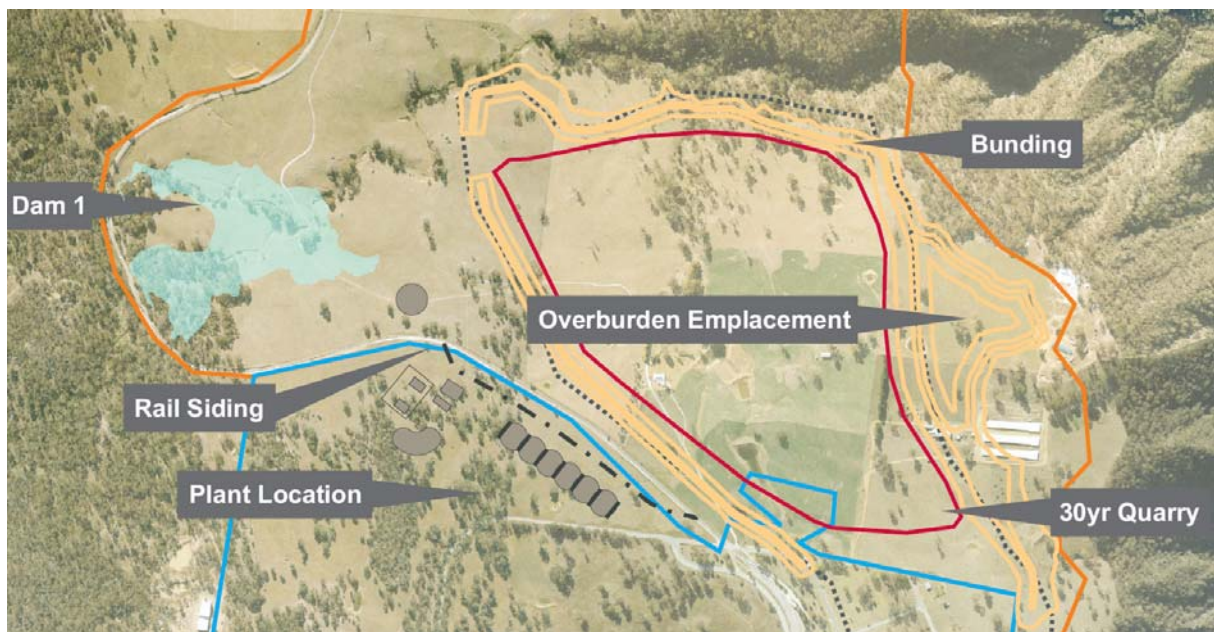




MAJOR PROJECT ASSESSMENT: Marulan South Quarry Project



Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

February 2007

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EXECUTIVE SUMMARY

Boral Resources (NSW) Pty Ltd (Boral) proposes to develop a hard rock quarry at Marulan South, 10 km south-east of Marulan, 31 km east of Goulburn and 175 km south-west of Sydney in the Goulburn Mulwaree local government area.

The proposal involves the extraction of a granodiorite resource of 105 million tonnes over a 30 year period, with the production of up to 3.5 million tonnes of quarry products (hard rock, aggregate and manufactured sand) a year. The proposal also involves the construction and operation of a processing plant, rail loading facility, and water management system, and transportation of the quarry products by rail to the Sydney construction materials market.

The proposal is classified as a Major Project under Part 3A of the *Environmental Planning and Assessment Act 1979*, and the Minister for Planning is the approval authority for the project.

The Department exhibited the Environmental Assessment for the project between 31 October 2006 and 1 December 2006 and received 12 submissions: 5 from public authorities, 2 from local industries, 1 from a special interest group and 4 from the general public. The submissions from the special interest group and general public objected to the project.

Key issues raised in the submissions and/or identified during the Department's assessment of the project were noise, air quality, water, flora and fauna, and visual amenity. The Department has assessed these issues in detail, and is satisfied that the impacts of the project can be managed and/or mitigated to ensure an acceptable level of environmental performance.

The project would provide economic and social benefits for the State by providing a new supply of construction and building materials for the Sydney market, attracting \$150 million of capital investment and creating 20 construction and 30 operational jobs.

On balance, the Department believes the benefits of the Marulan South Quarry Project outweigh its costs, and consequently believes the project is in the public interest and should be approved, subject to conditions.

1 BACKGROUND

Boral Resources (NSW) Pty Ltd (Boral) is a major producer of concrete and asphalt aggregates, roadbase, subbase and specific landscape products for the Greater Sydney Metropolitan Region. Boral currently operates four quarries (Peats Ridge, Dunmore, Emu Plains in the Penrith Lakes Scheme, and Prospect) that supply the Sydney market with construction and building materials. Of these quarries, the Penrith Lakes Scheme and Prospect Quarry are expected to cease operations by 2012.

Boral has identified a hard rock resource (granodiorite) of approximately 250 million tonnes at Marulan South which would allow quarrying for 70 or more years. Consequently, Boral has lodged an application with the Department to develop a quarry at Marulan South to produce hard rock products and manufactured sand from a granodiorite resource of 105 million tonnes. The proposed quarry would produce up to 3.5 million tonnes of quarry products a year for 30 years. The project site is located 10 km south-east of Marulan, 31 km east of Goulburn and 175 km south-west of Sydney (see Figure 1).

The proposed quarry would replace the current supply of sand, aggregate and rock products from the Penrith Lakes Scheme and Prospect Quarry, and meet current and future demands for construction and building materials in the Sydney market.

The proposed Marulan South quarry is located 10 km south-east of Marulan (see Figure 2) and north of the existing Blue Circle Southern Cement (BCSC) limestone mine and works at Marulan South. Other Boral operations in the Southern Highlands include the BCSC cement works at Berrima, the Penrose Sands sand quarry, and a number of concrete batching plants.



Figure 1 – Regional Context

The Marulan South project site primarily consists of cleared farmland that has been used for sheep and cattle grazing and fodder crop cultivation since the 1940s. Vegetation over the site is generally improved pasture with isolated stands of scattered trees. Several patches of remnant woodland exist at the southern and north-western extents of the project site.

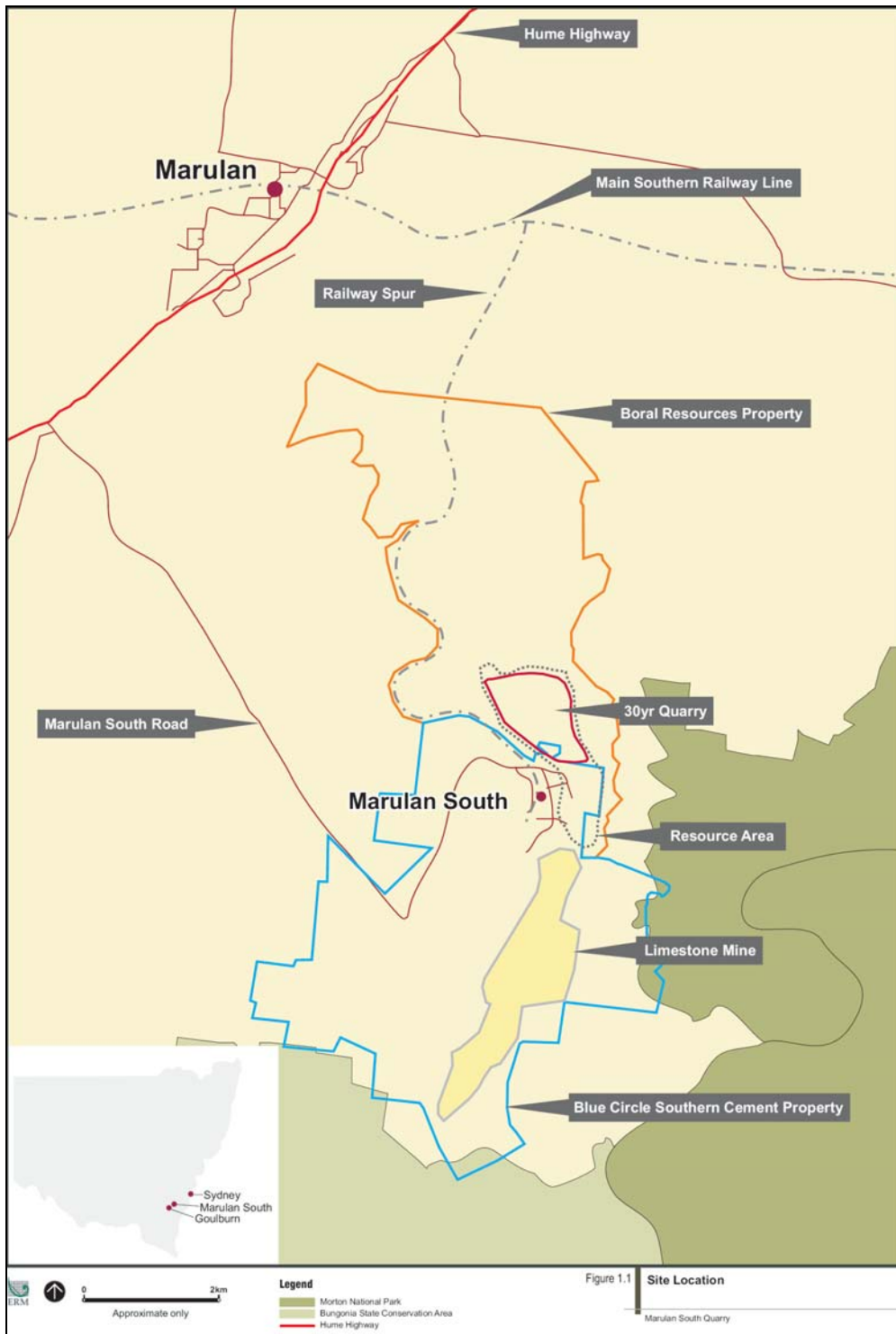


Figure 2 – Location Map

The project site is bounded by the limestone mine and works to the south, BCSC rail spur and rural properties to the west and north, and Barbers Creek gorge and Morton National Park to the east. The site of the former Marulan South township, which is owned by Boral, is located between the project site and the limestone mine. The town, which primarily served the limestone works, was closed in the 1990s and all the buildings and infrastructure, except a disused hall and bowling club, have been demolished or removed.

The landuses on the adjacent rural properties are predominantly grazing and poultry farms. These properties are accessed from Marulan South Road. The BCSC rail spur separates them from the project site. Rural residential properties are located to the east of the project site (east of Barbers

Creek gorge) along Long Point Road. The nearest residences are scattered to the west, north and east of the project site, with the closest residence located 1.4 km south-west of the proposed quarry.

The locality has an important recreational use, with the Morton National Park (located to the east, on the eastern side of Barbers Creek) and the Bungonia State Conservation Area (5 km to the south), close to the project site. These recreational areas contain natural bushland with lookouts and walking tracks.

The spur line on the western boundary of the project site joins the Main Southern Railway Line at Medway Junction, to the east of Marulan.

Other industries in the locality include extractive industries (Rinker's Lynwood Quarry and Johniefelds Quarry to the west and north of Marulan, respectively) and a recently approved fireworks factory located to the south-west of the project site.

2 PROPOSED DEVELOPMENT

Boral has sought approval for the establishment of a new hard rock quarry and associated infrastructure.

The main components of the project are outlined in Table 1 below and illustrated in Figure 3.

COMPONENT	DETAIL	
Resource	105 million tonnes of granodiorite	
Maximum Annual Production	3.5 million tonnes a year of a range of products (mainly concrete and asphalt aggregates, along with larger aggregates for armour or gabion baskets, railway ballast, and manufactured sand)	
Life of Quarry	30 years	
Extraction	Drill and blast	
Processing	Primary and secondary crushing of raw feed in-pit and final (tertiary) crushing, screening and stockpiling out-of-pit	
Transport	Rail transport of all products, with 4 trains per day at peak production	
Hours of Operation	In-pit activities	7:00am – 7.00pm, 7 days a week
	Out-of-pit (including processing, train loading and transportation)	24 hours, 7 days a week
Quarry Infrastructure	Processing plant, including mobile crushing and screening plant; conveyors; administrative offices; amenities; workshop; washdown station; refuelling; parking and other facilities; and water management system	
Transport Infrastructure	Rail siding adjacent to the BCSC rail spur	
Overburden Emplacement	Eastern side of the quarry area, with a number of alternatives for excess overburden on land to the north of the quarry, in-pit rehabilitation, or rehabilitation of the BCSC southern pit	
Rehabilitation and Final Land Use	Long term intention to gain approval for a southern continuation of quarrying. Rehabilitation would be limited to the northern terminal faces, perimeter bunding and overburden emplacement	

Table 1 – Components of the Project

The project has a capital investment value of \$150 million, and would generate 20 construction and 30 operational jobs.

The Environmental Assessment (EA) for the project was lodged with the Department on 29 August 2006 (see Appendix E).

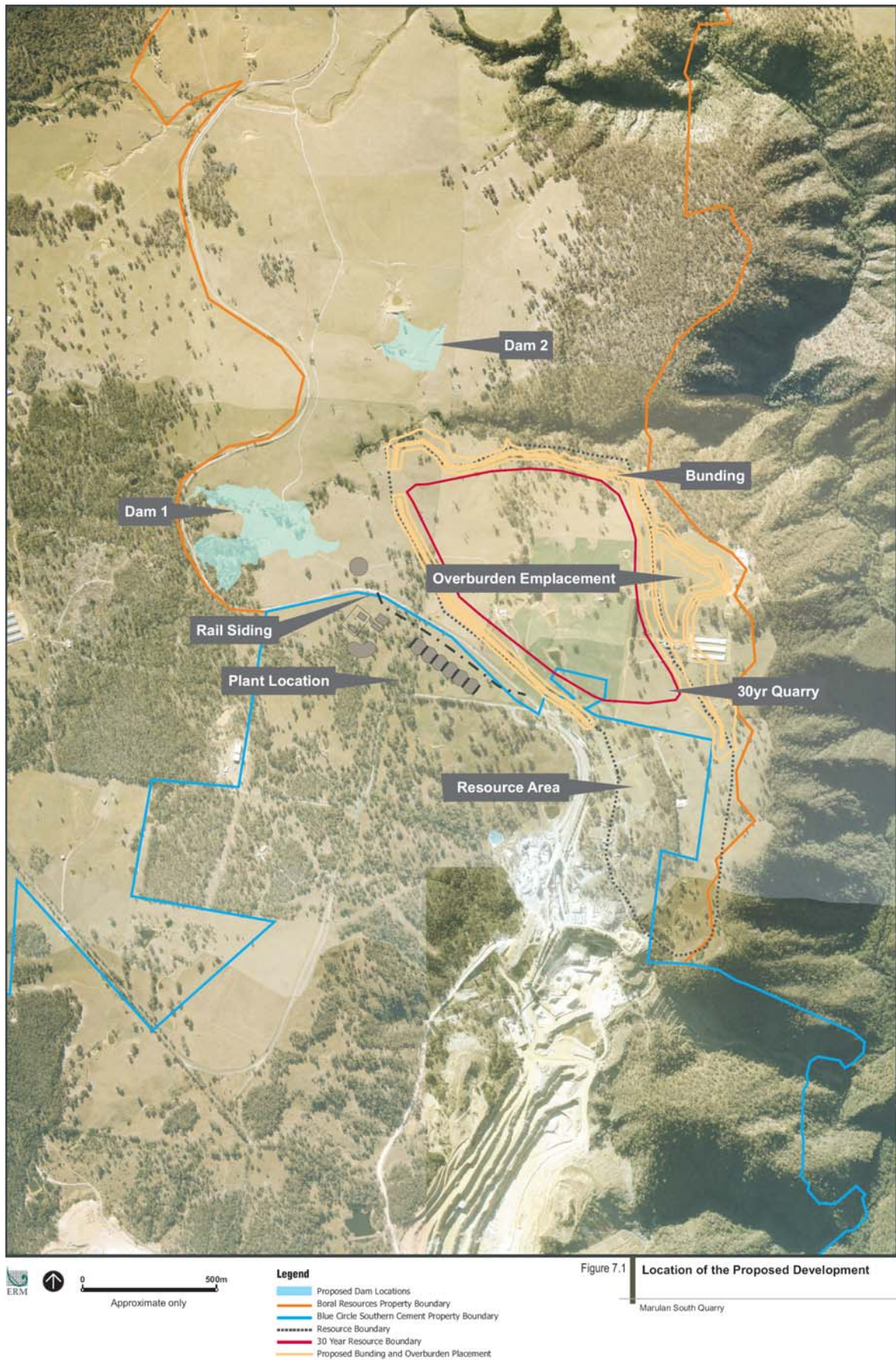


Figure 3 – Proposed Marulan South Quarry

3 STATUTORY CONTEXT

3.1 Major Project

Under *State Environmental Planning Policy (Major Projects) 2005*, the proposal is classified as a Major Project as it involves development for the purpose of extractive industry that extracts more than 200,000 tonnes of extractive materials per year. Consequently, Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) applies to the project, and the Minister for Planning is the approval authority.

3.2 Permissibility

The project is located on land zoned 1(a) General Rural under the *Mulwaree Local Environmental Plan 1995*, and is permissible with consent in this zone.

3.3 EA Exhibition

Under section 75(3) of the EP&A Act, the Director-General is required to make the EA for a project publicly available for at least 30 days.

After accepting the EA for the project, the Department:

- placed the EA on public exhibition between 31 October 2006 and 1 December 2006:
 - on the Department's website; and
 - at the Department's Information Centre, Goulburn Mulwaree Council, Marulan Post Office, and the Nature Conservation Council;
- notified landowners in the vicinity of the site about the exhibition period by letter;
- notified relevant State government authorities and Goulburn Mulwaree Council by letter; and
- advertised the exhibition of the EA in the Goulburn Post on two occasions.

The Department considers these actions satisfy the requirements in section 75H(3) of the EP&A Act.

3.4 Environmental Planning Instruments

Under section 75I(2) of the EP&A Act, the Director-General's report is required to include a copy of, or reference to, the provisions of any State Environmental Planning Policies (SEPPs) that substantially govern the carrying out of the project. The Department has assessed the project against the relevant provisions of the following environmental planning instruments (see Appendix F):

- *State Environmental Planning Policy No. 11 – Traffic Generating Development*;
- *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development*;
- *State Environmental Planning Policy No. 44 - Koala Habitat Protection*;
- *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply*; and
- *Mulwaree Local Environment Plan 1995*.

Following its assessment, the Department is satisfied that the project can be constructed and operated in a manner that is consistent with the relevant requirements of these environmental planning instruments.

3.5 Statement of Compliance

Under Section 75I of the EP&A Act, the Director-General's report is required to include a statement relating to compliance with the environmental assessment requirements with respect to the project.

The Department is satisfied that the environmental assessment requirements have been complied with.

4 CONSULTATION AND ISSUES RAISED

During the exhibition period the Department received 12 submissions on the project (see Appendix D for a copy of these submissions): 5 from public authorities (Department of Environment and Conservation, Department of Primary Industries, Roads and Traffic Authority, Sydney Catchment Authority, and Goulburn Mulwaree Council), 2 from local industries, 1 from a special interest group and 4 from the general public.

The Department of Primary Industries, Roads and Traffic Authority, Sydney Catchment Authority, and Goulburn Mulwaree Council did not object to the proposal. The Department of Environment and Conservation raised concerns about noise, air and water quality, threatened species and cultural heritage.

The submissions from the local industries (Rinker Australia Pty Limited and Foti International Fireworks Pty Ltd) supported the proposal, however, the submissions from the special interest group (Tallong Community Focus Group) and the general public objected to the proposal. The key issues raised in the objections were:

- noise generated by the quarry, limestone mine, road traffic and train movements on the rail spur;
- dust impacts from trains and quarrying;
- visual impacts of the overburden emplacement and bunding;
- vibration impacts;
- impacts of reduced water flows on downstream watercourses and flora and fauna; and
- increase in road traffic.

Boral's response to submissions is provided in Appendix C. The Department's consideration of the issues raised by the general public and public authority submissions is addressed in Section 5 below.

5 ASSESSMENT

5.1 Noise

The project has the potential to impact on 6 residences in the locality, 1 residence to the east, 2 to the south-west, 1 to the west, and 2 to the north-west, ranging from 1.4 km to over 3 km from the project site (see Figure 4). To assess the impacts of the project on these residences, Boral has undertaken a noise impact assessment of the project in accordance with the DEC's *Environmental Noise Control Manual (ENCM)* and *Industrial Noise Policy (INP)*.

Construction Noise

Boral expects the construction of the project to take approximately 12 months, therefore construction noise has been assessed against the "greater than 26 weeks" criterion in the ENCM. *The construction noise criteria for the project is the background noise level plus 5dB(A), which is the same as the operational noise criteria for the project.*

The noise assessment predicted construction noise levels would comply with the day time criteria during calm weather conditions. However the noise criteria would be exceeded under adverse weather conditions at 4 of the residential receivers during the noisiest construction activities, being overburden stripping occurring simultaneously with road construction and construction of the 10 metre bund. The noise exceedances range from 4-5 dB(A) at residence 1 and 5, 8 dB(A) at residence 3 and 13 dB(A) at residence 4. Boral states that although construction of the project is expected to take up to 12 months, the duration of each construction scenario is expected to be less than 26 weeks. Furthermore, noise levels would be expected to decrease as overburden stripping progressively deepens as the pit enlarges and deepens. Construction noise would be managed by the implementation of a Construction Noise Management Plan, which would include all reasonable noise mitigation measures.

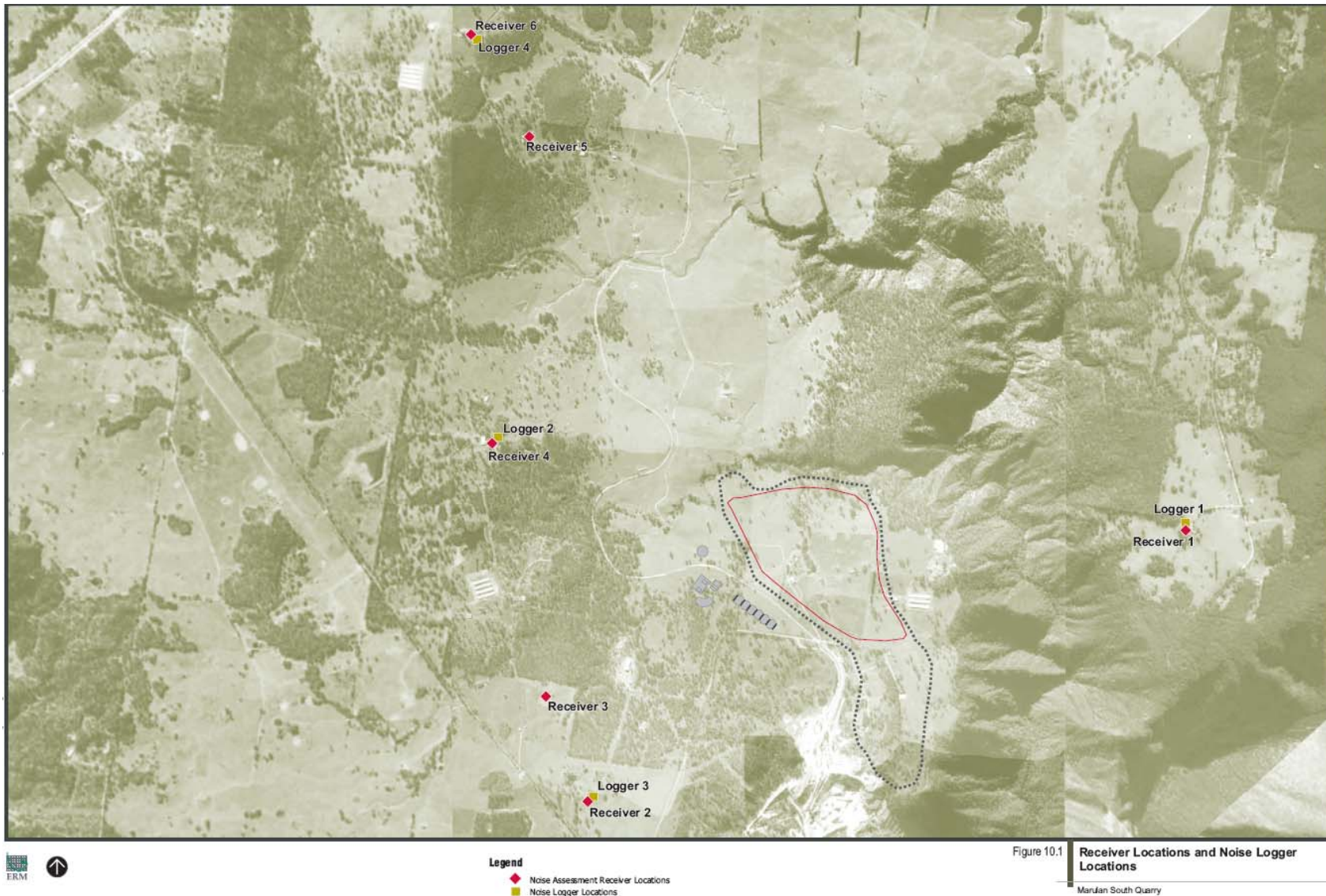


Figure 4 – Residential Receiver Locations

The construction of the western bund is expected to have the greatest impact on residence 4. Boral states the construction of the western bund is expected to take about 2 months. As the construction of the western bund is expected to take less than 26 weeks, it would be appropriate to use the ECNM's less than 26 weeks criteria for the assessment of construction noise levels. Under this criteria (background noise levels plus 10 dB(A)), the only exceedances would be at residence 3 and 4, being 3 dB(A) and 8 dB(A) respectively, during adverse weather conditions. Although construction of the western bund would result in a significant exceedance of the ENCM noise criteria at residence 4, the Department considers the exceedance is reasonable as the exceedance occurs under the worst case scenario associated with construction of the western bund; the impact is temporary (less than 2 months), the bund is being built to ultimately provide acoustic and visual protection for the residences, and Boral has committed to manage construction noise through the implementation of a Construction Noise Management Plan. The Department believes it is appropriate to condition the approval to require Boral to comply with the ENCM noise criteria for the first three months of construction of the acoustical bunds, and that bund construction over three months in duration should comply with the operational noise criteria for the project. The Department also believes that Boral should be required to comply with the standard construction hours of operation, including limited works on Saturdays and no work on Sundays and Public Holidays.

Operational Noise

Boral has undertaken an assessment of the operational noise of the project in accordance with the INP. The noise assessment includes quarrying and processing operations, as well as train loading and the movement of the quarry's trains on the BCSC spur line (ie. on-site rail noise).

The assessment is based on the assumption that Boral would implement a range of reasonable and feasible mitigation measures, including:

- constructing a 10 metre earth acoustic bund along the eastern, northern and western pit boundaries;
- enclosing the tertiary processing plant to achieve a 20 dB(A) noise reduction;
- limiting in-pit activities to the day shift (7.00am to 7.00pm);
- partially cladding the in-pit crushers to achieve a 10 dB(A) noise reduction; and
- cladding the conveyors to achieve a 5 dB(A) noise reduction.

Boral proposes to operate the project in two 12-hour shifts 7 days a week – a day shift between 7.00am and 7.00pm, and a night shift between 7.00pm and 7.00am. In-pit activities (blasting, primary and secondary processing, and operation of the conveyors) would be limited to the day shift. During the night shift, operations would be restricted to out-of-pit activities (tertiary processing, stockpiling, train loading and distribution).

The time periods for noise assessment purposes under the INP are slightly different to the proposed operating hours:

- Day – 7.00am to 6.00pm Monday to Saturday, and 8.00am to 6.00pm on Sundays and Public Holidays;
- Evening – 6.00pm to 10.00pm; and
- Night – 10.00pm to 7.00am Monday to Saturday, and 10.00pm to 8.00am on Sundays and Public Holidays.

The background noise assessment in the EA indicated that the evening background noise levels in the area are actually higher than the day time noise levels, due to traffic levels on roads in the area. Although it acknowledges that the evening noise levels were based on background noise measurements, the DEC believes that the project's noise criteria for the evening period should not be greater than the day time criteria, and recommended the adoption of the night time period noise criteria for the evening period.

The predicted operational noise impacts of the project, using the DEC's recommended criteria for the evening period, are shown in Table 2 below (with exceedances shown in brackets).

Residence	Project Noise Level (Worst Case) $L_{Aeq,15min}$	Project Specific Criteria (Exceedances) $L_{Aeq,15min}$		
		Day	Evening	Night
Day Shift				
1	32	36	35	35
2	39	39	39	39
3	44	39 (+5)	39 (+5)	39 (+5)
4	37	36 (+1)	36 (+1)	36 (+1)
5	35	35	35	35
6	35	35	35	35
Night Shift				
1	28	n/a	35	35
2	29	n/a	39	39
3	33	n/a	39	39
4	34	n/a	36	36
5	25	n/a	35	35
6	22	n/a	35	35

Table 2 – Predicted Operational Noise Impacts

The assessment indicates that the project would result in a minor exceedance at residence 4 (ie 1 dB(A)) and a moderate exceedance at residence 3 (ie 5 dB(A)) under adverse weather conditions during the day shift. The exceedances are similar for the day and evening INP periods. Night time operation of the project complies with the noise criteria.

The assessment also included consideration of the potential for sleep disturbance, concluding that the project would comply with sleep disturbance criteria.

The Department is satisfied that the operational noise emissions from the project are unlikely to result in a significant impact to surrounding residences. However, the project would have a moderate impact on residence 3, and accordingly, the Department believes that Boral should be required to implement additional noise mitigation measures at this property (such as double glazing, insulation and/or air condition) at the request of the landowner.

The Department also believes that Boral should be required to:

- comply with strict operational noise criteria;
- acquire properties (at the landowners request) if noise levels exceed the project specific criteria by more than 5 dB(A);
- seek to continually improve, and report on, noise performance;
- implement a comprehensive noise monitoring program; and
- comply with agreed hours of operation, including restricting in-pit activities to the day shift.

The Department notes that the DEC has recommended operational noise criteria for the project. The DEC's recommended evening and night time criteria are based on the (much lower) noise emissions from the quarry's night shift only. As discussed above, the quarry's day shift overlaps the INP evening and night time periods. To allow for this overlap, whilst maintaining stringent noise criteria for the night shift, the Department has recommended two sets of evening and night time criteria – one for the day shift and one for the night shift.

The Department also notes that the DEC's recommended day time criteria are based on operational noise levels from the project, plus noise from the neighbouring limestone mine's use of the rail spur. The Department notes that although Boral ultimately owns both the limestone mine and the proposed quarry, the two operations are separate entities. The Department does not believe that the noise criteria for the project can or should encompass another project whose activities are outside the direct control of Boral's quarry project. The Department's recommended noise criteria are therefore based on the project's noise emissions only.

However, to protect the amenity of the surrounding residents due to the combined operations of extractive industries in the locality, the Department believes it is appropriate that Boral comply with cumulative noise assessment criteria based on the INP's amenity goals.

It is noted that Boral has made a commitment to limit night time train movements to 1 in any 15 minute period from both sites whenever practicable.

Should the DEC wish to apply noise limits to the existing limestone mine trains, then that would be more appropriately dealt with by a review of the Environmental Protection Licence conditions for the limestone mine.

Rail Noise

Boral has undertaken an assessment of off-site rail noise along the Main Southern Railway Line (MSRL) in accordance with the ENCM. Currently 30 freight and 16 passenger train movements are recorded on the MSRL on a typical weekday, and 20 freight and 10 passenger movements a day on weekends. The project would increase the existing rail traffic by 8 rail movements a day (ie. 4 trains in; 4 trains out). The rail noise assessment concluded that over a 24 hour period the rail noise at a residence located more than 25 metres from the rail line would not exceed the ENCM noise criteria of 60 dB(A) $L_{eq(24-hour)}$. However, there would be a minor increase (1 dB(A)) in the existing noise levels. Boral states the project would have minimal impact on the amenity of residences along the MSRL as increases of 1-2 dB(A) in noise levels are generally not able to be distinguished by the human ear.

The submission from the Tallong Community Focus Group stated the increase in night time train movements along the MSRL would have a dramatic impact on sleep disturbance noise levels for villages on the rail line. However, the off-site rail noise assessment concluded that there would be a marginal increase of 1-2 dB(A) in rail noise at residences close to the MSRL.

The Department is satisfied that the off-site rail noise impacts from 8 train movements a day on the MSRL are likely to have any adverse impact on the amenity of residences along the rail line.

Road Traffic Noise

Boral assessed road noise along Marulan South Road in accordance with the DEC's *Environmental Criteria for Road Traffic Noise*. Under these guidelines Marulan South Road is classified as a local rural road, however, because the road is used by restricted access vehicles (B-doubles) and services the BCSC limestone mine and other industries, Boral has noted that the road would more applicably be classified as a collector road. The road noise assessment concluded the project would increase noise levels at the nearest residential receivers by 1 and 2 dB(A) respectively for operational and construction traffic during the day time period. The majority of the operational traffic movements would consist of employee cars as no quarry products would be moved by road. The assessment indicates that the project would comply with the day and night time noise criteria for Marulan South Road under both the local rural road and collector road classifications.

Cumulative Noise

Boral has assessed the cumulative noise impacts of the proposed quarry and the existing limestone mine. For most of the potential residential receivers the proposed quarry is likely to be the main source of noise during the day. During the night shift the noise contribution from the project is lower as only the tertiary crushing plant and rail loading would be operating. Boral has assessed cumulative noise impacts from the operation of the proposed quarry on the residential receivers closest to the limestone mine (residences 2 and 3). The cumulative noise assessment predicted the INP adverse weather conditions amenity goal of 40 dB(A) for a rural residence would not be exceeded by the concurrent night time operation of the project and the limestone mine.

Submissions from the Tallong Community Focus Group and two nearby property owners raised concerns about the cumulative impact of noise from the limestone mine and proposed quarry. One of the property owners (residence 3) also stated the cumulative noise assessment should be re-assessed when the new limestone mine crushing plant became operational. Boral has reviewed the impact of noise at residence 3 from the cumulative operation of the limestone crushing plant and

limestone mine, and the project. The assessment predicted the DEC's day and night time cumulative noise goals would not be exceeded.

Conclusion

The Department is satisfied that Boral has assessed the potential noise impacts of the project in accordance with the relevant DEC guidelines, and that it has based its assessment on reasonable and feasible mitigation measures.

With the adoption of these mitigation measures, the Department is satisfied that the project would not result in a significant noise impact to surrounding residents. However, the Department acknowledges that the project would generate some temporary noise impacts during construction of the project's acoustic bund, and would have a minor to moderate impact on 2 private properties during operations.

To minimise and mitigate the residual noise impacts of the project, the Department believes Boral should be required to:

- comply with strict operational noise criteria and hours of operation;
- undertake additional noise mitigation at residence 3 (at the landowners request);
- acquire properties (at the landowners request) if noise levels exceed the project specific criteria by more than 5 dB(A);
- seek to continually improve, and report on, noise performance;
- implement a comprehensive noise monitoring program; and
- implement a Construction Noise Management Plan.

5.2 Air Quality

Boral has undertaken an air quality assessment for the project, which modelled total suspended particulate matter (TSP), particulate matter less than 10 microns (PM₁₀), and deposited dust.

The modelling is based on the assumption Boral would implement a range of reasonable and feasible measures to control dust, including:

- covering of the conveyors and enclosing of crushing and screening plant;
- dust suppression sprays on the primary crusher;
- watering of haul roads and stockpiles;
- keeping exposed areas to a minimum; and
- removal and rehabilitation of unnecessary roads.

The air quality assessment found that the dust emissions from the project would comply with the relevant DEC dust criteria at all residential receiver locations.

The assessment also included consideration of cumulative dust impacts, with the combined effects of the project as well as worst case emissions from the BCSC limestone mine and other sources of dust in the locality. The cumulative assessment indicates that the project would comply with all relevant air quality criteria, with the exception of short term (ie. 24-hour average) PM₁₀ at one residence (residence 2), which is predicted to marginally exceed the DEC's goal of 50 µg/m³ by 2 µg/m³. The Department is satisfied that this potential exceedance is relatively minor, and that the prediction is based on conservative analysis.

However, the DEC raised concerns about the analysis of short term PM₁₀ emissions in the EA, in particular that Boral's assessment did not include consideration of background PM₁₀ levels. The Department acknowledges these concerns, but recognises that Boral's assessment has been conducted in accordance with contemporary PM₁₀ analysis for extractive industry projects. Traditionally, background PM₁₀ has not been included in short term PM₁₀ analysis, largely because of the inherent difficulty in establishing a suitable background level for 24-hour PM₁₀.

Notwithstanding, Boral has undertaken additional modelling of short term PM₁₀ including a derived background level. The DEC's approved assessment method requires a continuous record of 24-hour average PM₁₀ concentrations for each day in a year and contemporaneous meteorological data for the same period. Boral does not have a full set of this data and has undertaken an assessment based on the limited 24-hour average PM₁₀ concentrations and contemporaneous meteorological data it has. The revised model was undertaken of potential dust emissions from the project, and emissions from

the combined operation of the project and limestone mine, at the receivers closest to the limestone mine (residences 2 and 3).

The revised assessment indicates that, when assessed on a cumulative basis including background PM_{10} , the project would result in a small number of exceedances of the $50 \mu\text{g}/\text{m}^3$ short term PM_{10} goal – 8 per year at residence 3 (predicted levels up to $60 \mu\text{g}/\text{m}^3$) and 1 per year at residence 2 (up to $67 \mu\text{g}/\text{m}^3$).

For extractive industry projects, the Department adopts a maximum total (ie. background plus project emissions) short term PM_{10} criterion of $150 \mu\text{g}/\text{m}^3$ to indicate a significant short term dust impact. The project is predicted to comfortably comply with this criterion, and is therefore unlikely to result in a significant amenity or health impact to surrounding residences. Notwithstanding, Boral has identified a number of additional mitigation measures to further reduce dust emissions. These are:

- chemical treatment of haul roads to reduce dust generation; and
- cease hauling of overburden to the BCSC south pit when winds are from the north-east.

In addition, Boral would undertake continuous air quality monitoring, with further limitations imposed on quarrying if the $50 \mu\text{g}/\text{m}^3$ PM_{10} criterion is exceeded under adverse winds. The Department is satisfied that these measures should ensure that the project does not result in a significant short term dust impact. However, as a contingency the Department has recommended conditions that would require Boral to acquire affected properties in the event that actual air quality emissions exceed air quality criteria.

The submission from the Tallong Community Focus Group raised concerns about the impact of dust from uncovered train wagons carrying the quarried material, and dust impacts on the conservation areas of Barbers Creek and Shoalhaven gorge. Boral considers there would be minimal dust generated by the transport of the material. Water sprays are proposed to be used on the aggregate stockpiles to reduce dust therefore the products would be damp, and the typical grain size of the product for concrete and asphalt aggregate are not expected to result in significant dust. The use of uncovered wagons for the transport of aggregates is standard industry practice. The Department is satisfied that product rail transport is unlikely to result in significant emissions, and that the project is unlikely to significantly affect conservation areas near the site.

Conclusion

The Department is satisfied with the air quality assessment undertaken for the project. Although the revised assessment found the cumulative impact of the project and the limestone mine would result in minor exceedances of the 24-hour average PM_{10} goal at two receivers, the Department is satisfied that these exceedances would not represent a significant impact to surrounding residences.

To minimise and manage the residual air quality impacts of the project, the Department believes Boral should be required to:

- comply with strict air quality criteria;
- establish and maintain an air quality monitoring program, including provision for continuous monitoring;
- implement the mitigation measures proposed by Boral, including provision to cease or modify operations if monitoring indicates that air quality criteria are being exceeded; and
- acquire affected properties (at the landowners request) in the event that dust emissions exceed contemporary land acquisition air quality criteria.

5.3 Surface and Ground Water

Water Supply

Boral estimates that the project at peak production would generate an operational water demand of approximately 255 ML a year, mainly for dust suppression of haul roads, processing plant and stockpiles. The water is proposed to be sourced from overland flow within the site, in-flow into the quarry pit and from Tangerang Creek. The raw water supply would be stored in 5 dams constructed on existing creek and drainage lines within the project site. The main water supply facility (Dam 1) would be constructed in the north-west of the project site at the confluence of 2 tributaries of Tangerang Creek. The proposed dam would collect the upstream water flow of the creek. Tangerang

Creek is an ephemeral creek which has an upstream catchment area of about 750 ha and flows along the northern edge of the project site to Barbers Creek, about 500 metres to the east. Barbers Creek flows into the Shoalhaven River, which is located a further 6 km to the south. The Shoalhaven River (and its catchment) provides raw drinking water for Sydney and the Illawarra.

Boral states the project would have negligible effect on Sydney's drinking water catchment yield (less than 0.01% reduction) and a slightly beneficial effect on water quality immediately downstream of the proposed dam. An environmental flow equivalent to 10% of average daily flows would be provided for Tangarang Creek to minimise the ecological impacts of a reduction in water flows on flora and fauna downstream of the proposed dam.

The Shoalhaven River and its tributaries are subject to an Order made under section 22BA of the *Water Act 1912*. The Order was gazetted on 3 July 2003 and effectively places an embargo on new water entitlements within the catchment, to protect existing water supplies and environmental flows. The proposed water storages for the project require approval under the Water Act, and are therefore affected by the embargo. Accordingly, Boral will be required to acquire existing water entitlements to satisfy the water demand of the project (unless the embargo is otherwise lifted). The Department is satisfied that Boral should be able to acquire existing water entitlements to offset the water demand of the project, and has recommended a condition requiring Boral to obtain such entitlements prior to commencement of the project. With the acquisition of such water entitlements, the Department is satisfied that the project would have a negligible impact on total water supply within the Shoalhaven catchment.

The Department is also satisfied that the proposed dam would have minimal impacts on local downstream water users. Tangarang Creek flows for a distance of about 500 m within the project site before it joins Barbers Creek. There are no other water users along Tangarang Creek between the proposed dam and Barbers Creek. Barbers Creek flows through Morton National Park/Bungonia State Conservation Area and into the Shoalhaven River.

The Department believes that Boral should be required to obtain the necessary approvals under the *Water Act 1912* prior to construction of the project commencing.

Water Management

A comprehensive water assessment, including surface and groundwater, was undertaken for the project. The groundwater assessment indicated the granodiorite rock comprised a fractured aquifer with groundwater in localised, discrete and discontinuous fracture zones. There was no evidence of significant vertical or lateral connection between the fracture zones. Groundwater recharge was likely to occur through direct infiltration of exposed fractures and weathered bedrock or where the overburden cover was thin. The assessment concluded there would be a significant drawdown of groundwater in the immediate vicinity of the quarry pit, however, the project would have minimal impact on existing groundwater users in the locality, with the possible exception of one bore located about 1.5 km west of the site.

The proposed water management system has been designed to optimise water recycling within the quarry operational areas to minimise the potential for off-site water quality impacts. Three of the 5 new dams would be used for dirty water storage or in-pit sediment basins. All water from disturbed areas would be retained in dirty water storages or sediment basins, and excess water would be passed through the constructed wetland prior to release into the primary water storage dam (Dam 1). The surface water modelling indicates that the primary water storage dam has the capacity to remove 89% of the total suspended solids loads.

Boral has proposed a range of measures to manage the supply of and quality of water, including:

- diversion of clean water run-off to clean water storages;
- retention and treatment of dirty water to prevent sediment laden or contaminated runoff leaving the site; and
- recycling and treatment of all water used in the project to minimise demand for top-up water from the clean water dams and to minimise the flow of dirty water to the pit sediment dams.

State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply (SEPP 58) aims to ensure that developments within Sydney's drinking water catchment do not have an adverse impact on water quality. The SEPP requires a project to demonstrate that it would have a neutral or beneficial effect on the water quality in the water catchments. Boral states that all dirty water would be contained on the site and the dirty water dams would be located so that all overflows would be into the pit. Three dirty water dams would provide temporary storage for managing dirty water during the construction phase. These dams would be contained within the quarry pit once quarrying commenced. The dams would be designed to contain a 1 in 100 year storm event and would be emptied after a rainfall event by pumping to Dam 1 following any required water treatment. Boral considers the project achieves the objective of SEPP 58 that there is a neutral or beneficial effect on the water quality of the receiving waters. The modelling of the surface water impacts found there was a slight improvement to water quality mainly as a result of Dam 1 intercepting agricultural runoff from the catchment. The Sydney Catchment Authority is satisfied the project's clean and dirty water management system would ensure the operation of the quarry would have a neutral or beneficial impact on the water quality of receiving streams and ground water.

The submission from the Tallong Community Focus Group considered the impact on flora and fauna in the Tangarang Creek and Barbers Creek from reduced water flows in Tangarang Creek has not been adequately addressed. Boral states Tangarang Creek is an ephemeral creek which is dry for approximately 60% of the time and typically consists of a series of unlinked ponds. Boral states that the reduction in the Tangarang Creek catchment would reduce the total flows in the Shoalhaven River by less than 0.1%. To minimise the ecological impact of reduced water flows to downstream flora and fauna, Boral proposes to provide an environmental flow to Tangarang Creek equivalent to 10% of average daily flows. Boral also proposes to establish a Habitat Management Area around the Tangarang Creek corridor to enhance the habitat value of the creek.

The Department is satisfied that proposed Dam 1 would have minimal impacts on downstream flora and fauna.

Conclusion

The Department is satisfied with the assessment of surface and ground water impacts, and believes that the project is unlikely to have a significant impact on surface and ground water resources in the locality.

However, to ensure that water resources are appropriately monitored and managed, the Department believes Boral should be required to prepare and maintain an integrated Site Water Management Plan for the project that includes:

- a site water balance;
- an erosion and sediment control plan;
- a comprehensive surface and ground water monitoring program;
- a surface and ground water response plan, to address and/or compensate for any identified impacts to water supplies or water quality; and
- obtain approvals for the water supply prior to construction commencing.

5.4 Flora and Fauna

The majority of the project site has been cleared of native vegetation and consists of introduced pasture for agricultural landuse (grazing). Scattered stands of native trees and isolated patches of remnant woodland remain among the grassland. Native woodland vegetation on the site is concentrated to the south around the old Marulan South township, to the north-west near the proposed location of Dam 1, and on the steep banks of Tangarang Creek (see Figure 5).

The project requires the clearing of 90 hectares of grassland (with scattered trees), and 2.6 ha of native woodland within the footprint of Dam 1. This woodland comprises Box-Gum Woodland vegetation (White Box-Yellow Box Blakely's Red Gum Woodland), an endangered ecological community (EEC) listed under the NSW *Threatened Species Conservation Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

The flora and fauna assessment indicates that the clearing required for the project would not, with the exception of the EEC, have a significant impact on any other threatened flora or fauna species.

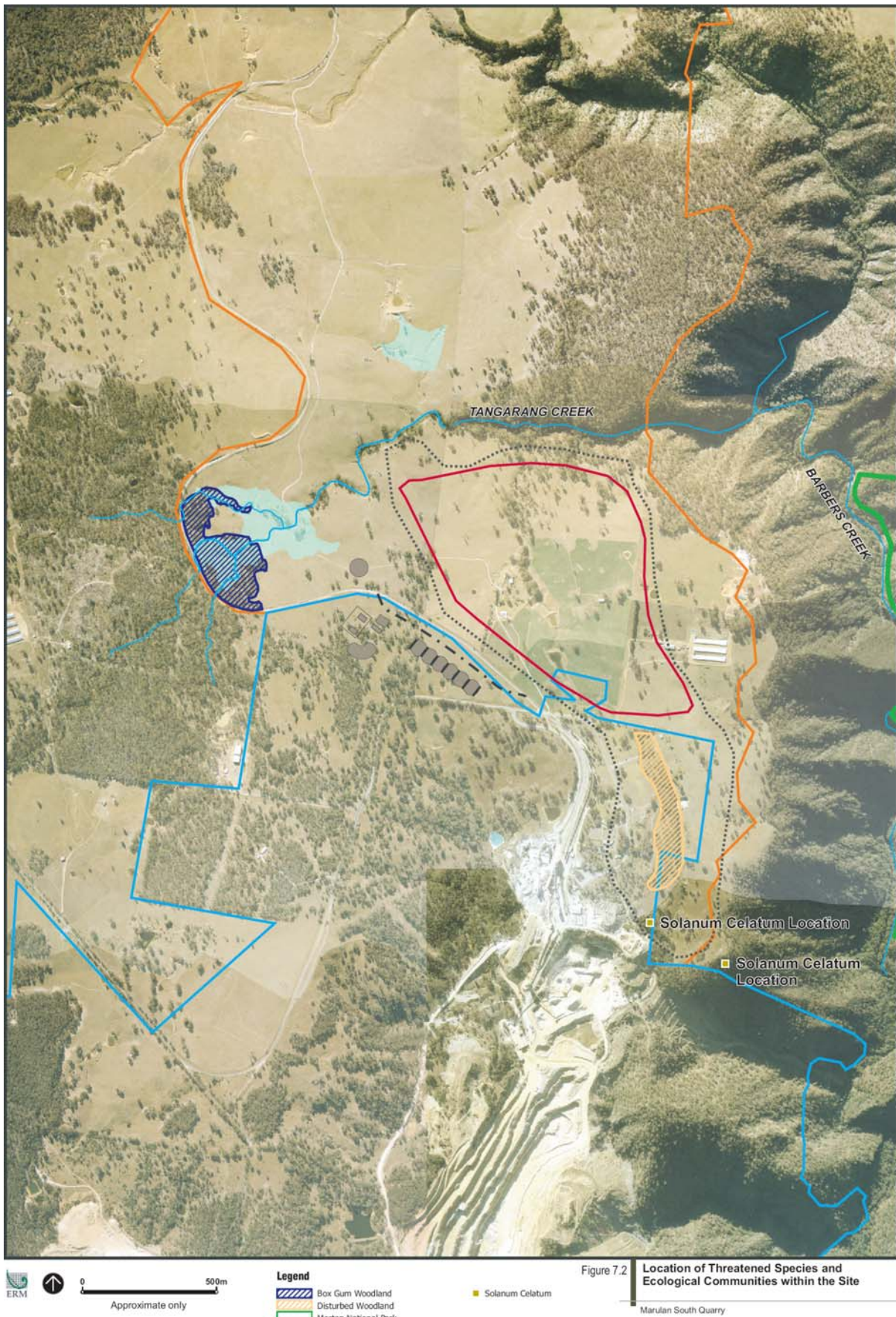


Figure 5 Location of Threatened Species and Ecological Communities within the Site

The EA included an offset strategy to compensate for the 2.6 hectares of Box Gum Woodland that would be removed for the construction of Dam 1. The offset strategy included revegetation of 5.2 hectares of land with endemic species characteristic of Box Gum Woodland (ie. an offset ratio of 2:1). Boral has subsequently increased the offset to 12 hectares (ie. offset ratio of 4.5:1), in response to the DEC's concerns that the original offset strategy was inadequate because of the high significance of the Box Gum Woodland. The DEC had recommended that the Box Gum Woodland be retained, or if removed, compensated for at an offset ratio of at least 10:1.

Boral's (revised) offset strategy has been prepared in accordance with the DEC's *Green Offsets for Sustainable Development – Concept Paper*, and proposes to:

- achieve a net improvement in ecological value and connectivity;
- protect and enhance the biological diversity of the area;
- increase the area of Box-Gum Woodland;
- manage, maintain and enhance vegetation and habitat for threatened species; and
- offer long term management and protection of the remnant EEC vegetation.

A Habitat Management Area (HMA) would be established around the remnant Box-Gum Woodland to be retained in the north-west of the project site and around the periphery of Dam 1 and Tangarang Creek (see Figure 6). The HMA would include the establishment of tree, shrub and groundcover species which are characteristic of the Box Gum Woodland community adjacent to the existing remnant vegetation and a 20 m wide buffer surrounding Dam 1 and Tangarang Creek.

The HMA would provide an improved east-west link along Tangarang Creek between the woodland vegetation to the west of the rail spur and north-west of the project site with Barbers Creek gorge and the Morton National Park to the east. There is currently poor east-west connectivity and Tangarang Creek is the only viable east-west habitat corridor for the locality as existing cleared land and mining dominate the landscape for several kilometres to the north and south.

The Department is satisfied that Boral's proposed offset strategy would adequately compensate for the clearing of 2.6 hectares of Box Gum Woodland vegetation. The establishment of an east-west habitat corridor along Tangarang Creek would improve the connectivity between woodland vegetation to the west and the Morton National Park to the east.

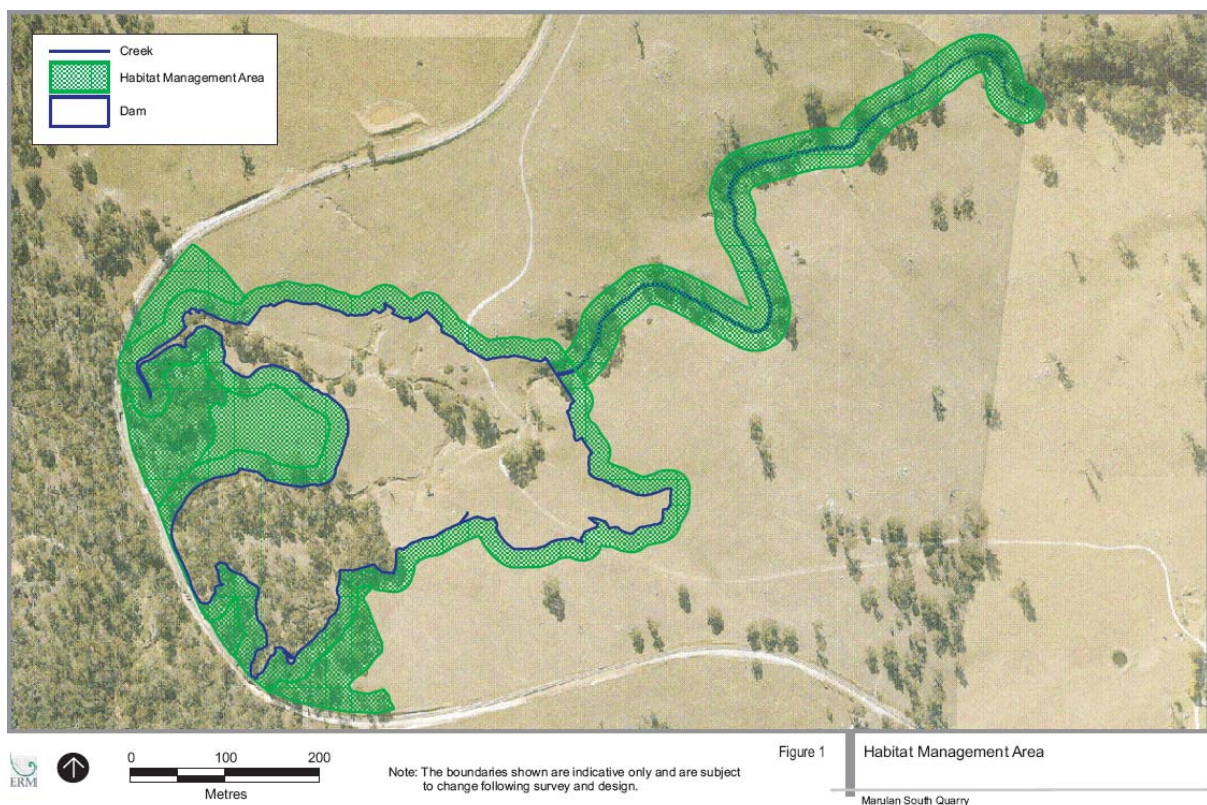


Figure 6 – Habitat Management Area

Conclusion

The Department is satisfied with the assessment of flora and fauna on the site and considers the proposed vegetation offset strategy adequately addresses the impacts of the project on the remnant EEC vegetation. The Department considers the 12 hectare vegetation offset provides appropriate compensation for the clearing of the Box Gum Woodland, which is equivalent to 4.5 hectares for every hectare cleared.

The enhancement and establishment of vegetation along the Tangarang Creek corridor strengthens the east-west linkage between woodland vegetation located on the western side of the rail spur and vegetation in the Tangarang Creek/Barbers Creek and ultimately to the Morton National Park.

To minimise and manage the impacts of the project on flora and fauna, the Department believes Boral should be required to prepare a comprehensive Rehabilitation and Landscape Management Plan, which includes:

- a description of the short, medium and long term measures that would be implemented to rehabilitate the site, implement the offset strategy, and manage remnant vegetation and habitat on the site;
- detailed assessment and completion criteria for the offset strategy, and the rehabilitation of the site;
- a program to monitor the performance of the rehabilitation over time; and
- the measures that would be implemented to minimise and manage impacts on flora and fauna.

5.5 Visual Amenity

Boral has undertaken a visual assessment of the project, which examined 6 locations with representative viewpoints to the proposed quarry, including:

- 2 locations in recreational areas to the east and south (lookouts and walking trails in the Morton National Park and Bungonia State Conservation Area);
- 3 locations representative of residential properties to the north, east and west; and
- Marulan South Road to the south of the project site.

The visual assessment concluded the project had:

- Low visual impact on the adjoining recreational areas. The project site was not visible from the Bungonia Lookdown (the main lookout) in the Bungonia State Conservation Area to the south. The limestone mine dominated the view from the lookout. The bund would be visible from the Long Point walking trail to the east of the site. The views would be restricted by the distance to the project suite and existing vegetation;
- Low visual impact on the residences in Long Point Road (east of the site). The visual assessment was undertaken at the closest residence which has expansive views to the project site across Barbers Creek gorge. Only a small section of the bund would be visible across grasslands and bushland in Morton National Park in the foreground;
- Low visual impact on properties to the north. Views of the project are shielded by a ridgeline between the northern properties and the project site;
- Medium-low visual impact on properties to the northwest of the spur line. The bund would be visible from the rail spur. The visual impact is reduced by planting on the bund and grazing land in the foreground; and
- Medium visual impact on Marulan South Road. Part of the quarry face, bunding and processing/stockpiling/loading facility would be visible from the public road. The planting of vegetation on the bund and grazing land in the foreground would reduce the visibility of the project. This section of Marulan South Road is only used to access the limestone mine and the proposed quarry, therefore road users would have a low visual sensitivity to the project.

The visual assessment considered the landscape around the project site had high visual absorption due to the existing terrain and vegetation cover. Boral proposes to minimise potential views of the project by providing 10 metre high bunds along the western, northern and eastern boundaries of the quarry pit. To further reduce the impact of the bunding it would be planted with native vegetation to blend with the existing vegetation. Additional planting would be provided between the site and the rail spur and Marulan South Road to provide additional screening.

Submissions from the Tallong Community Focus Group and a landowner on Long Point Road raised concerns about the visibility of the overburden emplacement and bunding around the project site. Boral states the visual assessment included the overburden emplacement and notes that the photo montages of the 30-year quarry included vegetation on the bunds and emplacement area. The visual assessment concluded the project would have minimal visibility from surrounding sensitive receivers (residences and recreational areas).

Conclusion

The Department is satisfied that the project can be managed in a way such that it would not result in a significant visual impact on nearby sensitive receivers, and that the proposed mitigation measures are appropriate to reduce the potential impacts. To minimise and manage the residual visual impacts, the Department believes Boral should be required to:

- prepare and implement a Rehabilitation and Landscape Management Plan for the project which includes the provision of planting of vegetation on the bunds and overburden emplacement;
- monitor the performance of the revegetation; and
- minimise light spill from the project.

5.6 Other Issues

Other environmental issues associated with the project, and the Department's consideration of these issues, are summarised in Table 5 below.

Impact	Consideration
Blasting and Vibration	<p>The submission from the Tallong Community Focus Group raised concerns about the impact of blasting on the scree slopes of Barbers Creek gorge, that blasting from the limestone mine can be felt up to 5.5 km away, and the stability of the bunding and overburden emplacement.</p> <p>Boral has modelled blasting impacts on nearby residential receivers (closest residence is more than 1.4 km from the site). The assessment concluded that blasting activities at the site would comply with the relevant DEC overpressure and ground vibration criteria. It is unlikely that there would be any vibration impact on rural residences along Long Point Road to the east, which is separated from the site by Barbers Creek gorge.</p> <p>Blasting associated with the project would not affect the scree slopes adjacent to the limestone mine and there are no scree slopes adjacent to the perimeter of the project site.</p> <p>The bunds and overburden emplacement would be constructed to engineering specifications to ensure minimal risk from blasting occurring in the adjacent quarry pit.</p> <p>The Department is satisfied that Boral has assessed the potential blasting impacts of the proposal in accordance with relevant DEC guidelines, and that the project can comply with relevant DEC blasting criteria.</p> <p>However, to ensure that blasting performance standards are achieved, and to protect the amenity of residents, the Department believes that Boral should be required to:</p> <ul style="list-style-type: none"> • comply with strict blasting criteria; • prepare and implement a blast monitoring program; and • inform surrounding landowners about planned blasting operations and effectively respond to enquiries and complaints.
Traffic and Transport	<p>The project would have minimal impact on the local road network. Road access to the site is available from Marulan South Road, which intersects with the Hume Highway near Jerrara Road. The road mainly</p>

Impact	Consideration
	<p>services the limestone mine and a number of rural properties including poultry farms, limestone processing industries and a fireworks factory.</p> <p>Boral has assessed the capacity of the road and intersection with the Hume Highway and concluded there is spare capacity to accommodate the traffic generated by the project (construction vehicles, and staff and delivery vehicles). Construction traffic generated by the project would constitute less than 12% of the average daily traffic movements on Marulan South Road.</p> <p>Boral proposes to transport all quarry products by rail from the site to markets in the Sydney Metropolitan area, and the only traffic generated by the operation of the project would be employee, maintenance and delivery vehicles. The traffic assessment concluded the additional traffic generated by the project would increase traffic flows by 12% (mainly employee vehicles).</p> <p>The project includes the delivery of sand from Penrose Quarry for blending with quarry fines to produce manufactured sand. However, the sand would be back-loaded by trucks (40 per day) that are returning to the limestone mine. Therefore the delivery of sand to the site would not involve the generation of additional truck movements on Marulan South Road.</p> <p>The Department, Council and RTA are satisfied that the project would have minimal impact on the local road network and supports the proposal to transport all quarry products by rail.</p>
Heritage	<p><i>Aboriginal Heritage</i></p> <p>Boral has undertaken an Aboriginal heritage assessment of the project site in conjunction with the local Aboriginal community (Pejar Local Aboriginal Land Council, United Ngunawal Corporation, Yurawang Gundana Aboriginal Corporation and Buru Ngunnawal Aboriginal Corporation).</p> <p>A total of 18 Aboriginal heritage sites were identified during the surveys, containing isolated finds and artefact scatters. The project would result in the loss of all sites within the quarry footprint (6 sites) and inundation of 8 sites within the location of Dam 1, and 1 in the vicinity of Dam 2. Three sites would not be impacted by the project.</p> <p>The Aboriginal heritage assessment concluded that most of the sites are of low scientific significance except the sites in the vicinity of Dam 1 which are considered to have scientific value. Boral considers, given the low significance and broad background scatter of artefacts in the area of the proposed quarry and that the area has been highly disturbed through previous and current farming activities (clearing and grazing of livestock) that no mitigation measures are warranted in this area. Similarly no further mitigation work is proposed in the area of Tangarang Creek Dam 2 given the unfavourable landform conditions and high level of disturbance in this area.</p> <p>The sites in the vicinity of Dam 1 contain the highest potential for relics and artefacts given the limited disturbance of the area. Boral proposes to mitigate the loss of these Aboriginal heritage sites by:</p> <ul style="list-style-type: none"> • conducting an Aboriginal site salvage program of all surface stone artefacts in a controlled manner in conjunction with the local Aboriginal community; • mapping location details and lodging records with the DEC's Aboriginal sites register;

Impact	Consideration
	<ul style="list-style-type: none"> • test pitting of a number of sites; and • subsurface excavation of sites with highest potential of Aboriginal relics. <p>The Department is satisfied with the Aboriginal cultural heritage assessment of the project and that the project is unlikely to result in a significant impact to Aboriginal heritage. However, the Department believes Boral should be required to prepare and implement an Aboriginal Cultural Heritage Management Plan in conjunction with the DEC and the Aboriginal community for the management and monitoring of Aboriginal cultural heritage on the project site.</p> <p><i>Non-Aboriginal Heritage</i></p> <p>Boral has undertaken a search of various heritage databases and registers on heritage items in or near the project site. The search did not identify any heritage items or relics in or near the project site.</p> <p>A site survey located an abandoned dimension stone quarry to the east of the site near the edge of Barbers Creek gorge. The former Marulan South village is located to the south of the project site, and may contain items of potential industrial heritage. The project would not affect the village or the former stone quarry.</p> <p>The Department is satisfied that the project would not impact on non-Aboriginal heritage items in the locality.</p>

Table 5 – Other Issues

6 RECOMMENDED CONDITIONS OF APPROVAL

The Department has prepared recommended conditions of approval for the project (see Appendix A).

These conditions are required to:

- prevent and minimise 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.

Boral does not object to the recommended conditions of approval.

7 CONCLUSION

The Department has assessed the EA, submissions and Boral's response to submissions, and is satisfied that the impacts of the project can be managed and mitigated to ensure an acceptable level of environmental performance.

The project would provide economic and social benefits to the State, region and local area through a capital investment of \$150 million and the creation of 20 construction and 30 operational jobs.

The Department is confident that these benefits can be achieved without significant impacts on the environment or residences in the areas surrounding the site.

The project would provide a long term supply of construction materials for the Sydney construction and building industry following the closure of the Penrith Lakes Scheme and Prospect Quarry. The

transport of all quarry products by rail provides environmental benefits by removing trucks from the local and regional road network.

Consequently, the Department believes the project is in the public interest and should be approved, subject to conditions.

8 RECOMMENDATION

It is RECOMMENDED that the Minister:

- consider the findings and recommendations of this report;
- approve the project application, subject to conditions, under section 75J of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached project approval (see Appendix A).

David Kitto
Director
Major Development Assessment

Chris Wilson
Executive Director
Major Project Assessment

Sam Haddad
Director-General

APPENDIX A. CONDITIONS OF APPROVAL

APPENDIX B. STATEMENT OF COMMITMENTS

APPENDIX C. RESPONSE TO SUBMISSIONS

APPENDIX D. SUBMISSIONS

APPENDIX E. ENVIRONMENTAL ASSESSMENT

APPENDIX F. ENVIRONMENTAL PLANNING INSTRUMENTS CONSIDERATION

The Department has assessed the project against the relevant provisions of the following environmental planning instruments:

State Environmental Planning Policy No. 11 – Traffic Generating Development (SEPP 11)

SEPP 11 aims to ensure that the RTA is made aware of and allowed to comment on proposals for developments listed in Schedules 1 and 2 of SEPP 11. The proposed development is a development listed under Schedule 1(m) of SEPP 11 as an 'extractive industry'. The EA of the project was forwarded to the RTA, who subsequently advised they had no objection to the project.

State Environmental Planning Policy No. 33 - Hazardous and Offensive Development (SEPP 33)

SEPP 33 aims to identify proposed developments with the potential for significant off-site impacts, in terms of risk and/ or offence (odour, noise etc) to people, property or the environment. A development is defined as potentially hazardous and/ or potentially offensive if, without mitigating measures in place, the development would have a significant risk and/ or offence impact on off-site receptors or future development. The proposal does not constitute "potentially hazardous development" or "offensive development" as defined in SEPP 33.

State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44)

SEPP 44 applies to proposals that are located on land that is potential koala habitat. Potential koala habitat is defined as areas of vegetation where trees providing food for koalas comprise at least 15% of the total number of trees. The ecological assessment found no evidence of koalas on the site and the vegetation to be cleared does not meet the density requirements of the SEPP. Therefore SEPP 44 does not apply to the project.

State Environmental Planning Policy No. 58 – Sydney's Drinking Water Catchments (SEPP 58)

SEPP 58 aims to ensure that any development in Sydney's drinking water catchments has a neutral or beneficial effect on water quality, the sustainability of water quality management practices over the long term, and compatibility with environmental objectives and water quality standards for the catchment.

The Department is satisfied the proposal can be constructed and operated to ensure all water quality issues are contained within the project site and that proposed water quality management and mitigation measures would ensure that water discharged from the site does not affect downstream water quality. The Department therefore believes the proposal is consistent with SEPP 58.

Mulwree Local Environment Plan 1995

The project is located on land zoned 1(a) Rural General under the *Mulwree Local Environment Plan 1995*. The project is permissible with consent under the 1(a) zone.

An objective of the 1(a) zone is:

to promote the proper management and utilisation of resources by:

- iv) valuable deposits of minerals, coal, petroleum, and extractive materials by controlling the location of development for other purposes in order to ensure the efficient extraction of those deposits*

The Department is satisfied that the project is consistent with this objective.