Executive Summary

Introduction

AECOM Australia Pty Limited (AECOM) has prepared this Environmental Assessment (EA) on behalf of Boral Bricks Pty Limited (Boral) to assess the potential environmental impacts of continued extraction of the Badgerys Creek quarry (the Project Site) beyond September 2010 to meet continued demand for its products. Boral currently carries out quarrying and brick making activities at the Project Site, which lies within the Liverpool Local Government Area (LGA) to the south-west of Sydney.

The proposal has been declared by the NSW Director General of the Department of Planning (DoP), as delegate of the Minister for Planning, as a 'major development' under the provisions of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) and *State Environmental Planning Policy (Major Development) 2005* (SEPP 2005), and is therefore subject to the provisions of Part 3A of the EP&A Act.

Existing operations on the Project Site involve the quarrying of clay and shale for the production of bricks and their dispatch to offsite locations. A substantial amount of valuable clay resource remains on the Project Site and it is important that this resource be fully utilised to ensure a steady ongoing supply of building materials for the construction industry. Current operations on the Project Site involve the following key activities and infrastructure:

- Three existing quarry pits (Pits 1, 2 and 3);
- A brick handling and production facility (brick making facility);
- A bricks finished goods storage yard;
- Raw material and unusable material stockpiles;
- Water storage and sedimentation ponds; and
- Access roads.

Boral is seeking Concept and concurrent Project Approval for the continuation of operations on the Project Site, comprising:

- Extraction from existing and future new pits across the Project Site in the order of 420,000 tonnes per annum (tpa); and
- Brick making activities in the order of 252,000 tpa.

Key works and ancillary activities included in the project are:

- Continuation of extraction of raw materials from Pit 3;
- Establishment of new quarry areas commencing with Pit 4 to the north of the existing Pit 3 and then extending into the area further to the north (Pit 5);
- Stockpiling of raw and unusable materials;
- Rehabilitation works ; and
- Other ancillary activities such as loading/unloading, brick storage and delivery and receipt of raw materials.

This EA has been prepared by AECOM on behalf of the Proponent to support an application for approval for the continuation of operations on the Project Site as described in **Chapter 4**. It has been prepared in accordance with Part 3A of the EP&A Act and the Director Generals Requirements (DGRs) issued for the Project by the Director-General of the DoP.

Site Description and Context

The Project Site is located in the suburb of Badgerys Creek within the Liverpool LGA. Badgerys Creek is approximately 41 km south west of Sydney and 17 km west of Liverpool. It is a small community comprising rural residences, agricultural activities, quarrying and industry. The locality supports a number of small rural residential holdings and a limited number of larger agricultural properties, agricultural enterprises (chicken farms, nurseries) and market gardens. The region forms part of the South West Growth Centre (SWGC) under the *City of Cities: Sydney Metropolitan Strategy* (DoP, 2007, *Sydney Metropolitan Strategy*) with Liverpool identified as a major centre and the Project Site earmarked for 'future industrial' development.

The Project Site is some 200 ha in area and is currently used for quarrying, brick production and associated activities. Existing features of the Project Site include two completed quarry pits (known as Pits 1 and 2), an active quarry pit (known as Pit 3), three large sediment basins in the eastern and northern portions of the Project Site, two smaller dams in the eastern and northern parts of the Project Site, a brick making facility, various administration buildings, a bricks finished goods storage yard, car parks and internal road network. These features are generally contained within the western part of the Project Site with the far eastern portion of the Project Site adjacent to South Creek being undeveloped and used for stock agistment and grazing.

Strategic Context and Project Need

The proposed Project involves the continuation of quarrying and brick making activities within the Project Site which is currently operating as a quarry and brick making facility. Quarrying and brick making activities at the Project Site currently yield approximately 250,000 tpa of shale and sandstone and produce bricks in the order of 200,000 tpa. A draft discussion paper prepared by the NSW Department of Mineral Resources (DMR) as part of structure planning for the *Sydney Metropolitan Strategy* states that Bringelly Shale is the primary source of structural shale for the manufacture of bricks and pavers for the Sydney region.

Boral is Australia's second largest producer of clay brick and pavers and also exports a small proportion of clay products to New Zealand and Japan and increasingly to other countries within the Asia region. In Australia, demand for Boral's clay and concrete products is primarily driven by the construction of multi-unit and attached/detached housing.

Badgerys Creek is located within the SWGC, an area identified as part of the *Sydney Metropolitan Strategy* as a major growth area. The Growth Centres are expected to accommodate 30 to 40 percent of Sydney's new housing by 2031. The Project Site has been earmarked under the *Sydney Metropolitan Strategy* as 'future industrial' employment land. Surrounding areas have been earmarked for either 'future industrial' or 'residential' land use. Continuation of quarrying at the Project Site and the subsequent production of clay bricks and pavers, would support proposed future urban development within the SWGC and predicted growth across the broader Sydney region and align with the proposed rezoning of the land to 'future industrial'.

The proposed continuation of quarrying and brick making activities at the Project Site would utilise existing surface infrastructure and facilities, with no requirement for upgrade. The use of existing infrastructure including the brick making facility would provide an economically viable means of extracting, processing, manufacturing and transporting valuable shale and sandstone resource as bricks and pavers.

Alternatives Considered

Alternative options considered for the Project include:

Location and Depth of Extraction

- *Extraction from deeper geological units.* It is expected that in order to extract resource from within deeper geological units, and to penetrate the dense, Minchinbury Sandstone, alternative extraction techniques such as blasting would likely be required. At this stage, given the availability of more readily accessible resource across the Project Site, it is not economically viable to extract material deeper than the current average of 35 m, therefore it is not proposed to extract deeper than this under the current proposal.
- *Location of proposed future Pits 4 and 5.* The proposed pit locations have been chosen to target the required resource whilst avoiding areas of environmental constraint. Proposed Pits 4 and 5 represent the most economically viable and environmentally sustainable locations for quarrying to take place over the next 20 years.
- *Extraction in the east of the Project Site.* Suitable resource may exist in the eastern portion of the Project Site to justify future extraction in this location, however extensive geological investigation has not yet been undertaken on this part of the site. Quarrying may take place in the eastern part of the site at some point in the future subject to geological and environmental investigations, market conditions and planning approval, however under the current proposal, this part of the site would not be subject to quarrying activites.

Use of the Project Site

- *Cessation of extraction and rehabilitation of the land for a 'future industrial' land use in accordance with the intent of the Sydney Metropolitan Strategy*. This option was discounted as it would not allow for the full utilisation of resources existing on the Project Site and the sterilisation of the land for future extraction. This would have implications for the availability of construction materials and potentially broader impacts upon the cost of housing development in the Sydney region.
- *Cessation of quarrying and brick making operations at the Project Site and closure of the Project Site.* Similar to the above, this would leave a valuable natural resource on the Project Site. This option is not considered to have economic or social merit given that the Project Site is already operating as a successful business, with strong future potential given the growing housing market in the greater Sydney region.

Upon consideration of these alternatives, the continued use of the Project Site for extraction and brick making was considered to be the highest and best use of the land in the foreseeable future.

Do Nothing

The 'Do Nothing' option would comprise Boral continuing to operate until the expiration of its existing consent in September 2010, beyond which operations at the Project Site would have to cease as they would no longer have the required approval. This option would have the same implications as those discussed above, with the loss of a regionally significant natural resource and subsequent flow-on effects for the local and regional economy.

Project Description

Concept and concurrent Project Approval is sought for the continuation of operations on the Project Site beyond September 2010. Operations would involve continued extraction of raw materials and continued brick making activities with some increase in total volumes extracted and throughput of the brick making facility. The Project includes the following components:

- Extraction of raw materials from the Project Site in the order of 420,000 tpa, involving:
  - Extraction from Pit 3 to an approximate depth of 35 m; and
  - Establishment of Pits 4 and 5 and extraction in these pits to a depth of approximately 35 m.
- Brick production in the order of 250,000 tpa;
- Import of raw materials required for brick making in the order of 20,000 tpa;
- Associated handling, packaging, storage and transport of bricks;
- Associated construction of bunds and stockpiles;
- Maintenance and rehabilitation works.

The Project is separated into three key components: Quarry activities, brick making activities and ancillary activities/works such as stockpiles, stormwater management works and rehabilitation.

Quarrying on the Project Site is expected to progress in the following manner:

- Continued quarrying of Pit 3 (existing) including the lateral progression of the pit towards the east. It is anticipated that extraction from Pit 3 would continue until approximately 2016.
- Establishment of proposed Pit 4 would commence in approximately 2014. It is anticipated that extraction from Pit 4 would continue until approximately 2022.
- Establishment of proposed Pit 5 would commence in approximately 2020. It is anticipated that extraction from the Pit 5 would continue until approximately 2028.

Ancillary infrastructure and activities on the Project Site include:

- Storage, handling and dispatch of bricks;
- Delivery of raw materials for brick making;
- Associated administrative, office and sales activities; and
- Rehabilitation works.

Rehabilitation works would aim to both stabilise land on the Project Site in order to minimise environmental impacts and to enable use of the land for an appropriate, productive land use upon completion of the proposed quarrying operations. This future land use is yet to be determined and would be informed by environmental conditions, market conditions and planning policy and direction at the time.

Statutory Approvals

Commonwealth Legislation

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

The proposed project is not anticipated to affect matters of NES under the EPBC Act and as such a Referral to the Minister for Sustainability, Environment, Water, Population and Communities is not required.

NSW Environmental Planning and Assessment Act 1979

The proposed Project has been declared by the Minister as a 'major development' under the provisions of the EP&A Act and SEPP 2005 and is therefore subject to the provisions of Part 3A of the EP&A Act with the Minister being the approval authority.

Environmental Planning Instruments

A range of Environmental Planning Instruments (EPIs) created under the EP&A Act provide further detailed guidance and regulation for development at a State, regional and local level.

In accordance with Clause 75J of the EP&A Act, in deciding whether or not to approve the carrying out of a Project, the Minister may (but is not required to) take into account the provisions of any EPI that would not apply to the project if approved. As this is a discretionary matter for the Minister, a range of EPIs have been considered in relation to the Project, including:

- *SEPP 2005;*
- *SEPP (Mining, Petroleum Production and Extractive Industries) 2007;*
- *SEPP (Sydney Region Growth Centres) 2006;*
- *SEPP No. 33 – Hazardous and Offensive Industries;*
- *SEPP No. 44 – Koala Habitat Protection;*
- *SEPP No. 55. – Remediation of Land; and*
- *Liverpool Local Environmental Plan 2008 (LLEP 2008).*

A discussion of the application of these instruments to the Project and the permissibility of the Project is provided in **Chapter 5** of the EA. The Project is generally characterised as an 'extractive industry' and permissibility is established under LLEP 2008.

Whilst extractive industries are permissible with consent in the RU1 zone, there is no fitting definition for the brick making component of the Project and it is therefore deemed a prohibited use within the zone by default. In order to clarify permissibility and to provide certainty regarding future operations at the Project Site, Concept Plan and concurrent Project Approval is sought for the Project.

Licensing

Should approval be granted for the Project, an application would be made for a mining lease in accordance with the relevant provisions of the *Mining Act 1992* (Mining Act). Clause 75V of the EP&A Act provides that subject to the issue of Project Approval, a mining lease for the Project cannot be refused and must be substantially consistent with the terms of Project Approval.

The Project Site is subject to an existing environment protection licence (EPL) under the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act) which would need to be reviewed and updated based upon the proposed continued operations. An application would be made for a variation to the existing EPL to reflect the proposed future operations at the Project Site. Clause 75V of the EP&A Act provides that, subsequent to the granting of Project Approval, an EPL cannot be refused and must be substantially consistent with the terms of Project Approval.

Consultation

This EA has been prepared in accordance with Part 3A of the EP&A Act and its Regulation. Part 3A of the EP&A Act ensures that the potential environmental effects of the proposal are properly assessed and considered in the decision making process.

Statutory and Other Relevant Authorities

In preparing this EA, the DGRs have been addressed as required by Clause 75F of the EP&A Act. The key matters raised by the Director-General for consideration in the EA are outlined in **Table 12** of the EA.

The Proponent has undertaken consultation with key local and State Government agencies as specified in the DGRs during the preliminary design phase and preparation of this EA. The key agencies that AECOM has consulted include:

- The DoP;
- The NSW Department of Environment, Climate Change and Water (DECCW);
- The NSW Office of Water (NOW);
- The NSW Department of Industry and Investment (DII);
- The NSW Roads and Traffic Authority (RTA); and
- Liverpool City Council (LCC).

Community Consultation

The Proponent regularly engages with adjoining landowners and has in the past received no substantial complaint in relation to the existing Project Site operations.

As part of the EA process, a program of targeted land owner consultation involving face to face meetings and discussions with potentially impacted landholders who reside within 250 m of the Project Site boundary, has been undertaken. The consultation process endeavoured to inform and discuss with local landowners planned quarrying activities including the continued extraction of raw materials from Pit 3 and the progression of quarrying activities into proposed Pit 4 and Pit 5 in the eastern and northern areas of the Project Site. Feedback from the consultation process has been taken into consideration in preparing this EA.

Issues Prioritisation

An Issues Prioritisation Matrix was prepared for the proposed continued operations, which is based on the need to recognise that the higher the potential severity of adverse environmental effects and the greater the consequence of those unmanaged effects, the higher the degree of environmental assessment required.

Table 1 below identifies that the prioritisation of environmental issues, and therefore the focus of assessment for the proposed project should be as follows:

Table 1: Environmental issue prioritisation

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

Air quality

An Air Quality Impact Assessment (AQIA) was undertaken as part of the EA in accordance with the DECCW's Approved Methods (DEC, 2005). Maximum predicted pollutant Ground Level Concentrations (GLCs) on a gridded modelling domain and at identified sensitive receptors were compared against relevant guideline values. The modelling results show that odour, hydrogen fluoride, gaseous chlorine, sulphur dioxide and sulphuric acid mist all met the stated assessment criteria at the discrete sensitive receptors for both isolated and cumulative predicted GLCs.

The dust modelling results indicated that TSP GLCs and dust deposition met the assessment criteria for all modelled scenarios. In relation to PM_{10} the modelling indicated the following:

- The predicted 24 hour PM_{10} GLCs in isolation from background concentrations and cumulatively showed exceedances of assessment criteria for all modelled scenarios (except scenario 1B (no quarrying activities) in isolation from background concentrations);
- The predicted annual PM_{10} GLCs in isolation from background concentrations met the assessment criteria for all scenarios; and
- The cumulative annual PM_{10} GLCs showed exceedances of assessment criteria for all scenarios (except scenario 1B).

A number of mitigation measures would be implemented as part of the Project to manage air quality impacts, including the following:

- Dust control measures would be employed, and
- An Air Quality Management Plan (AQMP) would be prepared for the Project Site, which would include measures to control dust and emissions from the Project Site and would include details of a dust mitigation program for the Project Site.

Further detail in relation air quality mitigation measures is provided in **Section 8.4** of the EA.

In relation to Greenhouse Gas (GHG) emissions, the total emissions from the facility were estimated to be approximately 0.041 Mt carbon dioxide equivalent (CO_2-e) per year, which is around 0.4% of total emissions from the mining non-energy sector in Australia, and 0.007% of total Australian emissions. As such, the contribution of the facility to GHG emissions overall is very small. The facility has been operating for many years, with GHG emissions at these approximate levels for at least the past three years. As such, the proposed development would not result in significant additional environmental impacts in this regard.

Approximately 60% of GHG emissions from the Project Site are generated from the combustion of natural gas in the production process. GHG emissions from natural gas combustion are lower than those associated with the combustion of other fossil fuels.

Surface Water

The potential water quality and management impacts associated with the proposed Project are focused on the increased potential for sediment laden runoff to enter nearby waterways due to the increased area of surface disturbance on the Project Site and increased duration of the existing quarrying activities. The Project Site does however currently operate with nil discharge and would continue to do so under the proposed operations.

Water balance modelling was undertaken as part of the EA and is detailed in **Chapter 10** and **Appendix C** to the EA. The modelling shows that there is sufficient on-site storage capacity for the proposed 20 years of operation on the site based upon a worst case scenario. Boral would also continue to investigate options for reuse of water stored on site for beneficial purposes.

It is not anticipated that the project would have significant impacts on surface water on the Project Site or in the surrounding waterways subject to the maintenance and augmentation of appropriate mitigation measures as detailed in **Section 10.3** of the EA.

Groundwater

The extraction of raw materials within the Project Site extends to a depth of approximately 35 m and targets the fine-grained Bringelly Shale of the Wianamatta Group. The Wianamatta Group is not considered a significant groundwater resource due to the poor primary porosity and permeability and high salinity is exhibits, and is not extracted and utilised in the vicinity of the Project Site.

Dewatering of the Bringelly Shale formation would have occurred at a result of quarrying operations to date and cumulative impacts as a result of the proposal are not considered likely to have a measurable impact on water levels in the vicinity of the Project Site.

In order to mitigate the potential impacts of the development on Badgerys Creek, a 50 m buffer zone would be implemented along the creekline (Badgerys Creek). Adverse impacts to groundwater contained within alluvial sediment associated with Badgerys Creek are not anticipated as a result of the development and further investigation of the extent of alluvial sediments through the implementation of a groundwater monitoring program would aim to ensure that unexpected impacts are readily identified and managed accordingly. In this regard, Boral would implement alluvial mapping and assessment and a Groundwater Monitoring Program at least two years prior to extraction in proposed Pit 4 to establish and map the location and extent of the alluvial aquifer associated with Badgerys Creek and monitor groundwater impacts. The location of proposed pits could be adjusted in response to the alluvial mapping if required to ensure that extraction does not encroach upon the alluvial aquifer such that impacts upon this system are minimised. A detailed methodology for the proposed alluvial mapping and groundwater monitoring program is provided in **Chapter 11** of the EA.

Noise

The Noise Assessment undertaken for the Project Site reveals that a number of residences to the north, west, and east of the Project Site may be affected by noise from the proposed operation. Noise modelling of various stages during the life of the proposed operation has shown that mitigation measures would be required in order to satisfy the noise criteria at noise sensitive locations. With these measures implemented, it is predicted that noise from the site would generally comply with the INP noise criteria.

It is considered that with careful regard to noise during planning and operation of the quarry and brick making facility, and with proper implementation of the noise mitigation measures recommended, the proposed operations could proceed without excessive adverse noise impact on existing development in the surrounding area.

Land Use

The potential impacts of the proposed works on land use are not considered to be significant. Many of the potential land use impacts are related to amenity issues which would be effectively managed through the implementation of appropriate mitigation measures.

The Project Site and surrounding area is set to experience significant land use change over the life of the project and as such, the project has been designed to adapt and integrate with that change. The existing operation demonstrates the ability to co-exist within a variety of environments with minimal impact and it is anticipated that the proposed operations would integrate effectively with both existing and future planned land uses in the area for the life of the project.

Traffic and Transportation

A Traffic Impact Assessment (TIA) was undertaken in respect of the proposal to assess the potential impacts of the project on traffic and transport. During peak hours, the frequency of proposed project generated traffic is less than what is currently produced by the facility during peak hours due to the proposed extended operating hours of the storage yard. The extended operating hours has the effect of spreading the impact of the trucks over a longer period of time, thereby reducing the impact to the intersection of Martin Road and Elizabeth Drive in peak hours. In addition, the recent upgrade of packaging equipment within the plant (subject of a separate development consent issued by LCC) has resulted in significant improvements in the efficiency of brick transport with more bricks being transported per truckload. This has resulted in fewer truck movements to transport the same volume of brick product.

Project generated traffic is considered to have a negligible impact on the performance of the Martin Road and Elizabeth Drive intersection in a future year of 2029, as it accounts for a very small proportion of the forecast traffic volumes.

Geology and Soils

The Project Site is located in the Cumberland Lowlands subregion, one of the seven physiographic subregions of the Sydney Geological Basin. The Sydney Basin Region is underlain by Triassic sediments which dip gently from the east and north to a central lowland area southwest of Parramatta. The centre of the basin, the Cumberland Lowlands, consists of plains and gently undulating to low hills on the youngest of the Triassic rocks, the Wianamatta Group (DPI, 2005).

Disturbances to the soils and geology would occur during the continued operations on the Project Site. However these impacts would be locally confined and would be mitigated through the use of appropriate erosion and sediment controls and safeguards, as detailed in the SWMP (**Appendix C**) and **Section 14.3** of the EA.

Visual

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

It is expected that the overall visual character of the site would remain largely unchanged as a result of the proposal, however the extent of disturbed areas would increase with the movement of extraction into Pits 4 and 5. Much of the Project Site would be screened from surrounding receivers by bunding along the northern and eastern site boundaries. Visually, the site would therefore be generally unobtrusive when viewed from surrounding properties and public roads. The proposal relates to an existing operation which has been in place on the site for some 30 years. The existing operation is generally integrated with the surrounding landscape and is not out of character with existing development which includes large-scale rural industrial and commercial operations such as Australian Native Landscapes. Future land use is likely to include increased industrial development which would result in significant change to the existing surrounding land use character, within which the proposed operations would integrate with minimal impact. Proposed bunding and landscape screening would assist with minimising the visual impacts of the Project Site upon the surrounding area as land uses change into the future. Proposed visual management and mitigation measures are outlined in **Chapter 15** of the EA.

Heritage

One Aboriginal site (BC-01-09) consisting of a single stone artefact would be impacted by the construction of Pit 5. However, this site was determined to have low archaeological (scientific) significance and the loss of this site would not have a significant impact on the heritage values of the study area. Additionally, a review of potential European Heritage sites found no European Heritage items located within the study area.

Standard mitigation measures as described in **Section 16.3** of the EA would be implemented on the site to ensure that potential heritage impacts are adequately managed during quarrying activities.

Ecological

The ecological values of the proposed quarry footprint are limited as these areas have been largely cleared. The proposed works have been sited to avoid areas containing endangered ecological communities (EECs). The vegetation that occurs within the proposed Pit 4 and Pit 5 areas comprises exotic grassland with some isolated mature native trees and regrowth patches of vegetation.

The proposed works would not have a significant impact on the ecological values of the site. Rehabilitation works would be undertaken in the riparian areas adjacent to Badgerys Creek and the Badgerys Creek tributary to ensure impacts are minimised.

Socio-Economic

Potential social impacts of the project generally relate to visual, noise, air quality (dust), traffic and land use impacts associated with quarrying activities. The location of the Project Site within the SWGC means that the nature and character of surrounding development is likely to change significantly over the life of the Project, becoming more urban and industrial in nature. A range of mitigation measures have been recommended throughout the EA that consider the changing nature of the site surrounds. Mitigation measures would be implemented as appropriate to ensure potential social impacts are minimised.

The location of the site within the SWGC provides a ready market for the brick products produced at the site. This market proximity would ensure that transport costs and impacts related to GHG emissions, noise and congestion would be minimised.

The quarry and brick making facility has been operating on the Project Site for the last 30 years without significant conflict. An ongoing communications program targeting the local community in conjunction with the proposed mitigation measures would seek to ensure that the Project provides social benefits through the provision of ongoing local employment without placing additional strain on community or social infrastructure or resulting in unacceptable impacts upon general amenity.

The residual socio-economic impacts of the Project are considered to be generally positive, given the minimal noted impacts upon amenity as a result of the existing operation and the substantial contribution which the project stands to make in economic terms.

Waste

The continuation and expansion of operations on the Project Site would result in the generation of the same types and quantities of wastes generated under existing operations. Potential waste management impacts would be minimised through the use of appropriate mitigation and management measures and through the continued implementation of the Waste Management Plan for the site.

Hazard and Risk

Hazards identified as having the potential to pose a risk to the human or built and natural environments associated with the continuation of operations at the site are generally centred on the refuelling of vehicles and plant, the storage of fuel and chemicals associated with quarrying and brick production, stockpile areas and the potential for contaminated surface runoff.

The hazards identified are not considered to represent a significant constraint to the project provided appropriate mitigation measures are implemented, as described in **Section 20.4**.

Cumulative Impacts

The cumulative impacts of the Project have been considered with respect to the impacts associated with the continuation of operations in the context of existing surrounding development as well as in relation to other approved projects in the region.

Mitigation measures have been recommended throughout this EA to minimise impacts associated with the proposed Project. Provided these mitigation measures are adopted, the Project would have negligible cumulative impacts.

Environmental Management and Commitments

Environmental Commitments are those environmental management measures formally established to mitigate and manage the potential environmental impacts of the Project. These commitments would be incorporated into an Environmental Management Plan (EMP) for the Project Site. The Proponent currently has a range of environmental policies and procedures under which the existing site activities operate including:

- Waste and Water Management Guidelines; and
- Energy and Greenhouse Gas Management Guidelines.

In accordance with the requirements under Part 3A and the DGR's, a Statement of Commitments (SoC) has been prepared and is provided in **Chapter 22** of the EA. The SoC states the Proponent's environmental commitments and details the environmental management and monitoring of the proposed Project. The SoC, prepared in respect of the Project, has been compiled on an issues basis and is informed by the environmental risk analysis and impact assessment undertaken as part of this EA.

The Proponent is committed to ensuring the preparation and implementation of the environmental management and monitoring plans, further investigations and studies and environmental mitigation measures detailed in the SoC for the proposed Project.

Project Justification

The proposed continuation and expansion of operations on the Project Site has been considered in the context of the principles of ESD and is considered to be generally consistent with these principles. The project is not expected to result in significant environmental impacts provided that the environmental management measures recommended in the EA are implemented. The project stands to provide significant economic benefit through the extraction and utilisation of a regionally significant resource and the provision of local employment.

Conclusion

Potential environmental impacts resulting from the Project have been identified and measures have been recommended throughout the EA to manage impacts to within acceptable levels. The Project would be operated to meet existing environmental standards and the environmental performance of the Project would be monitored to ensure achievement of these standards.

Undertaking the project in the manner proposed is justified taking into consideration potential biophysical, economic and socio-cultural implications.