badgerys Creek	1 DP 838361
R53 ^a	65 Leggo St, Badgerys Creek	1 DP 838361

a. Dwelling within Western Sydney Airport site and not assessed.

b. Residence on CSR owned land.

4.2.2 Impact Assessment

Noise Criteria

The operational noise criteria, included in Condition 3 of Schedule 3 of the Project Approval states:

3. The Proponent shall ensure that the operational noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2 Noise Criteria dB(A)

Activity	Location	Day	Evening	Night	
		L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{A1} (1min)
Quarrying	All residential premises	44	NA	NA	NA
Brick making and storage yard activities		44	38	35	45

Notes:

- To identify the locations referred to in Table 2, see the figure and associated table in Appendix 2;
- Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

The locations of residential premises in the Project Approval noise criteria are consistent with those presented in **Section 4.2.1**, noting that the Project Approval was determined prior to the demolition of the dwellings on the Western Sydney Airport site.

Computer Noise Model

Operational and noise emissions associated with the modification were modelled using the CadnaA V4.6 acoustic noise prediction software and the CONCAWE noise prediction algorithm. The CONCAWE noise propagation model is used around the world and is widely accepted as an appropriate model for predicting noise over significant distances. Factors that were addressed in the noise modelling are:

- Equipment noise level emissions and locations;
- Shielding from ground topography;
- Noise attenuation due to geometric spreading;
- Ground absorption; and,
- Atmospheric absorption.

Subsequent to the Project Approval, a section of noise bund, required under the Project Approval, was constructed along the project boundary adjacent to the north-eastern section of Pit 3. This section of noise bund forms part of the existing ground topography in the noise model. Construction of the remainder of the noise bund along the eastern project boundary and the entire noise bund along the northern project boundary, required under the Project Approval, has not commenced, and therefore, is not included in the noise model.

Worst Case Operating Scenario

Section 3.1.1 and **3.1.2** presents the proposed activities associated with the exportation of raw material and the temporary storage of finished building products respectively. **Figure 4** provides a snapshot of the location of machinery/activities associated with this modification. Together these present the worst case operating scenario on the site at any one point in time during operations under Modification 2. The machinery in this worst case operating scenario, have been located where they are likely to be most audible at the most affected sensitive receivers during operations under Modification 2. To make the noise model even more conservative, all activities associated with Modification 2 were modelled at the same time, which is highly unlikely to occur in practice.

Section 4.2.6 of the noise impact assessment summarises the noise sources modelled in the worst case operational scenario described above. Quantities, sound power levels (SWL) and other pertinent assumptions for all machinery are provided.

Predicted Operational Noise Levels at Sensitive Receivers

The predicted $L_{Aeq,15min}$ noise levels at sensitive receivers due to the typical worst case operation of the proposed modification in the identified noise assessment periods are presented in **Table 7**.

Table 7 Predicted $L_{Aeq, 15min}$ Operational Noise Levels

Receiver	Predicted Level		Criteria		Complies
	Day	Evening	Day	Evening	
R5	37	33	44	38	Yes
R9	34	31	44	38	Yes
R11	40	23	44	38	Yes
R12	40	23	44	38	Yes
R12a	42	24	44	38	Yes
R13	39	23	44	38	Yes
R14	38	23	44	38	Yes
R15	38	22	44	38	Yes
R25	33	28	44	38	Yes
R26	36	31	44	38	Yes
R27	35	28	44	38	Yes
R28	35	30	44	38	Yes
R29	33	25	44	38	Yes
R30	31	23	44	38	Yes
R31	34	27	44	38	Yes
R32	31	24	44	38	Yes
R34	30	22	44	38	Yes
R35	30	24	44	38	Yes
R42	36	32	44	38	Yes
R43	33	25	44	38	Yes
R44	30	21	44	38	Yes
R45	31	22	44	38	Yes
R46	29	20	44	38	Yes

Noise modelling results presented in **Table 7** indicate that $L_{Aeq,15min}$ noise levels at sensitive receivers due to the operation of the proposed modification comply with the noise limits defined in the existing Project Approval without the implementation of any form of additional noise attenuation.

4.2.3 Mitigation Measures

Although no specific noise attenuation has been identified by the noise impact assessment, operations under Modification 2 will be undertaken in accordance with noise related conditions and requirements of the Project Approval (once modified), as well as the Noise Management Plan.

4.3 Conclusion

CSR is seeking to modify the current Project Approval (PA10_0014) under Section 75W of the EP&A Act, with the aim to:

- extract 275,000 tonnes of raw material per calendar year. This material will be loaded into trucks and transported to other CSR brick making facilities in the Sydney area; and
- receive, temporarily store, and dispatch finished building products produced at other CSR manufacturing facilities.

While the existing Project Approval does not allow for the exportation of raw material from site or the delivery, temporary storage and dispatch of finished building products from other CSR manufacturing facilities, the potential impacts associated with this modification are no greater than those assessed in the original EA.

Following a thorough, highly conservative noise impact assessment, in conjunction with the review and evaluation of the potential impacts of the proposed modification against key environmental issues identified in the original EA, it is considered that the proposed modification would result in minimal environmental impact and not substantially alter the development for which Project Approval was granted.

The existing Environmental Management Plans will be reviewed by CSR following approval of the modification and amended as necessary.

The modification is therefore considered to be in the public interest, and is recommended for approval.

5 ABBREVIATIONS

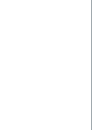
Table 8 Table of Abbreviations

Abbreviation	Definition
%	Percent.
ACC	Autoclaved Aerated Concrete.
AHD	Australian Height Datum.
bgs	Below ground surface.
Boral	Boral Bricks Pty Limited.
COA	Conditions of Approval.
CSR	CSR Building Products Limited.
dBA	A Weighted Decibel (expression of the relative loudness of sounds in air, as perceived by the human ear).
DP&E	Department of Planning and Environment.
EA	Environmental Assessment.
EMP	Environmental Management Plan.
EPA	Environment Protection Authority.
EP&A Act	The NSW Environmental Planning and Assessment Act 1979.
EPL	Environment Protection Licence.
ha	Hectare.
INP	Industrial Noise Policy.
km	Kilometre.
L _{Aeq}	The equivalent continuous sound level (L _{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.
LCC	Liverpool City Council.
LEP	Local Environmental Plan.
LGA	Local Government Area.
m	Metre.
mm	Millimetre.
m ²	Square metre.
m ³	Cubic metre.
NATA	National Association of Testing Authorities.
NSW	New South Wales.
VENM	Virgin Excavated Natural Material.



APPENDIX A

CONSOLIDATED PROJECT
APPROVAL 10_0014



Project Approval

Section 75J of the *Environmental Planning & Assessment Act 1979*

As delegate of the Minister for Planning and Infrastructure, I approve the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Richard Pearson
**Deputy Director-General, Development Assessment and
Systems Performance**

Sydney

2011

SCHEDULE 1

Application Number:	10_0014
Proponent:	Boral Bricks Pty Ltd
Approval Authority:	Minister for Planning and Infrastructure
Land:	See Appendix 1
Project:	Boral Badgerys Creek Quarry and Brick Making Project

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DEFINITIONS

Annual review	The review required by Condition 3 of Schedule 5
BCA	Building Code of Australia
Conditions of this approval	Conditions contained in Schedules 2 to 5 inclusive
Council	Liverpool City Council
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
Department	Department of Planning and Infrastructure
Director-General	Director-General of the Department (or nominee)
EA	Environmental assessment titled <i>Environmental Assessment - Boral Badgerys Creek Continued Operation of Quarry and Brick Making Facility</i> Volumes 1 – 3, dated November 2010, prepared by AECOM, including the Response to Submissions
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPL	Environment Protection Licence issued under <i>POEO Act</i>
Evening	The period between 6pm to 10pm on any day
Feasible	Feasible relates to engineering considerations and what is practical to build or carry out
Incident	A set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in this approval
Land	In general, the definition of land is consistent with the definition in the EP&A Act. However, in relation to the noise and air quality conditions in Schedules 3 and 4 it means the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Minister	Minister for Planning and Infrastructure, or delegate
Minor	Small in quantity, size and degree
Mitigation	Activities associated with reducing the impacts of the project
Mod 1	Modification application (10_0014 Mod 1) and supporting letter from Boral Bricks Pty Ltd to the Director-General dated 5 November 2012
Negligible	Small and unimportant, such as to be not worth considering
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
NOW	NSW Office of Water (within the Department of Primary Industries)
OEH	Office of Environment and Heritage (within the Department of Premier and Cabinet)
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Privately-owned land	Land that is not owned by a public agency or a extractive industry company (or its subsidiary)
Project	The development described in the EA
Proponent	Boral Bricks Pty Limited, or its successors
Quarry water	Water that accumulates within active quarrying areas, overburden emplacement areas and infrastructure areas, synonymous with dirty water
Quarrying operations	The extraction, processing and transportation of extractive materials and the associated removal of vegetation, topsoil and overburden
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The treatment or management of land disturbed by the project for the purpose of establishing a safe, stable and non-polluting environment, and includes remediation
Response to Submissions	The proponent's responses to issues raised in submissions, including those titled <i>Boral Badgerys Creek Continued Operation of Quarry and Brick Making Facility – Submissions Report</i> , dated June 2011, prepared by AECOM
Shutdown period	Period of time when no quarrying or brick making operations are being undertaken on site, as detailed in Mod 1
Site	The land to which the project application applies, as listed in Appendix 1
Statement of Commitments	The Proponent's commitments in Appendix 6

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the project.

TERMS OF APPROVAL

2. The Proponent shall carry out the project in accordance with the:
 - (a) EA;
 - (b) Statement of Commitments;
 - (c) Mod 1; and
 - (d) conditions of this approval.
- Notes:*
 - The general layout of the project is shown in Appendix 3; and
 - The Statement of Commitments is reproduced in Appendix 6.
3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.
4. The Proponent shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of:
 - (a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with this approval; and
 - (b) the implementation of any actions or measures contained in these documents.

LIMITS ON APPROVAL

5. The Proponent may carry out quarrying operations and brick making on the site until 27 September 2031.
Note: Under this approval, the Proponent is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Director-General. Consequently, this approval will continue to apply in all other respects - other than the right to conduct quarrying and brick making operations - until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.
6. The Proponent shall not:
 - (a) extract more than 420,000 tonnes of clay shale from the site in any calendar year;
 - (b) produce more than 252,000 tonnes of bricks at the site in any calendar year;
 - (c) extract any clay shale or carry out any work in the extraction area below 35 metres below the pre-existing natural surface of the ground, other than construction of bores approved by NOW; and
 - (d) receive more than 20,000 tonnes of raw materials required for brick making to the site in any calendar year.

STRUCTURAL ADEQUACY

7. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.
Notes:
 - Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works; and
 - Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.

DEMOLITION

8. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

OPERATION OF PLANT AND EQUIPMENT

9. The Proponent shall ensure that all the plant and equipment used on site, or to transport brick and other clay product from the site, is:
 - maintained in a proper and efficient condition; and
 - operated in a proper and efficient manner.

STAGED SUBMISSION OF ANY STRATEGY, PLAN OR PROGRAM

10. With the approval of the Director-General, the Proponent may submit any strategy, plan or program required by this approval on a progressive basis.

Note: While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations of the site are covered by suitable strategies, plans or programs at all times.

11. The Proponent shall continue to implement the existing strategies, plans or programs that apply to any development on site until they are replaced by an equivalent strategy, plan or program approved under this approval.
-

SCHEDULE 3 ENVIRONMENTAL PERFORMANCE CONDITIONS

NOISE

Construction Noise Criteria

- The Proponent shall ensure that noise generated during the construction of acoustic bunds does not exceed the criteria in Table 1.

Table 1: Construction Noise Criteria dB(A)

Construction Activity	Location	Day <i>L_{Aeq} (15 min)</i>
Bund 3C	Residence 9	55
Bund 4A	Residences 27 and 31	
Bund 4B	Residence 28	
Bund 4A	Residences 26, 28 and 42	60
Bund 4A	Residences 5 and 25	65
Bund 4A	Residence 9	68
Bunds 3C, 4A and 4B	All other residences	50

Notes:

- To identify the locations referred to in Table 1, see the figure and associated table in Appendix 2;
- Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

- The Proponent shall notify the Department in writing of:
 - prior to the commencement of construction of each acoustic bund, the expected date of commencement and estimated period of construction of the bund/s; and
 - within 2 weeks of completion of construction of each bund, the date of completion of construction of the bund/s.

Operational Noise Criteria

- The Proponent shall ensure that the operational noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2: Noise Criteria dB(A)

Activity	Location	Day <i>L_{Aeq} (15 min)</i>	Evening <i>L_{Aeq} (15 min)</i>	Night	
				<i>L_{Aeq} (15 min)</i>	<i>L_{A1} (1 min)</i>
Quarrying	All residential premises	44	NA	NA	NA
Brick making and storage yard activities		44	38	35	45

Notes:

- To identify the locations referred to in Table 1, see the figure and associated table in Appendix 2;
- Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

Traffic Noise Criteria

- The Proponent shall ensure that the traffic noise generated by the project does not exceed the criteria in Table 3.

Table 3: Traffic noise impact assessment criteria dB(A)

Road	Day / Evening <i>L_{Aeq} 1 hour)</i>
Martin Road	55

Note:

- Traffic noise generated by the project is to be measured in accordance with the relevant procedures in the DECCW's Environmental Criteria for Road Traffic Noise.

Operating Hours

5. The Proponent shall comply with the operating hours in Table 4.

Table 4: Operating hours

Activity	Operating Hours / Day
Removal of overburden and construction of noise bunds	7am to 6pm / Monday to Friday 8am to 1pm / Saturday
Quarrying	7am to 6pm / Monday to Saturday
Brick making and storage yard	24 hours / Monday to Sunday
Deliveries and dispatch	6am to 10pm / Monday to Friday 6am to 6pm / Saturday

Operating Conditions

6. The Proponent shall:
- (a) implement best practice noise management, including all reasonable and feasible noise mitigation measures to minimise the construction, operational and road traffic noise generated by the project; and
 - (b) implement all noise management and mitigation measures that were committed to in the EA, to the satisfaction of the Director-General.

Noise Management Plan

7. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:
- (a) be prepared in consultation with EPA and Council, and submitted to the Director-General for approval by the end of August 2013;
 - (b) describe the noise mitigation measures that would be implemented to ensure compliance with the relevant conditions of this approval;
 - (c) describe measures to ensure that all the commitments in the EA in relation to noise are implemented;
 - (d) include an acoustic bund construction plan to specify the mitigation and management measures that will be implemented during the construction of the acoustic bunds;
 - (e) include an operational noise management plan that includes mitigation and management measures that will be implemented during the operation of the quarry and brick making works;
 - (f) include a consultation plan detailing:
 - procedures for notifying and consulting nearby residents prior to the commencement of the construction of the noise bunds and during quarrying and brick making works;
 - details of a telephone complaints line (all hours) and relevant site persons responsible for following up complaints;
 - procedures for handling and monitoring all complaints received;
 - contingency measures that would be implemented where complaints are received; and
 - (g) include a noise monitoring program for construction and operation that:
 - uses attended monitoring to evaluate the performance of the project; and
 - includes a protocol for determining exceedances of the relevant conditions of this approval.

AIR QUALITY & GREENHOUSE GAS

Odour

8. The Proponent shall ensure that no offensive odours, as defined by the POEO Act, are emitted from the site.

Greenhouse Gas Emissions

9. The Proponent shall implement all reasonable and feasible measures to maintain greenhouse gas emissions on site at 2007 levels, and offset any increases above this level by implementing efficiency measures to the satisfaction of the Director-General.

Air Quality Criteria

10. The Proponent shall ensure compliance with stack emission limits and gaseous pollutant load limits included in any EPL applicable to the site.
11. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria listed in Tables 5, 6 and 7 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 5: Long term criteria for particulate matter

Pollutant	Averaging period	^d Criterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 6: Short term criterion for particulate matter

Pollutant	Averaging period	^d Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µg/m ³

Table 7: Long term criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total^f deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes for Tables 5-7:

- ^a Total impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to other sources);
- ^b Incremental impact (i.e. incremental increase in concentrations due to the project on its own);
- ^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
- ^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, illegal activities or any other activity agree to by the Director-General in consultation with EPA.

Operating Conditions

12. The Proponent shall:
 - (a) implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, gaseous emissions, fume and dust emissions generated by the project;
 - (b) implement all air management and mitigation measures that were committed to in the EA; and
 - (c) ensure that real-time air quality monitoring for 24-hour average PM₁₀ and meteorological monitoring data are assessed regularly, and that quarrying operations are relocated, modified and/or stopped as required to ensure continuing compliance with the relevant criteria in this approval, to the satisfaction of the Director-General.
13. Prior to the commencement of quarrying operations in Pit 5, the Proponent shall undertake an Air Quality Audit to the satisfaction of the Director-General. The audit must:
 - (a) be undertaken in consultation with EPA by suitably qualified and experienced persons whose appointment has been approved by the Director-General;
 - (b) review the effectiveness of existing air quality management and control measures; and
 - (c) describe any additional air quality control measures, including operational controls, required to ensure continuing compliance with air quality criteria during the quarrying activities associated with Pit 5.

Air Quality & Greenhouse Gas Management Plan

14. The Proponent shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This plan must:
 - (a) be prepared in consultation with EPA and Council, and submitted to the Director-General for approval by the end of August 2013;
 - (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval;
 - (c) describe measures to ensure that all the commitments in the EA in relation to air quality are implemented;
 - (d) include a program to ensure surface disturbance associated with quarrying operations is minimised;
 - (e) include an air quality monitoring program, that uses a combination of real-time monitors, high volume samplers and dust deposition gauges, to evaluate the performance of the project at potential receivers and on-site;
 - (f) include a program to:
 - notify affected landowners of the potential health-related impacts associated with dust; and
 - respond effectively to enquiries or complaints; and
 - (g) include a protocol for determining any exceedance with the relevant conditions of this approval.

METEOROLOGICAL MONITORING

15. During the life of the project, the Proponent shall ensure that there is a suitable meteorological station operating in the vicinity of the site that:
- (a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and
 - (b) is capable of continuously recording wind speed and direction, temperature and rainfall.

Note: Meteorological monitoring is not required during the shutdown period.

SOIL & WATER

Water Discharges

16. The Proponent shall ensure that all quarry water from the site is contained wholly within the site.
17. The Proponent shall ensure that all surface water discharges from the site comply with the limits (both volume and quality) set in any EPL applicable to the site.

Riparian Buffer Distance

18. The Proponent shall maintain a minimum setback width of 60 metres (measured from the top of bank) between extraction areas and both Badgerys Creek and Badgerys Creek tributary.

Alluvial Aquifers

19. The Proponent shall ensure that the project has no impact on alluvial aquifers associated with South Creek, Badgerys Creek or Badgerys Creek tributary.
20. The Proponent shall prepare and implement an Alluvial Aquifer Assessment for the project to the satisfaction of the Director-General. This plan must:
- (a) be prepared in consultation with NOW by suitably qualified and experienced persons whose appointment has been approved by the Director-General;
 - (b) be submitted to the Director-General for approval within 12 months of **recommencing quarrying operations**; and
 - (c) include:
 - a program to monitor groundwater from boreholes to be constructed in the alluvial sediments adjacent to Badgerys and South Creeks and in the Bringelly Shale bedrock aquifer;
 - alluvial mapping to delineate the presence and extent of alluvial sediments and alluvial aquifers between Badgerys Creek and the proposed Pit 5 extraction area (refer to Appendix 3);
 - mitigation and management measures to ensure alluvial sediments and alluvial aquifers are not impacted by the project, including:
 - appropriate buffer setback distances between the alluvial sediments and the Pit 5 extraction area; and
 - any resulting adjustments to the Pit 5 extraction area.

Water Management Plan

21. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director-General. This plan must be prepared in consultation with **EPA** and NOW by suitably qualified and experienced persons whose appointment has been approved by the Director-General, and submitted to the Director-General by the end of **August 2013**.

In addition to the standard requirements for management plans (see Condition 2 of Schedule 5), this plan must include:

- (a) a Site Water Balance that:
 - includes details of:
 - sources and security of water supply;
 - water use on site;
 - adequacy of water storage facilities to contain all surface water runoff; and
 - reporting procedures; and
 - describes what measures would be implemented to minimise potable water use on site.
- (b) a Surface Water Management Plan, that includes:
 - a detailed description of the water management system on site, including the:
 - clean water diversion systems;
 - erosion and sediment controls; and
 - water storages;
 - detailed plans, including design objectives and performance criteria, for:
 - reinstatement of drainage lines on the rehabilitated areas of the site; and
 - control of any potential water pollution from rehabilitated areas of the site;

- performance criteria for the following, including trigger levels for investigating any potentially adverse impacts on:
 - the water management system;
 - surface water quality in creeks and other water bodies that could potentially be affected by the project (including Badgerys Creek and Badgerys Creek tributary);
 - the stream health, vegetation health and channel stability of water bodies that could potentially be affected by the project; and
 - a program to monitor:
 - the effectiveness of the water management system;
 - surface water flows and quality in creeks and other water bodies that could potentially be affected by the project;
 - the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially be affected by the project; and
 - a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project; and
- (c) a Groundwater Management Plan, which includes:
- groundwater assessment criteria, including trigger levels for investigating and potentially adverse groundwater impacts;
 - a program to monitor:
 - groundwater inflows to the quarrying operation;
 - the impacts of the project on baseflows to Badgerys Creek and Badgerys Creek tributary; and
 - a plan to respond to any exceedances of the performance criteria.

HERITAGE

22. The Proponent shall ensure that:
- (a) archaeological salvage of site BC-01-09 is undertaken in accordance with recommendation 1 of Appendix C, Section 6.0 of the Response to Submissions; and
 - (b) regeneration works in the area of the archaeological deposit identified adjacent to Badgerys Creek (see Appendix 4) are either avoided, or else undertaken in a manner that will minimise harm to Aboriginal objects, to the satisfaction of the Director-General.

Aboriginal Heritage Management Plan

23. The Proponent shall prepare and implement an Aboriginal Heritage Management Plan for the project to the satisfaction of the Director-General. The Plan must:
- (a) be prepared in consultation with OEH and the Aboriginal community;
 - (b) be submitted to the Director-General for approval by the end of **August 2013**; and
 - (c) include a:
 - program for the recording, salvage and surface collection of any Aboriginal objects/sites that have been identified and may be encountered within the project area;
 - describe measures that will be implemented to ensure Aboriginal objects in the area adjacent to Badgerys Creek are not impacted during regeneration operations;
 - description of the measures that would be implemented if any Aboriginal skeletal remains are discovered during the project; and
 - protocol for the ongoing consultation and involvement of the Aboriginal community in the conservation and management of the Aboriginal heritage of the objects/sites.

TRAFFIC & TRANSPORTATION

Road Haulage

24. **Prior to recommencing quarrying operations**, the Proponent shall:
- (a) erect signage on Elizabeth Drive advising of “trucks turning”;
 - (b) install a wheel wash on the quarry access road to prevent material being deposited in Martins Road; and
 - (c) ensure the access driveway from Martin Road is capable of catering for all heavy vehicles associated with the project in accordance with AS2890.2, to the satisfaction of Council.

Transport Management Plan

25. By the end of **August 2013**, the Proponent shall prepare and implement a Transport Management Plan, to the satisfaction of Council. The plan must include:
- (a) a safety audit of project-related truck transport on local roads;
 - (b) a drivers’ code of conduct to minimise the impacts of project-related trucks on local residents; and
 - (c) the measures that would be put in place to ensure compliance with the drivers’ code of conduct.

Monitoring of Brick Transport

26. The Proponent shall:
- (a) keep accurate records of the:
 - number and weight of bricks transported from the site (on a monthly basis); and
 - the date and time of loaded truck movements from the site; and
 - (b) provide the Director-General with a summary of these truck movements on **request**.

Operating Conditions

27. The Proponent shall ensure that:
- (a) bricks are only transported from the site by road;
 - (b) a maximum of 60 laden brick trucks (ie 120 movements) exit the site per day, Monday to Friday; and
 - (c) a maximum of 20 laden brick trucks (ie 40 movements) exit the site per day on Saturdays.

Road Upgrade and Maintenance Contribution

28. The Proponent shall:
- (a) **repair Martin Road to the satisfaction of Council by 30 June 2013 and in accordance with the agreement dated 9 April 2013 attached as **Appendix 7**; and**
 - (b) **prior to recommencing quarrying operations, enter into a formal agreement with Council for the:**
 - **upgrade and widening of Martin Road from the site entrance to the entrance of Australian Native Landscape; and**
 - **annual road maintenance contributions to be paid to Council, based on the weight of brick products and associated materials transported from and to the site, for the life of the project, to the satisfaction of the Director-General.**

If there is any dispute between the Proponent and Council, then either of the parties may refer the matter to the Director-General for resolution.

VISUAL

Visual Amenity and Lighting

29. The Proponent shall:
- (a) minimise the visual impacts, and particularly the off-site lighting impacts, of the project;
 - (b) take all practicable measures to further mitigate off-site lighting impacts from the project; and
 - (c) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting*, to the satisfaction of the Director-General.

WASTE

30. The Proponent shall:
- (a) minimise the waste generated by the project; and
 - (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of, to the satisfaction of the Director-General.
31. The Proponent shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Director-General. This plan must be submitted to the Director-General by the end of **August 2013**.

FIRE MANAGEMENT

32. The Proponent shall:
- (a) ensure that the development is suitably equipped to respond to any fires on-site; and
 - (b) assist the emergency services as much as possible if there is a fire on-site during the development.

SAFETY

33. The Proponent shall secure the project to ensure public safety to the satisfaction of the Director-General.

REHABILITATION

Rehabilitation Objectives

34. The Proponent shall rehabilitate the site to the satisfaction of the Director-General. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA and shown on the figure in Appendix 4, and include:
- (a) stabilising and revegetating existing stockpiles and unused haul roads;
 - (b) stabilising and revegetating acoustic bunds;
 - (c) returning Pit 2 to natural ground level and revegetating;
 - (d) stabilising voids; and
 - (e) fencing, planting and weed control along Badgerys Creek and Badgerys Creek tributary.

Progressive Rehabilitation

35. The Proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.

Rehabilitation Strategy

36. The Proponent shall prepare a Rehabilitation Strategy for the project to the satisfaction of the Director-General. The strategy must:
- (a) be prepared by a team of suitably qualified and experienced experts whose appointment has been endorsed by the Director-General;
 - (b) be submitted to the Director-General by the end of **August 2013**;
 - (c) be prepared in consultation with relevant stakeholders, including Council and OEH;
 - (d) investigate options for the future use of disturbed areas including voids after completion of quarrying operations;
 - (e) describe and justify the proposed rehabilitation strategy for the site, including post-operations landform and use;
 - (f) **describe and justify the proposed rehabilitation strategy for the site in the event that quarrying and brick making operations do not recommence following the shutdown period; and**
 - (g) **define the rehabilitation objectives for the site, as well as the proposed completion criteria for this rehabilitation.**

Rehabilitation Management Plan

37. The Proponent shall prepare and implement a Rehabilitation Management Plan for the project to the satisfaction of the Director-General. This plan must:
- (a) be submitted to the Director-General by the end of **August 2013**;
 - (b) be prepared in consultation with OEH and NOW;
 - (c) be prepared in accordance with any relevant guideline(s);
 - (d) achieve the Rehabilitation Objectives specified in the Rehabilitation Strategy (Condition 36);
 - (e) take into account any relevant strategic planning limitations in the local and regional areas; and
 - (f) build, to the maximum extent practicable, on the other management plans required under this approval.
-

SCHEDULE 4 ADDITIONAL PROCEDURES

INDEPENDENT REVIEW

1. If an owner of privately-owned land considers the project to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land.

If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-General's decision the Proponent shall:

- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to:
 - consult with the landowner to determine his/her concerns;
 - conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 3; and
 - if the project is not complying with these criteria then:
 - determine if more than operation is responsible for the exceedance, and if so the relative share of each operation towards the impact on the land;
 - identify the measures that could be implemented to ensure compliance with the relevant criteria; and
 - (b) give the Director-General and landowner a copy of the independent review.
2. If the independent review determines that the project is complying with the relevant criteria in Schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the project is not complying with the relevant impact assessment criteria in Schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent shall:

- (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or
 - (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Director-General.
-

SCHEDULE 5

ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must:
 - (a) be submitted to the Director-General for approval by 31 **August 2013**;
 - (b) provide the strategic framework for environmental management of the project;
 - (c) identify the statutory approvals that apply to the project;
 - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
 - (e) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the project;
 - respond to any non-compliance;
 - respond to emergencies; and
 - (f) include:
 - copies of any strategies, plans and programs approved under the conditions of this approval; and
 - a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.

Management Plan Requirements

2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
 - (a) detailed baseline data;
 - (b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria;
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
 - (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the project;
 - effectiveness of any management measures (see c above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences;
 - (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and
 - (h) a protocol for periodic review of the plan.

Note: The Director-General may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Annual Review

3. **Prior to recommencing quarrying operations**, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:
 - (a) describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year;
 - (b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the
 - the relevant statutory requirements, limits or performance measures/criteria;
 - the monitoring results of previous years; and
 - the relevant predictions in the EA;
 - (c) identify any non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;
 - (d) identify any trends in the monitoring data over the life of the project;

- (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
- (f) describe what measures will be implemented over the next year to improve the environmental performance of the project.

Revision of Strategies, Plans and Programs

- 4. Within 3 months of:
 - (a) the submission of an annual review under Condition 3 above;
 - (b) the submission of an incident report under Condition 6 below;
 - (c) the submission of an audit report under Condition 8 below; and
 - (d) any modification to the conditions of this approval, (unless the conditions require otherwise), the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

- 4A. Prior to recommencing quarrying operations the Proponent shall:
 - (a) review and revise all plans and strategies required under Schedule 3, and the Environmental Management Strategy required under Condition 1 of Schedule 5; and
 - (b) submit these revised plans and strategies to the Director-General for approval.

REPORTING

Incident Reporting

- 5. The Proponent shall notify the Director-General and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.

Regular Reporting

- 6. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

INDEPENDENT ENVIRONMENTAL AUDIT

- 7. Within 12 months of recommencing quarrying operations, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
 - (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
 - (b) include consultation with the relevant agencies;
 - (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any EPL or Mining Lease EPL applicable to the site (including any assessment, plan or program required under these approvals);
 - (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and
 - (e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Director-General.

- 8. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

- 9. Prior to the commencement of construction on site, the Proponent shall:
 - (a) make copies of the following publicly available on its website:
 - the documents referred to in Condition 2 of Schedule 2;
 - all current statutory approvals for the project;
 - all approved strategies, plans and programs required under the conditions of this approval;
 - the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
 - a complaints register, updated on a monthly basis;
 - the annual reviews of the project;

- any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit;
 - any other matter required by the Director-General; and
- (b) keep this information up-to-date,
to the satisfaction of the Director-General.

APPENDIX 1 SCHEDULE OF LAND

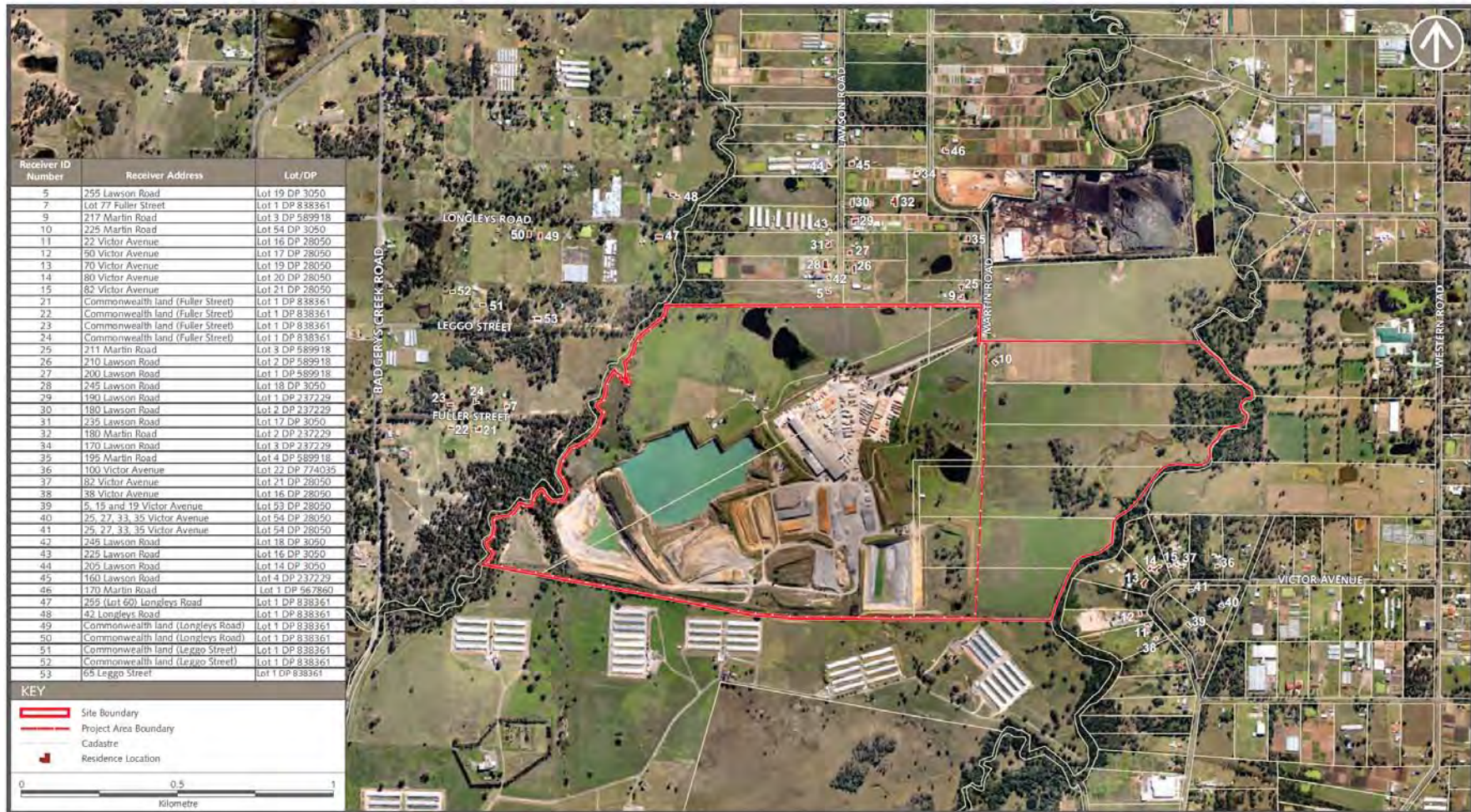


AECOM

Schedule of Land
Environmental Assessment
Boral Quarry and Brick Making Facility, Badgerys Creek

Appendix 1

APPENDIX 2 LAND OWNERSHIP SURROUNDING THE PROJECT



AECOM

Land Ownership Surrounding the Project
Environmental Assessment
Boral Quarry and Brick Making Facility, Badgerys Creek

Appendix 2

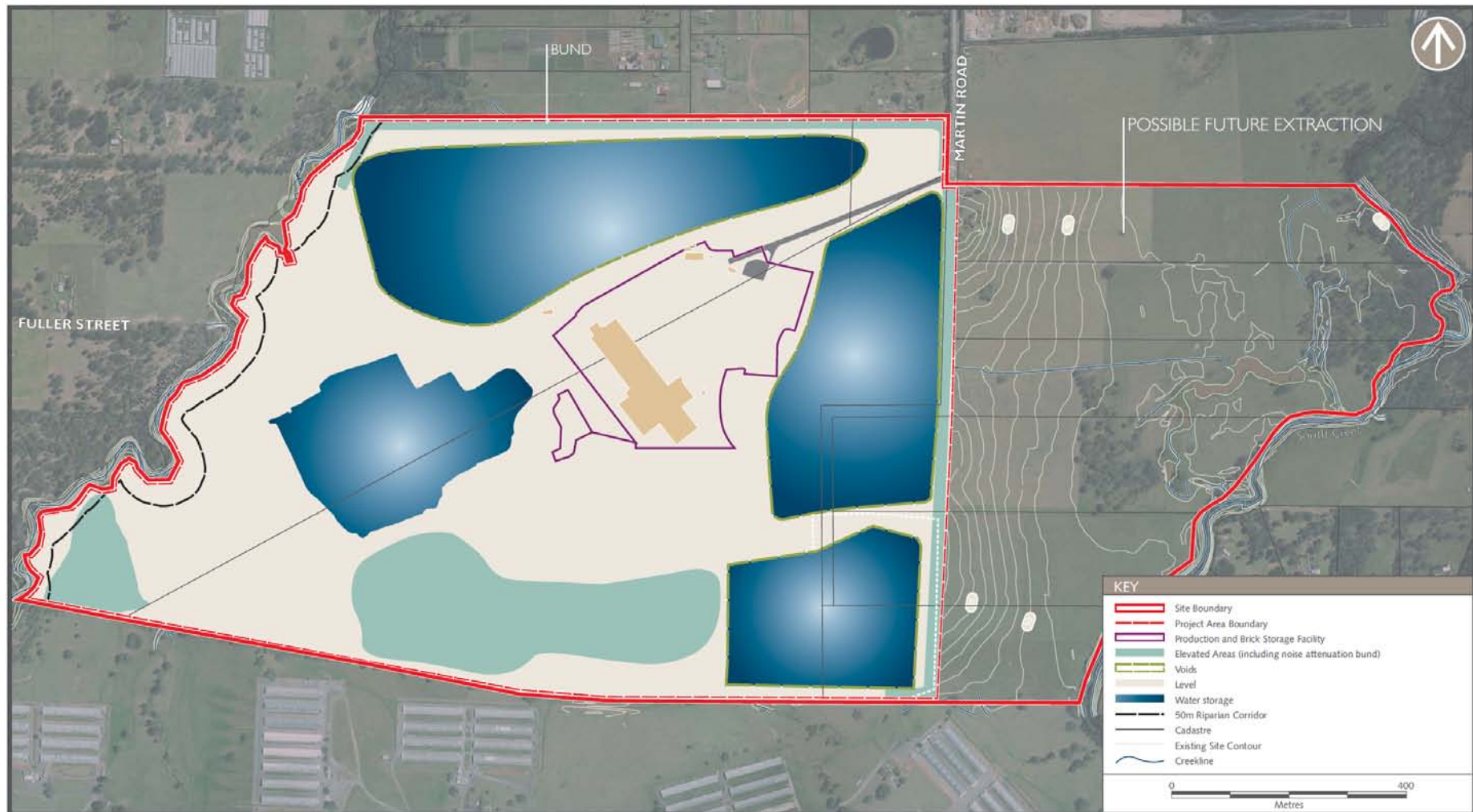
APPENDIX 3 PROJECT LAYOUT PLAN



AECOM

Proposed Operations
Environmental Assessment
Boral Quarry and Brick Making Facility, Badgerys Creek

APPENDIX 4 REHABILITATION PLAN



AECOM

APPENDIX 5 ARCHAEOLOGICAL DEPOSIT AVOIDANCE ZONE



AECOM

Archaeological Deposit Avoidance Zone
Environmental Assessment
Boral Quarry and Brick Making Facility, Badgers Creek

APPENDIX 6 STATEMENT OF COMMITMENTS

Issue	Commitment
General	
General	1) The Proponent will implement all practicable measures to prevent or minimise harm to the environment that may result from the construction, operation or rehabilitation of the Project.
Air Quality	<p>2) The Proponent will prepare an Air Quality and Green House Gas Management Plan (AQGHGMP) for the project to the satisfaction of the Director-General. The AQGHGMP will outline the purpose, methodology and expected outcomes of the dust monitoring, and will include the following content:</p> <ul style="list-style-type: none"> - Dust fraction to be measured, i.e. TSP, PM₁₀, PM_{2.5} etc.; - Equipment to be used to measure selected dust fraction; - Frequency of the monitoring, i.e. sample collection schedule; - Duration of the monitoring program; - Location of the monitoring station/s; - Standards/guidelines that are to be followed for location/construction of the monitoring station, equipment calibration, collection of samples and analysis of samples; - Calibration methodology and schedule; - Reporting procedure; - Regulatory guidelines and compliance criteria; - Action levels and contingency measures in the event that pollutant concentrations approach or are likely to exceed the relevant compliance criteria; and - A consultation program that involves nearby agricultural producers and residents, in order to determine if the dust mitigation measures are being effective. <p>3) The AQGHGMP will detail measures to control dust and emissions from the Project Site including the following measures:</p> <ul style="list-style-type: none"> - Haul roads to be watered at a rate equal to or greater than 2 L/m²/hr; - Unloading of trucks containing raw or unusable extracted material to be controlled using water sprays; - Dust from the raw material stockpile to be controlled using water sprays; - Dust from existing stockpiles of unusable material and open pits to be controlled using water sprays with chemical additives (surfactants); - Completed pits to be revegetated as soon as practicable after completion of quarrying activities; - Disturbed soil surfaces to be revegetated in accordance with the RP for the Project Site; - Operational practices to be reviewed to ensure 'best practice' techniques are being employed and that operational equipment is working efficiently; <p>4) A reactive dust management program will be implemented during quarrying activities. The reactive program will form part of the AQGHGMP. A reactive management program involves the combination of instantaneous dust monitors and an on-site meteorological station. The dust monitors will be located on the boundary of the site between the dust emitting activities and the most affected receptors, and alert the operators when dust levels approach or exceed criteria levels. If the dust levels reach a pre-determined warning or critical concentration and the winds are shown to be blowing from the Site towards the monitor (i.e. the site is likely to be contributing to the elevated dust levels and potentially affecting receptors), pre-arranged actions will be taken to minimise the Site's dust emissions. Once the dust concentrations return below the warning level, the additional mitigation measures can cease and quarrying operations return to normal. The warning or critical concentration levels will be chosen in consultation with OEH and represent levels that provide the Site enough time to implement mitigation measures and/or inform personnel to cease works.</p>

Issue	Commitment
General	
Noise	<ol style="list-style-type: none"> 5) The Proponent will implement all practicable measures to undertake the development in a way that minimises the noise generated. The Proponent has made the following commitments in relation to operation noise management: 6) The Proponent will conduct quarrying activities at the Project Site only between the following hours: <ul style="list-style-type: none"> • 7.00 am to 6.00 pm Monday to Saturday 7) The Proponent will operate the Brick making facility and conduct activities within the storage yard at the Project Site 24 hours a day, Monday to Sunday. 8) The Proponent will conduct deliveries and dispatch only between the following hours: <ul style="list-style-type: none"> • 6.00 am to 10.00 pm Monday to Friday • 6.00am to 6.00pm Saturday 9) The Proponent will apply 5 dB(A) of noise reduction treatment to all dozers and excavators used in the quarrying operations. 10) The Proponent will apply 5 dB(A) of attenuation treatment to the front end loader operating as part of the brick works. 11) The Proponent will construct an earth bund of a minimum height of 10 m along the northern and part of the western Project site boundaries, and 7m along the eastern Project Site boundary and part of the southern Project Site boundaries as shown in Figure 6 and Appendix B of the Noise Assessment Addendum Report. The earth mound will be constructed in stages as specified in Figure 6 of the Noise Assessment Addendum Report. 12) The Proponent will remove overburden material using excavators only in pits where the use of a dozer exceeds the noise criteria. 13) The Proponent will use smaller dozers during raw material removal stages where the predicted noise levels from larger dozers exceed the noise criteria. 14) Construction works associated with the earth bund will be limited to 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays. 15) The Proponent will adopt best practicable means of controlling noise during the construction of the noise berm and will include noise mitigation measures in a construction noise and vibration management plan which will form part of the construction management plan to minimise the noise impact at sensitive receivers. This may include the work practices described below as detailed in Section 8 of the Noise Assessment Addendum Report: 16) The Proponent will apply 5 dB(A) of attenuation treatment to dozers operating as part of the noise berm construction activities. 17) All construction activities associated with the construction of the noise berm will be subject to the standard noise and vibration mitigation measures described in Section 8.2 of the Noise Assessment Addendum Report. 18) Unforeseen noisy activities will be subject to additional mitigation measures depending on the extent of predicted or measured impacts. 19) In the case that high impact noise activities, such as those likely to generate noise levels above LAeq 75 dB(A) or activities likely to generate noise with intermittent, impulsive, tonal or low-frequency characteristics are required during the construction of the noise berm, adjacent sensitive receivers will be appropriately notified prior to works commencing and respite periods will be implemented. 20) The mitigation measures described in Section 8.5 of the Noise Assessment Addendum Report will be implemented in order to minimise the impact of noise exceedances from heavy vehicles (i.e. trucks and dump trucks) moving around the site. 21) The Proponent and/or its appointed contractors will select and maintain bulk earthwork machinery as specified in Section 8.6 of the Noise Assessment Addendum Report. 22) Broadband reversing alarms or other non-tonal vehicle movement and warning alarms will be fitted to all machinery on site (quarrying, brick making and storage yard machinery). The potential noise impact associated with reversing alarms will be managed and minimised via a combination of proactive driver/operator training and operational procedures as detailed in Section 8.6 of the Noise Assessment Addendum Report.

Issue	Commitment
General	
	<p>23) The Proponent will implement a noise monitoring programme which would involve attended noise monitoring at a number of nearby identified receiver locations.</p> <p>24) The Proponent will undertake consultation with identified nearby residential receivers (as detailed in Section 8.9 of the Noise Assessment Addendum Report) that are predicted to exceed the recommended noise criteria to inform them of the timing and duration of the work.</p> <p>25) The Proponent will maintain a noise complaint register.</p>
Surface Water	<p>26) The Proponent will manage surface water on the Project Site in accordance with the SWMP prepared for the Project Site (ERM, 2002), including Addendum dated April 2010 (AECOM, 2010) and included as Appendix C to the EA.</p> <p>27) If during the operational phase of the quarry or on completion of the quarry operations, the proponent wishes to make use of the water from the pits/dams in the brick making process or for reuse at other premises offsite etc, a licence will be obtained from the NOW.</p>
Groundwater	<p>28) The Proponent will prepare and implement a Groundwater Monitoring Program for the Project Site generally in accordance with the methodology provided in Chapter 11 of the EA, subject to consultation with the NOW and the satisfaction of the Director-General of the DP&I. The program will commence within 12 months of the project proposal approval.</p> <p>29) The Proponent will report the results of the Groundwater Monitoring Program to the Director-General of the DP&I and the NOW on an annual basis.</p> <p>30) The Proponent will implement appropriate management measures in relation to groundwater as indicated by the Monitoring Program and agreed with the Director-General.</p> <p>31) A licence to authorise any groundwater monitoring installation, required as part of this project, will be obtained from the NOW prior to any drilling commencing.</p> <p>32) The proponent will implement an alluvial aquifer mapping and assessment program to inform:</p> <ul style="list-style-type: none"> - The definition of the boundaries of the alluvial system; - Adjustment to the extent of proposed pits to avoid impacts to the alluvial aquifer; and - The establishment of further mitigation measures (if required) to minimise potential impacts upon the alluvial aquifer. - This program will commence within 12 months of the project proposal approval and the results will be reported to the NOW and the Director-General of the DP&I.
Rehabilitation	<p>33) The Proponent will carry out rehabilitation works at the Project Site in accordance with the RP prepared for the Project Site and included as Appendix D to the EA.</p> <p>34) The Proponent will prepare a Final Landform Rehabilitation Plan in consultation with the OEH and DP&I two years prior to the completion of all approved quarrying activities.</p>
Traffic and Transport	<p>35) The Proponent will manage traffic movements to and from the Project Site generally in accordance with the following:</p> <ul style="list-style-type: none"> - Personnel operating trucks and vehicles to and from the Project Site would be required to undertake a site-specific health and safety induction, specifying operating hours, avoidance of the AM and PM peak periods and vehicle speed limits on Martin Road. - A heavy vehicle protocol would be developed for the Project Site and distributed to relevant staff and contractors during induction procedures. The protocol would deal with such issues as timing of vehicle movements, idling of vehicles, speed limits and parking. - Unnecessary vehicle movements would be minimised where possible. <ul style="list-style-type: none"> • Deliveries would be scheduled on larger capacity 'Truck and Trailer' vehicles rather than 'Truck Only' vehicles where possible to minimise truck movements.

Issue	Commitment
General	
Cultural Heritage	<p>36) The Proponent will adopt the following measures in relation to the management of cultural heritage on the Project Site:</p> <ul style="list-style-type: none"> - Isolated find BC-01-09 would be collected prior to works commencing. - The location of quarry pit 5 and the noise attenuation berm would be modified so as to not encroach within 60m of Badgerys Creek. - Salvaged heritage material would be returned to the location they originated from as per the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> and the procedure outlined in the Aboriginal Heritage Assessment Addendum. - Should relics be uncovered during the course of the approved works, works will cease. In cases where historical items have been uncovered, the NSW DP&I's Heritage Branch will be advised or should indigenous items be uncovered the National Parks and Wildlife Service will be advised; - Workers/contractors will be informed of their obligations under the NPW Act 1974, namely that it is illegal to disturb, damage or destroy a relic without the prior approval of the Director General of the OEH; and - Should human remains be found in, on, or under the land during construction, the responsible party will: <ul style="list-style-type: none"> • Contact the local police; • Not disturb or excavate the remains; • Immediately cease all work at the particular location; • Notify the OEH office as soon as practicable and provide any available details of the remains and their location; and • Not recommence any work at the particular location until authorised in writing by the OEH.
Ecology	<p>37) The Proponent will adopt the following measures in relation to the removal of any trees on the Project Site:</p> <ul style="list-style-type: none"> - The canopy of the trees to be visually inspected prior to clearing to assess for the presence of fauna. Where bird species are detected the tree is to be nudged prior to felling to encourage the fauna to vacate the tree prior to felling. Trees to be left in situ until the birds leave the canopy; - Felled trees are to be left in-situ for at least 24 hours to allow fauna species to relocate. Qualified personnel are to be on hand to check for wildlife and relocate them; - Felled wood is to be relocated to the remnant woodland (and not placed in piles) or chipped and used in rehabilitation areas; - Should any wildlife be inadvertently injured during the proposed works, WIRES or an accredited veterinarian will be contacted; - A 60m buffer area will be provided along Badgerys Creek and the Badgerys Creek tributary. Rehabilitation works are to be undertaken in this area in accordance with the RP prepared as part of this EA; and - Five native trees will be planted for each mature native tree that is removed. The plantings will be located adjacent to the riparian vegetation along Badgerys Creek and its tributary.
Waste	<p>38) The Proponent will manage waste in relation to the Project in accordance with the existing WMP for the Project Site, included as Appendix M to the EA.</p>
Mineral Resources	<p>39) The proponent will provide annual production data to the Mineral Resources Branch of NSW Industry and Investment, as and when requested.</p>
Environmental Management	<p>40) The Proponent will prepare an EMP for the Project Site to provide environmental management practices and procedures to be followed during the operation of the Project. The EMP will include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> - identification of statutory and other obligations that the Proponent is required to fulfil in relation to operation of the Project; - a description of the roles and responsibilities for all key personnel involved in environmental management of the Project; - the environmental policies and principles to be applied to the operation of the Project; and - describe in general terms how the environmental performance of the Project would be monitored and managed.

APPENDIX 7
REPAIR WORKS FOR MARTIN ROAD



9 April 2013

Mr Raj Autar
Manager – Civil Construction & Assets
Liverpool City Council
1 Hoxton Park Rd
Liverpool NSW 2170

Clay & Concrete NSW
Bricks & Roofing
PO Box 234
Kemps Creek
NSW 2178

T: 13 30 35
F: 1300 368 760

www.boral.com.au

Re: Proposed approach to patching of Martin Road from the Australian Native Landscapes site entrance to the entrance to Boral's Badgerys Creek Quarry and Brick Making Facility

Dear Raj,

As you are aware from previous formal correspondence (letter from Boral date 22 July 2012), Boral announced the mothballing of the Badgerys Creek brick making facility in April 2012.

With the Badgerys Creek brick making facility in a mothballed state, Boral were not in a position to:

- Upgrade and widen Martin Road from the site entrance to the entrance of Australian Native Landscape (ANL); and
- Commit an annual road maintenance contribution to Council, based on the weight of brick products and associated materials transported from and to the site.

In subsequent correspondence with the Department of Planning (email of 6 February 2013), Liverpool City Council (LCC) advised that they “would be amenable to alternative temporary repairs (to a satisfactory trafficable standard to be agreed on site) until (prior to) recommencement of full operations”.

LCC and Boral met on site on 15 March 2013 and agreed in principle to both the extent of repairs (see attached figure) that are required as well as the specifications of this repair work.

For ease of reference, the interface between Boral's concrete driveway and the asphalt surface at the end of Martin Road is defined as Chainage 0 (CH0) with increasing chainage references towards Chainage 386, opposite the entrance to ANL.

Boral is committed to the repair of the full width of Martin Road (approximately 7m from shoulder to shoulder) in the following areas:

- CH17 – CH55 (38m x 7m = 266m²);
- CH80 – CH130 (50m x 7m = 350m²)
- CH242 – CH386 (144m x 7m = 1008m²)

Boral Bricks
ABN 66 082 448 342



Boral will therefore repair a total area of 1624 m².

The approach to the repair works that were agreed with LCC were to mill the areas to be repaired to a depth of 100mm and to fill these areas with 100mm of asphalt (AC28 C450 – AUSPEC 1144 Oct/12).

Once LCC have confirmed that they are in agreement with the above approach discussed on site, Boral will contact LCC to confirm dates for completion of the work and to discuss logistics around road safety requirements.

If you have any further queries, please do not hesitate to contact me.

Yours sincerely

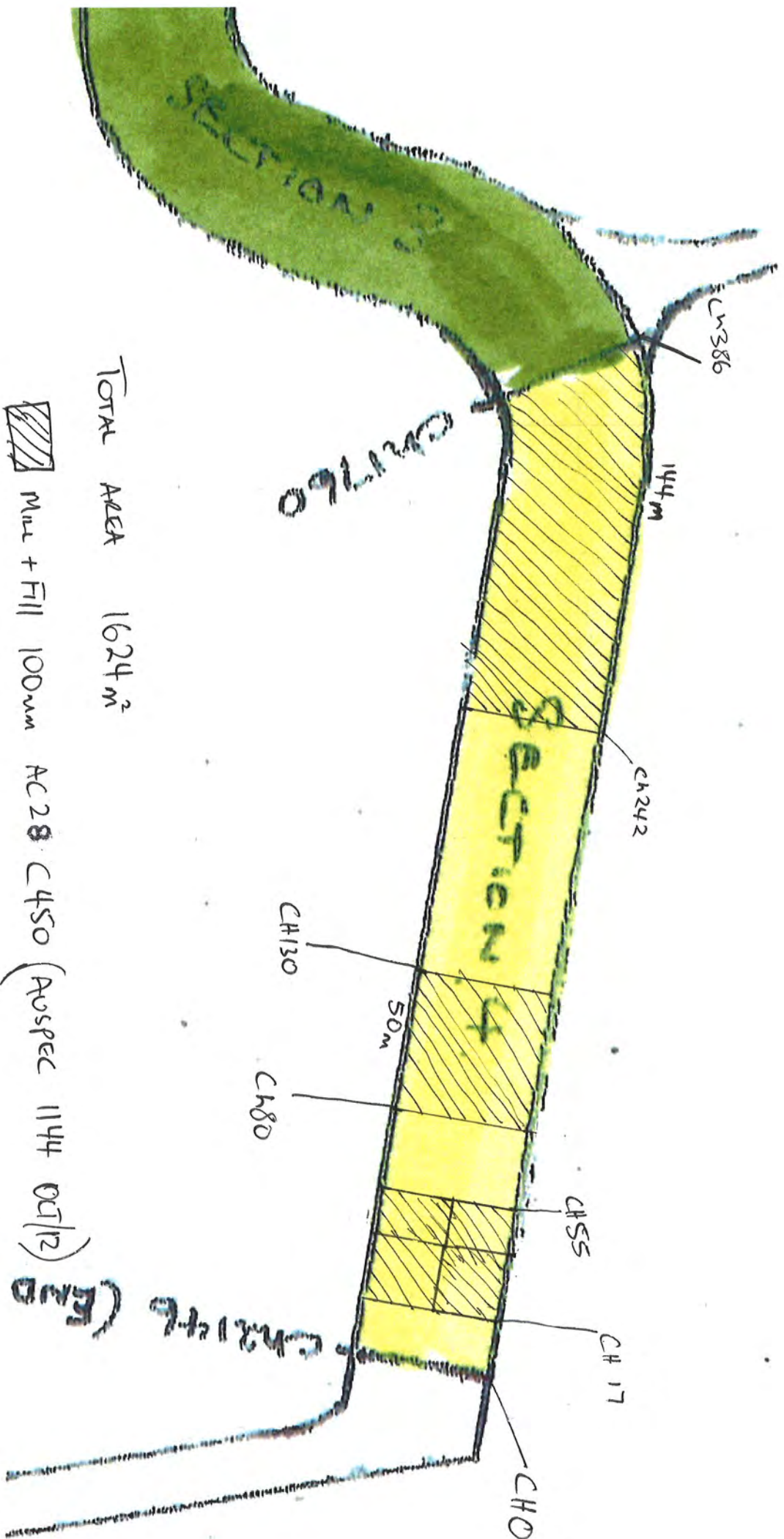
A handwritten signature in black ink, appearing to read "David Bird", is written over the "Yours sincerely" text. The signature is fluid and cursive, with a large loop at the end.

David Bird
Regional General Manager
Clay & Concrete Products NSW

$$144 \times 7m = 1008m^2$$

$$50m \times 7m = 350m^2$$

$$38m \times 7m = 266m^2$$



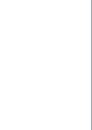
$$\text{TOTAL AREA } 1624m^2$$





APPENDIX B

NOISE IMPACT ASSESSMENT



BADGERYS CREEK BRICK MAKING FACILITY - MOD 2 NOISE IMPACT ASSESSMENT

REPORT NO. 17199
VERSION C

NOVEMBER 2017

PREPARED FOR

ELEMENT ENVIRONMENT
PO BOX 1563
WARRIWOOD NSW 2102

DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Draft	10 November 2017	Nic Hall	John Wassermann
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B	Final	23 November 2017	Nic Hall	John Wassermann
C	Final	29 November 2017	Nic Hall	John Wassermann

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Quality
ISO 9001

SAI GLOBAL

AAAC

This firm is a member firm of the Association of Australasian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.



Celebrating 50 Years in 2012

Wilkinson Murray is an independent firm established in 1962, originally as Carr & Wilkinson. In 1976 Barry Murray joined founding partner Roger Wilkinson and the firm adopted the name which remains today. From a successful operation in Australia, Wilkinson Murray expanded its reach into Asia by opening a Hong Kong office early in 2006. Today, with offices in Sydney, Newcastle, Wollongong, Orange, Queensland and Hong Kong, Wilkinson Murray services the entire Asia-Pacific region.



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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

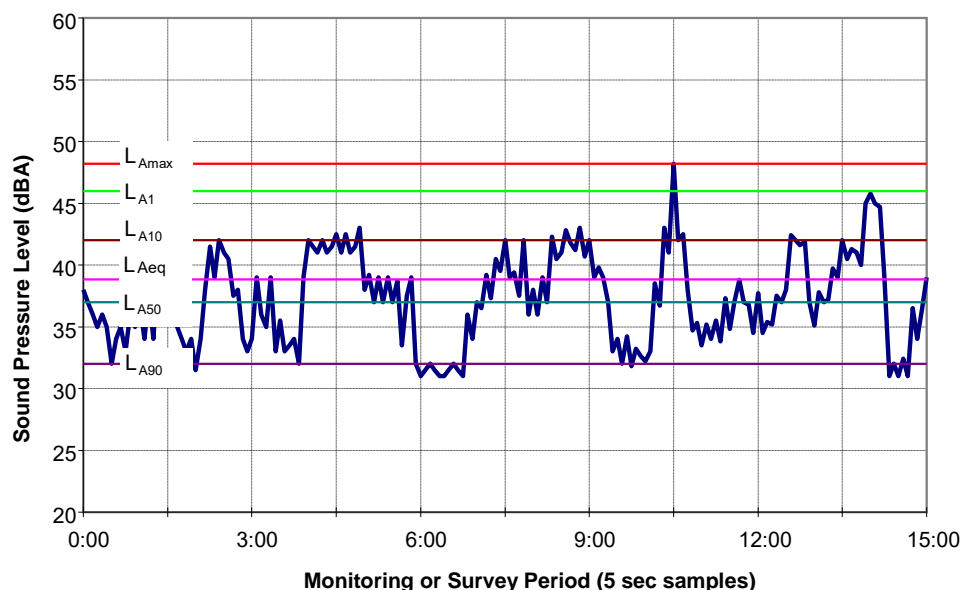
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

Wilkinson Murray Pty Limited (WMPL) has prepared this report for Element Environment (Element) on behalf of CSR Building Products Limited (CSR). It presents an assessment of potential off-site noise impacts associated with the proposed modifications to the operation of the Badgerys Creek Brick Making Facility (the Project).

The existing Project Approval (PA10_0014) does not allow for the exportation of material extracted on-site. Due to recent and forecasted closure of many quarries in the region, reducing the availability of raw materials, CSR is lodging a modification application for the exportation of up to 275,000 tonnes of clay per calendar year.

Although the existing Project Approval allows for the storage of finished brick products in the hard stand storage yard, to the east of the brick factory, this storage area will not be used for the storage of bricks manufactured at the site, until planning approval has been granted for the upgrade of the existing brick factory and the upgrade has been completed. In the interim, CSR wishes to make use of this valuable space for the temporary storage of finished building products from other CSR manufacturing facilities.

The exportation of clay and the temporary storage of finished building products on the site are hereafter referred to as the Proposal.

This report presents an assessment of operational noise levels at nearby sensitive receivers with the applicable noise limits in the existing Project Approval. The assessment of operational noise has been conducted in general accordance with the *NSW Industrial Noise Policy* (INP).

Traffic movements on the surrounding public road network generated by the Proposal would be less than or equal to those associated with the Approved Project. Accordingly, a quantitative assessment of traffic noise has not been conducted.

2 GENERAL DESCRIPTION

2.1 Site Location

The Project site is located at 235 Martin Road in the suburb of Badgerys Creek within the Liverpool Local Government Area. Badgerys Creek is approximately 41 km south west of Sydney and 17 km west of Liverpool. The Project site is approximately 200 hectares in size.

2.2 Surrounding Land Use and Sensitive Receivers

The land use surrounding the site to the north, east and south is predominantly rural. The Western Sydney Airport site is located to the west of the Project site.

The nearest and most potentially affected receivers are a number of rural residential properties surrounding the site. These receivers have previously been identified in the *Noise Assessment Addendum Report* included in the *Responses to Submissions Report* for the current Project Approval, prepared by AECOM and dated 31 May 2011. These receivers are shown on Figure 2-1 and summarised in Table 2-1.

Identified receivers to the west of the Project site, on the opposite side of Badgerys Creek are situated on the Western Sydney Airport site. The majority of these dwellings have been demolished, and it is understood that none of these buildings would be used as residential dwellings in the future. These receivers are identified on Figure 2-1; however, operational noise levels associated with the Proposal are not assessed at these receiver locations.

Receiver R10 is situated on land owned by CSR. Therefore, operational noise levels at R10 have not been assessed.

Review of aerial photography indicates that a second dwelling may be situated on property of receiver R12. This dwelling has been identified as receiver R12a and included in this assessment.

Table 2-1 Sensitive Receivers

Receiver	Address	Lot/DP Number
R5	255 Lawson Road, Badgerys Creek	19 DP 3050
R7 ^a	Lot 77 Fuller Street, Badgerys Creek	1 DP 838361
R9	217 Martin Road, Badgerys Creek	3 DP 589918
R10 ^b	225 Martin Road, Badgerys Creek	16 DP 28050
R11	22 Victor Avenue, Kemps Creek	17 DP 28050
R12	50 Victor Avenue, Kemps Creek	19 DP 28050
R12a	50 Victor Avenue, Kemps Creek	19 DP 28050
R13	70 Victor Avenue, Kemps Creek	20 DP 28050
R14	80 Victor Avenue, Kemps Creek	21 DP 28050
R15	82 Victor Avenue, Kemps Creek	3 DP 589918
R25	211 Martin Road, Badgerys Creek	2 DP 589918
R26	210 Lawson Rd, Badgerys Creek	1 DP 589918
R27	200 Lawson Road, Badgerys Creek	18 DP 3050
R28	245 Lawson Road, Badgerys Creek	1 DP 237229

Receiver	Address	Lot/DP Number
R29	190 Lawson Road, Badgerys Creek	2 DP 237229
R30	180 Lawson Road, Badgerys Creek	BORAL
R31	235 Lawson Road, Badgerys Creek	17 DP 3050
R32	180 Martin Road, Badgerys Creek	2 DP 237229
R34	170 Lawson Road, Badgerys Creek	3 DP 237229
R35	195 Martin Road, Badgerys Creek	4 DP 589918
R42	245 Lawson Road, Badgerys Creek	18 DP 3050
R43	225 Lawson Road, Badgerys Creek	16 DP 3050
R44	205 Lawson Road, Badgerys Creek	14 DP 3050
R45	160 Lawson Road, Badgerys Creek	4 DP 237229
R46	170 Martin Road, Badgerys Creek	1 DP 567860
R47 ^a	255 (Lot 60) Longleys Road, Badgerys Creek	1 DP 838361
R48 ^a	42 Longleys Road, Badgerys Creek	1 DP 838361
R53 ^a	65 Leggo St, Badgerys Creek	1 DP 838361

a. Dwelling within Western Sydney Airport site and not assessed.

b. Residence on CSR owned land.

Figure 2-1 Sensitive Receivers



2.3 Existing and Current Operations

2.3.1 Planning Approval History

Boral Bricks Pty Limited (Boral) owned and operate the Badgerys Creek Quarry and Brick Making Facility at Badgerys Creek for over 30 years. In 2001, approval was granted for the ongoing production of bricks and the expansion of the existing quarrying operations at the Badgerys Creek site.

Due to adverse economic conditions, Boral "mothballed" its operations at Badgerys Creek in March 2012. As a consequence of the site shutdown, Boral was unable to comply with the conditions of approval and submitted a modification application (10_0014 Mod 1) requesting that site activities from March 2012 be limited to:

- Minor maintenance and inspection;
- Operation of the retail display facility; and,
- Irregular and occasional dispatch of bricks from the inventory remaining on-site.

2.3.2 Approved Project

The approved quarrying and brick making activities, outlined in the Project Approval are to:

- Extract 420,00 tonnes of clay per calendar year;
- Produce 252,000 tonnes of bricks per calendar year;
- Extract any clay shale or carry out any work in the extraction area no deeper than 35 metres below the pre-existing natural surface of the ground; and,
- Receive 20,000 tonnes of raw material for brick making per calendar year.

Product from the quarry and brick making facility is approved for transport entirely by road. The Project Approval limits the number of truckloads that can leave the site per day to:

- A maximum of 60 laden brick trucks (i.e. 120 movements), Monday to Friday; and,
- A maximum of 20 laden brick trucks (i.e. 40 movements) on Saturdays.

The approved operating hours for the site are outlined in Table 2-2.

Table 2-2 Approved Operating Hours

Activity	Day	Time
Removal of overburden and construction of noise bunds	Monday-Friday	7:00am – 6:00pm
	Saturday	8:00am – 1:00pm
	Sunday and public holidays	None
Quarrying	Monday-Saturday	7:00am – 6:00pm
	Sunday and public holidays	None
Brick making facility and Storage Yard	Monday- Sunday	24 hours
Deliveries and Dispatch	Monday-Friday	6:00am – 10:00pm
	Saturday	6:00am – 6:00pm
	Sunday and public holidays	None

2.4 Proposed Operations

The Proposal involves extracting up to 275,000 tonnes of clay per calendar year from Pit 3, and exporting this material off-site to support CSR's wider brick manufacturing business. The on-site activities under the Proposal would include:

- Stripping overburden in the eastern half of Pit 3 and hauling to Pit 2 for engineered fill;
- Extracting material in Pit 3 and hauling to product stockpiles;
- Loading product into trucks and exporting off-site; and,
- Engineered fill of Pit 2.

All quarrying activities associated with the extraction of clay would be conducted in accordance with the approved quarrying hours (7am - 6pm, Monday - Saturday). The exportation of clay material would be conducted between 7am and 10pm, Monday to Saturday, which is within the approved deliveries and dispatch hours.

In addition to the proposed quarrying and exportation of clay products, it is also proposed to temporarily store finished building products from other CSR manufacturing facilities on the hardstand area in the brick storage yard, to the east of the brick factory. The finished building products would be transported by flat-bed trucks, up to a B-Double size, from other CSR factories and unloaded by forklifts. On demand, flat-bed trucks would transport the finished building products to customers after being loaded by forklifts in the storage yard. All proposed activities associated with the finished building products from other CSR manufacturing facilities, such as delivery, unloading, storage, loading and dispatch, would be conducted between 7am and 10pm, Monday to Saturday, within the approved deliveries and dispatch hours.

CSR would carefully manage the total number of truckloads per day, associated with both the clay exportation and the delivery and dispatch of finished building products, to ensure they do not exceed the approved daily truckload limit. Therefore, a detailed assessment of traffic noise impacts associated with the Proposal has not been conducted.

3 NOISE CRITERIA

The operational noise criteria in the Project Approval are:

3. *The Proponent shall ensure that the operational noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.*

Table 2: Noise Criteria dB(A)

Activity	Location	Day	Evening	Night	
		$L_{Aeq}(15\text{ min})$	$L_{Aeq}(15\text{ min})$	$L_{Aeq}(15\text{ min})$	$L_{A1}(1\text{ min})$
<i>Quarrying</i>	<i>All</i>	<i>44</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>
<i>Brick making and storage yard activities</i>	<i>residential premises</i>	<i>44</i>	<i>38</i>	<i>35</i>	<i>45</i>

Notes:

- *To identify the locations referred to in Table 2, see the figure and associated table in Appendix 2 (of consent);*
- *Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

The locations of residential premises in the Project Approval noise criteria are consistent with those presented in Section 2.2, noting that the Project Approval was determined prior to the demolition of the dwellings on the Western Sydney Airport site.

4 OPERATIONAL NOISE ASSESSMENT

4.1 Operational Noise Prediction Methodology and Assumptions

4.1.1 Computer Noise Model

Operational and noise emissions associated with the Proposal were modelled using the CadnaA V4.6 acoustic noise prediction software and the CONCAWE noise prediction algorithm. The CONCAWE noise propagation model is used around the world and is widely accepted as an appropriate model for predicting noise over significant distances. Factors that were addressed in the noise modelling are:

- Equipment noise level emissions and locations;
- Shielding from ground topography;
- Noise attenuation due to geometric spreading;
- Ground absorption; and,
- Atmospheric absorption.

Subsequent to the Project Approval, a section of noise bunding, required under the Project Approval, was constructed along the project boundary adjacent to the north eastern section of Pit 3. This section of bunding forms part of the existing ground topography in the noise model. Construction of the noise bund along the northern boundary of the site and the remainder of the noise bund along the eastern project boundary, required under the Project Approval has not commenced and; therefore, is not included in the noise model.

4.1.2 Meteorological Effects

At relatively large distances from a source, the resultant noise levels at receivers can be influenced by meteorological conditions, particularly temperature inversions and gradient winds. Where these factors are a feature of an area their effect on resultant noise levels should be taken into account.

Section 5.2 of the INP advises that assessment of the effects of temperature inversions should be confined to the night time (10:00pm – 7:00am) assessment period only. As the hours of operation for the Proposal are limited to daytime hours only, the effects of temperature inversions have not been included in the modelling.

A detailed assessment of prevailing winds at the Project site was conducted in the *Noise Assessment Addendum Report* included in the *Responses to Submissions Report* for the current Project Approval, prepared by AECOM and dated 31 May 2011. This assessment concluded that no source to receiver winds up to 3 m/s would persist for more than 30 percent of any assessment period in any season. Accordingly, enhancement of noise levels due to gradient winds is not considered a feature of the area, and is not included in the modelling.

4.2 Operational Activities and Plant

Based on the proposed operations, as outlined in Section 2.4, a number of discrete activities and associated plant items have been identified for the assessment of potential noise impacts associated with the Proposal, and are described in the following sub-sections.

4.2.1 Stripping Overburden in Pit 3

Overburden material in the eastern half of Pit 3 would be stripped to expose product. Overburden would be stripped to a depth that is, on average, approximately 4 metres below the existing surface level. In the south eastern corner of Pit 3, it is expected that very little overburden would be stripped. Alternatively, some areas in the northern part of Pit 3 are expected to have up to 8-10 metres of overburden removed. The material would be stripped with a single excavator and loaded into one of 3 dump trucks for haulage across the site to Pit 2.

For assessment purposes, it is conservatively assumed that the stripping of overburden is occurring at the existing ground level. Over time, this activity will occur at lower ground levels and will receive some degree of shielding to nearby receivers by the surrounding topography.

4.2.2 Extracting Product from Pit 3

Clay would be pushed up with a dozer and loaded into dump trucks with an excavator. Two dump trucks would haul the material from the pit to the raw material stockpile.

For assessment purposes, it is conservatively assumed that the extraction is occurring in the eastern half of Pit 3, in relatively close proximity to the overburden stripping. Further, it is assumed that extraction is occurring at the **"stripped" ground** level, which is the maximum height of extraction, thereby receiving the least amount of shielding from the surrounding topography.

4.2.3 Exporting Product Off-site

A front end loader would be used to load clay products into truck-and-dogs for haulage off-site. It is assumed that, at most, two trucks would exit the site in a worst-case 15 minute period.

4.2.4 Engineered Fill of Pit 2

The overburden stripped and hauled from the eastern half of Pit 3 would be dumped into the central and southern sections of Pit 2. A compactor and a water cart would be used to achieve the required compaction.

Additionally, a single excavator would be used to strip previously emplaced overburden from the northern third of Pit 2. This material would be loaded into one of 2 dump trucks and hauled to the central and southern sections of Pit 2 for compaction.

For assessment purposes, it is assumed that all activities associated with the engineered fill of Pit 2 are occurring at a ground level similar to the existing topography outside of Pit 2. This represents the final ground level at the completion of the fill and results in noise sources being modelled with the minimum foreseeable shielding from surrounding topography.

4.2.5 Temporary Storage of finished building products

Finished building products from other CSR manufacturing facilities would enter the site on trucks, and would be unloaded with forklifts. For assessment purposes, it is assumed that, in a worst-case 15-minute period, two truckloads of finished building products would be brought onto the site and unloaded with two forklifts.

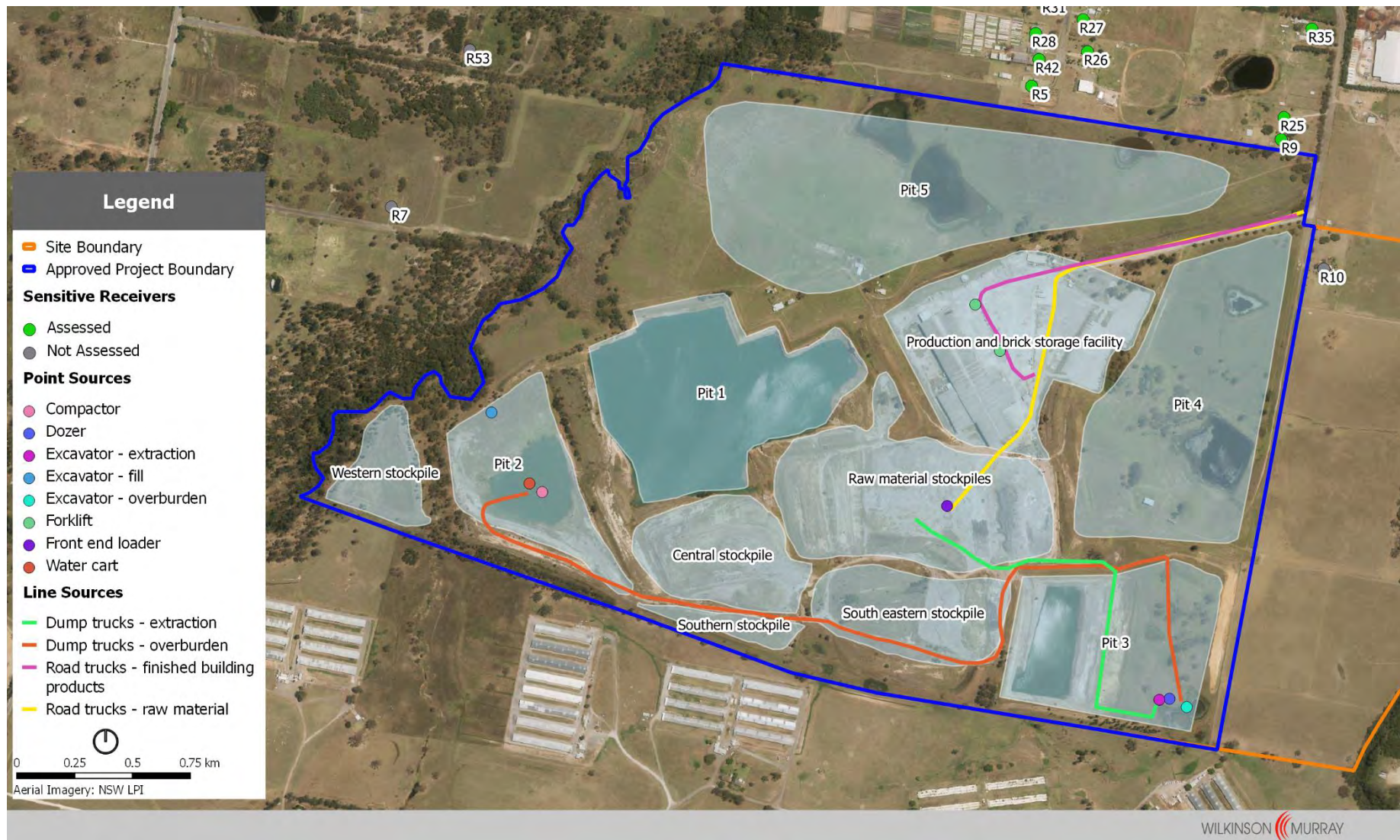
4.2.6 Summary of Modelled Noise Sources

Table 4-1 summarises the noise sources modelled in the worst-case operational scenario described above. Quantities, sound power levels (SWL) and other pertinent assumptions for all plant are provided. The modelled location of all sources is shown on Figure 4-1.

Table 4-1 Modelled Sources

Plant Item	Individual SWL (Continuous)	Quantity	Comments
Excavator	111 dBA	3 total (1 overburden, 1 extraction, 1 fill)	Modelled in continuous operation
Dump truck	115 dBA	7 total (3 overburden, 2 extraction, 2 fill)	All units modelled in continuous operation
Dozer	115 dBA	1 total (extraction)	Modelled in continuous operation
Front end loader	110 dBA	1 total (export)	Modelled in continuous operation
Truck and dog	105 dBA	4 total (2 clay export, 2 finished building products)	Assume 5 min on- site travel time per round trip, per truck. $L_{Aeq,15min}$ SWL modelled @ 106 dBA.
Compactor	112 dBA	1 total (fill)	Modelled in continuous operation
Water cart	110 dBA	1 total (fill)	Modelled in continuous operation
Forklift	98 dBA	2 total (finished building products)	Modelled in continuous operation

Figure 4-1 Modelled Sources



4.3 Noise Assessment Scenarios

As outlined in Section 2.4, activities and operating hours under the Proposal would be generally consistent with the existing Project Approval. Specifically, during the daytime (7:00am – 6:00pm, Monday to Saturday) all activities identified for the Proposal could be occurring concurrently; whereas, in the evening (6:00pm – 10:00pm, Monday to Friday), only clay material exportation and deliveries and dispatch of finished building products would occur.

It should be noted that although the existing Project Approval allows for deliveries and dispatch to be undertaken from 6am – 10pm Monday to Friday and 6am to 6pm on a Saturday, and for activities in the storage yard e.g. unloading and loading trucks, to be undertaken 24 Hours, Monday to Sunday, CSR is not proposing to undertake any activities on site during the night time (10pm – 7am, Monday to Friday), on a Saturday evening and night (6pm – 7am) or 24 hrs on a Sunday and public holidays.

Furthermore, as outlined in Section 4.1.1 noise modelling has been undertaken based on the existing site topography, which features no part of the 10 m high noise bund along the northern boundary of the site and part of the 7 m high noise bund along the eastern boundary of the site, required under Project Approval, in order to ascertain whether any form of additional noise attenuation is required on site when undertaking those activities associated with the Proposal.

4.4 Predicted Operational Noise Levels at Sensitive Receivers

The predicted $L_{Aeq,15min}$ noise levels at sensitive receivers due to the typical worst-case operation of the Proposal in the identified noise assessment periods are presented in Table 4-2.

Table 4-2 Predicted $L_{Aeq,15min}$ Operational Noise Levels

Receiver	Predicted Level		Criteria (dBA)		Complies?
	Day	Evening	Day	Evening	
R5	37	33	44	38	Yes
R9	34	31	44	38	Yes
R11	40	23	44	38	Yes
R12	40	23	44	38	Yes
R12a	42	24	44	38	Yes
R13	39	23	44	38	Yes
R14	38	23	44	38	Yes
R15	38	22	44	38	Yes
R25	33	28	44	38	Yes
R26	36	31	44	38	Yes
R27	35	28	44	38	Yes
R28	35	30	44	38	Yes
R29	33	25	44	38	Yes
R30	31	23	44	38	Yes
R31	34	27	44	38	Yes
R32	31	24	44	38	Yes

Receiver	Predicted Level		Criteria (dBA)		Complies?
	Day	Evening	Day	Evening	
R34	30	22	44	38	Yes
R35	30	24	44	38	Yes
R42	36	32	44	38	Yes
R43	33	25	44	38	Yes
R44	30	21	44	38	Yes
R45	31	22	44	38	Yes
R46	29	20	44	38	Yes

Review of Table 4-2 indicates that $L_{Aeq,15min}$ noise levels at sensitive receivers due to the operation of the Proposal would comply with the noise limits defined in the existing Project Approval, without any form of noise attenuation.

5 CONCLUSION

Wilkinson Murray Pty Limited has prepared this report for Element Environment on behalf of CSR Building Products Limited. It presents an assessment of potential off-site noise impacts associated with the proposed modifications to the operation of the Badgerys Creek Brick Making Facility.

The existing Project Approval does not allow for the exportation of material extracted on-site. Due to recent and forecasted closure of many quarries in the region, reducing the availability of raw materials, CSR is lodging a modification for the exportation of up to 275,000 tonnes of clay per calendar year. In addition to the proposed quarrying and exportation of clay products, CSR is also proposing to temporarily store finished building products from other CSR manufacturing facilities on the hardstand area in the brick storage yard.

Operational noise levels at nearby sensitive receivers have been predicted based on worst-case scenarios for the operation of the Proposal in the relevant noise assessment periods. The predicted noise levels comply with the relevant criteria in the Project Approval without any form of additional noise attenuation e.g. noise bunds. Therefore, completion of the 7 m high noise bund along the eastern boundary of the site and construction of a 10 m high noise bund along the northern boundary of the site, as outlined in the Project Approval, is not required when only conducting those activities on site, which are the subject of this modification application.



