



ASSESSMENT REPORT

Lynwood Hard Rock Quarry Marulan

1. BACKGROUND

Readymix Holdings Pty Ltd (Readymix) has identified a substantial high quality hard rock resource which is suitable for the production of quarry products at a site about 1 km west of Marulan township in the Goulburn Mulwaree local government area. The total extent of the resource has the potential to provide a 130 year supply of construction materials.

Readymix is looking to establish a long term supply of construction materials for the Sydney market to replace its current supply from the Penrith Lakes Scheme, which is expected to close by 2010. The closure of the Penrith Lakes Scheme without a guaranteed replacement supply of construction materials would likely result in a shortage of construction material for the Sydney and regional markets. The development of the rock resource at Marulan would allow Readymix to continue to supply the Sydney market at current levels, and provide the ability to cater for predicted increases in market demand over the life of the project, and provide a supply for regional (ACT) and local (Goulburn and Southern Highlands) markets.

Readymix has investigated alternative sources to replace the supply from the Penrith Lakes Scheme, however, no alternative location offers a better high quality, large scale resource with ready access to key transport infrastructure, than the Marulan resource.

2. PROPOSED DEVELOPMENT

Readymix proposes the establishment of a hard rock quarry on the Lynwood property near Marulan (see **Figures 1** and **2**). The proposal involves the:

- Extraction and processing of hard rock;
- Transportation of quarry products by road and rail;
- Operation of the quarry 24-hours a day, 7 days a week; and
- Placement of overburden and excess product material in out of pit emplacement areas.

The main components of the proposal are presented in **Table 1** and illustrated in **Figures 3** and **4**).

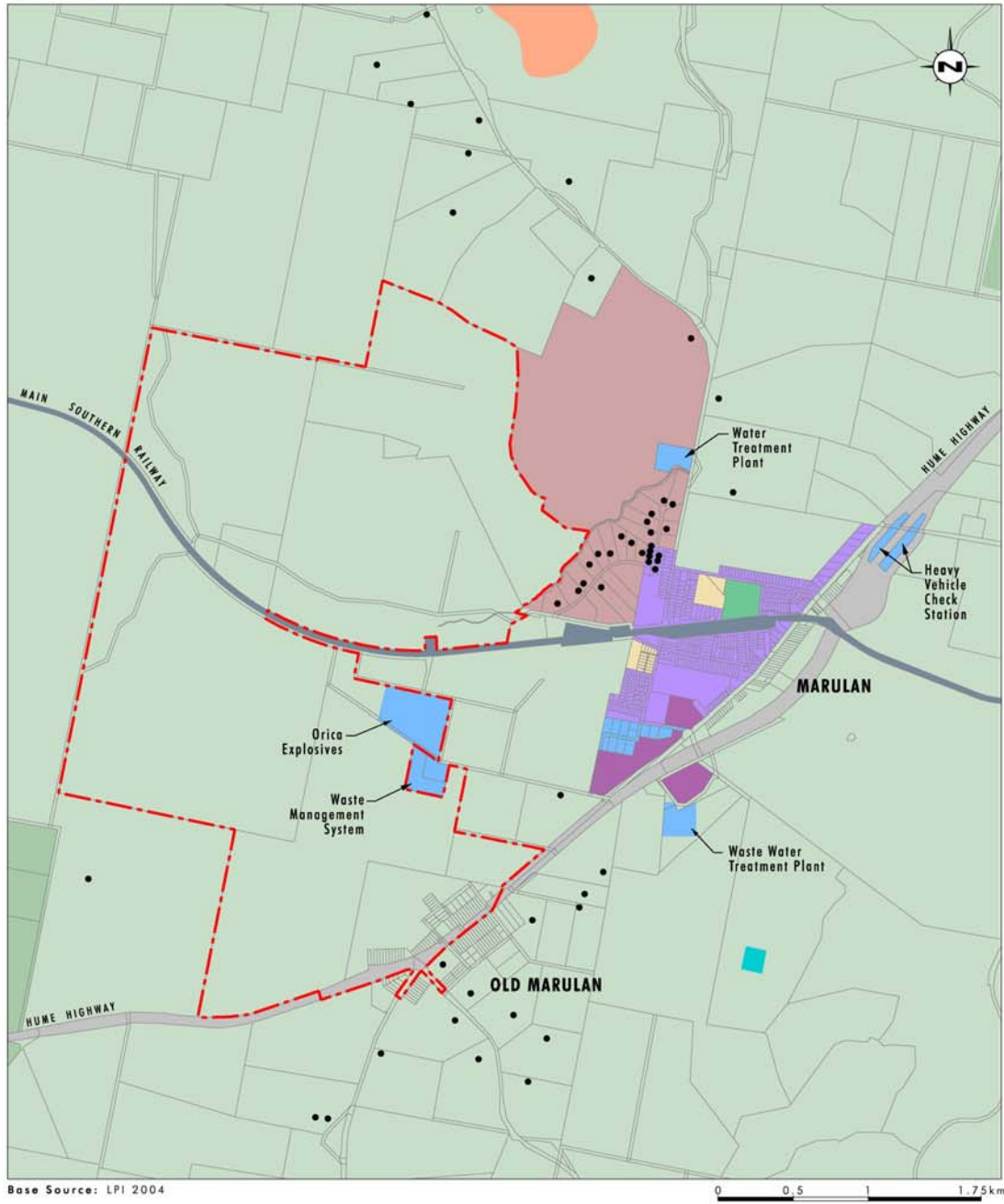
Component	Detail
Resource	145 million tonnes of quarry products
Maximum Annual Production	5,000,000 tonnes per year
Extraction	Drill and blasting
Traffic and Transport	Rail and road transport, with maximum of 1.5 million tonnes a year by road
Processing	3-phase crushing and screening plant to produce a range of rock products from sizes of 0.3 metre diameter rock to fine manufactured sand
Hours of Operation	Quarrying: 7:00am – 10:00pm, 7days a week
	Processing: 24 hours, 7 days a week
	Product Transportation: 24 hours, 7 days a week
Quarry Infrastructure	Processing and handling plant, pre-coat plant, site workshop, laboratory, office and administration, and staff amenity buildings
Transport Infrastructure	Construction of a grade separated interchange with the Hume Highway, Marulan South Road and Jerrara Road, quarry access road off the Hume Highway, rail loop off the Main

Component	Detail
	Southern Rail Line, and truck and train loading facilities
Emplacement Areas	3 out of pit overburden emplacement areas and 2 excess product emplacement areas
Life of Quarry	30 years
Employment	115 fulltime jobs
Capital investment value	\$195,000,000
Final Landform	Rehabilitation of emplacement areas and quarry benches. Final use of the quarry pit could include water storage or recreational facility, or in-pit dumping of overburden and excess product storage should the life of the quarry be extended beyond Year 30

Table 1: Main Project Components



Figure 1 – Regional Context



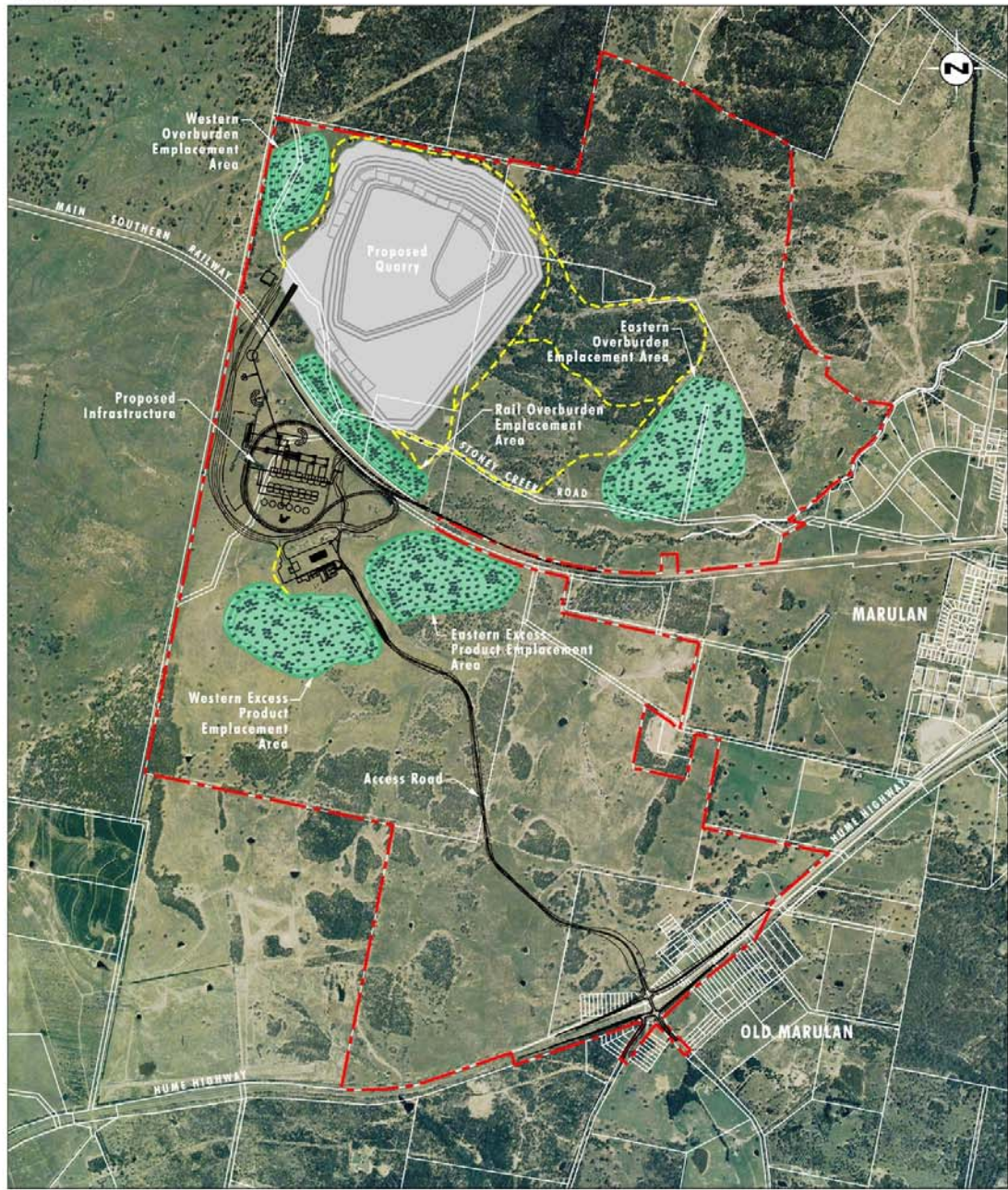
Legend

- | | | |
|--------------------------|-----------------------|--------------|
| --- Project Area | Recreation | Quarry |
| Grazing | Intensive Agriculture | • Residences |
| Residential | Open Space | |
| Rural Residential | Pine Tree Plantation | |
| Industrial | Highway | |
| Business Highway Service | Railway | |

FIGURE 5.12
Existing Land Use

File Name (A4): R03_V1/1829_016.dgn

Figure 2 – Local Context



Base Source: LPI 2004, Readymix Holdings Pty Ltd (Aerial Photo March 2005)

0 0.5 1 1.25km

Legend

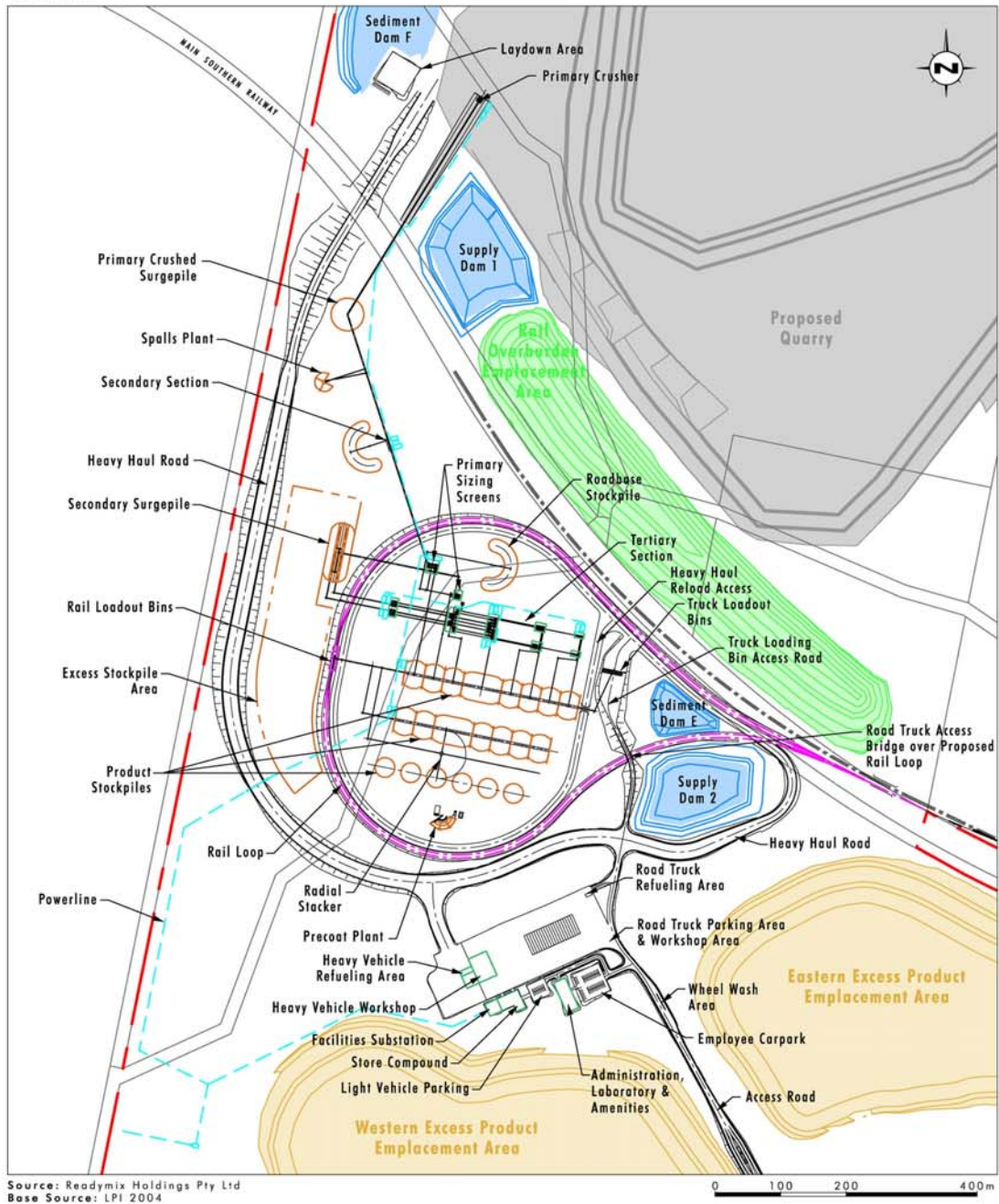
- - - Project Area
- Haul Road
- Quarry Area
- Rehabilitated Area

FIGURE 2

Proposed 30 Year Quarry Plan

File Name (A4): ES_V1/1829_221.dgn

Figure 3 – Proposed Development – Year 30 Quarry Plan



Legend
 - - - Project Area
 - - - Powerline

FIGURE 3.11
Key Infrastructure Components

File Name (A4): R03_V1/1829_145.dgn

Figure 4 – Processing Plant and Rail Infrastructure

Readymix owns all of the land within the project area, except for several small parcels of Crown land near the Hume Highway, Roads and Traffic Authority land, two privately owned old system title lots and Crown land comprising the Joarimin Creek bed and Crown road reserves.

The quarry site adjoins predominantly agricultural uses (cattle grazing). Other land uses in the vicinity include the residential and industrial areas of Marulan to the east, rural-residential and the

Johniefields Quarry to the north, and transport corridors and associated services to the south and east.

Marulan is the main village in the Goulburn Mulwaree local government area, and Council's Settlement Strategy (prepared by the former Mulwaree Shire Council) promoted future growth to occur Marulan. This was because of its strategic location in the Sydney-Canberra Corridor and its good access to the Hume Highway.

Proposals for rural residential and urban development in the area include the 36-lot rural lifestyle subdivision (minimum 40 ha lots) of the Lockyersleigh property to the west, and the Tailored Properties industrial and residential proposal to the east (between the proposed quarry and Marulan) and the Medway residential proposal on the eastern side of the Hume Highway. Goulburn Mulwaree Council is currently considering a subdivision application for the Lockyersleigh property and rezoning proposals for the Tailored Properties and Medway land.

3. STATUTORY PLANNING FRAMEWORK

Under Part 4 of the unamended *Environmental Planning and Assessment Act 1979* (EP&A Act), the proposal is classified as State significant, integrated and designated development.

3.1 Permissibility

The land is zoned 1(a) General Rural, 1(b) Rural – Urban Investigation and 1(c) Rural Small Holdings under the Mulwaree Local Environmental Plan 1995. The proposal is permissible with consent in the 1(a) zone but prohibited development under the 1(b) and 1(c) zones. Readymix has sought the approval of the proposal in the 1(b) and 1(c) zones under section 76A(8)(c) of the unamended EP&A Act. Section 76A(8)(c) states that if part of State significant development is prohibited, it may be carried out with development consent. The majority of the quarry proposal (infrastructure and extraction area) is located in the 1(a) zone, with a small area of the quarry pit and the eastern overburden emplacement area in the 1(c) zone and part of the quarry access road in the 1(b) zone.

Under the Greater Marulan Structure Plan the majority of the quarry site is to be zoned 1(e) Rural Employment. The proposed 1(e) zone includes the portion of the site zoned 1(b) and part of the 1(c) land. The balance of the 1(c) zoned land (the north eastern portion of the site) retains the Rural Small Holdings zone.

3.2 State significant development

The proposal is classified as State significant development under s.76A (7) (b) of the EP&A Act as the development meets the criteria in Schedule 1 of the *State Environmental Planning Policy (State Significant Development) 2005*. Consequently the Minister is the consent authority for the proposal.

3.3 Integrated development

The proposal is classified as integrated development under s.91 of the EP&A Act as it requires additional approvals under the:

- *Heritage Act 1977*;
- *National Parks and Wildlife Act 1974*;
- *Protection of the Environment Operations Act 1997*;
- *Rivers and Foreshores Improvement Act 1948*;
- *Roads Act 1993*; and
- *Water Act 1912*.

3.4 Designated development

The proposal is classified as designated development under s.77A of the EP&A Act because it meets the criteria for extractive industries in Schedule 3 of the *Environmental Planning and Assessment Regulation 2000*.

4. CONSULTATION

The Applicant lodged a DA and EIS for the proposal on 27 May 2005.

The Department subsequently:

- Notified all residents who were identified as potentially affected by the proposal in writing and invited them to make submissions on the proposal;

- Notified Goulburn Mulwaree Council, and all relevant State Government agencies in writing and invited these agencies to make submissions on the proposal;
- Advertised the exhibition of the DA and EIS in the Goulburn Post on 1 June 2005 and 22 June 2005; and
- Exhibited the DA and EIS at four locations between 6 June 2005 and 8 July 2005, in accordance with the requirements of clause 118 of the EP&A Regulation.

This consultation satisfies the requirements for public participation of State significant advertised development in the EP&A Regulation. During the exhibition period, the Department received 17 submissions on the proposal: 4 from public authorities, 11 from the general public and 2 from special interest groups. The issues raised in the submissions are summarised below and relevant issues are considered in more detail in **Section 5** of this report.

4.1 Public Authorities

The Department received submissions from 4 public authorities. The comments made by the public authorities are summarised in the following section.

4.1.1 Rail Corporation

The Rail Corporation supports the proposal.

4.1.2 Department of Primary Industries

The Department of Primary Industries (DPI) provided comments on the proposal from its mineral resources and agriculture divisions.

The former Mineral Resources NSW noted that a thorough resource assessment has been undertaken which has identified substantial rock resources which has the potential to make a significant contribution to coarse aggregate supply for the Sydney market for up to 100 years. The manufactured sand products produced by the proposal have the potential to make up a shortfall in supply from natural sand sources.

The former NSW Agriculture provided the following general comments on the proposal:

- Measures should be provided to prevent soil and sediment movement from soil stockpiles;
- A weed management program should be developed for soil stockpiles and disturbed areas;
- Dust control measures to reduce dust deposition from stockpiles and access roads to minimise impacts on the health of grazing livestock;
- A site rehabilitation plan should be developed for post-quarrying and include ongoing monitoring and management; and
- Surface and groundwater management and monitoring.

4.1.3 Sydney Catchment Authority

The Sydney Catchment Authority (SCA) is satisfied the proposal can be designed, constructed and operated to contain its water quality impacts on site. The SCA considers the proposal satisfies clause 10 of *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply*. The SCA recommended conditions to address:

- Construction and operational environmental management plans;
- Soil and water management plans;
- Monitoring of the quality of surface and ground waters;
- Securing of an external water supply; and consultation with the SCA in the development of the wastewater management system.

4.1.4 Goulburn Mulwaree Council

The Goulburn Mulwaree Council on 19 July 2005 resolved to support the proposal subject to conditions on:

- Road upgrading and maintenance;
- Compliance with State Government agency requirements;
- Provision of adequate utility services;
- Establishment of site restoration funds and maintenance of noise attenuation and buffer areas; and
- Complaints mechanisms and community notification programs.

Council also suggested conditions of consent for the proposal.

4.2 General Public

Eleven submissions were received from the general public, of which 2 submissions objected to the proposal and 9 submissions either conditionally supported or supported the proposal (properties that

made a submission are shown in **Figure 5**). Of the 9 submissions that conditionally supported the proposal, 5 were from the residential area of Elizapower Drive (submissions 1-5), who raised concerns about noise from additional rail movements and the safety of a level crossing.

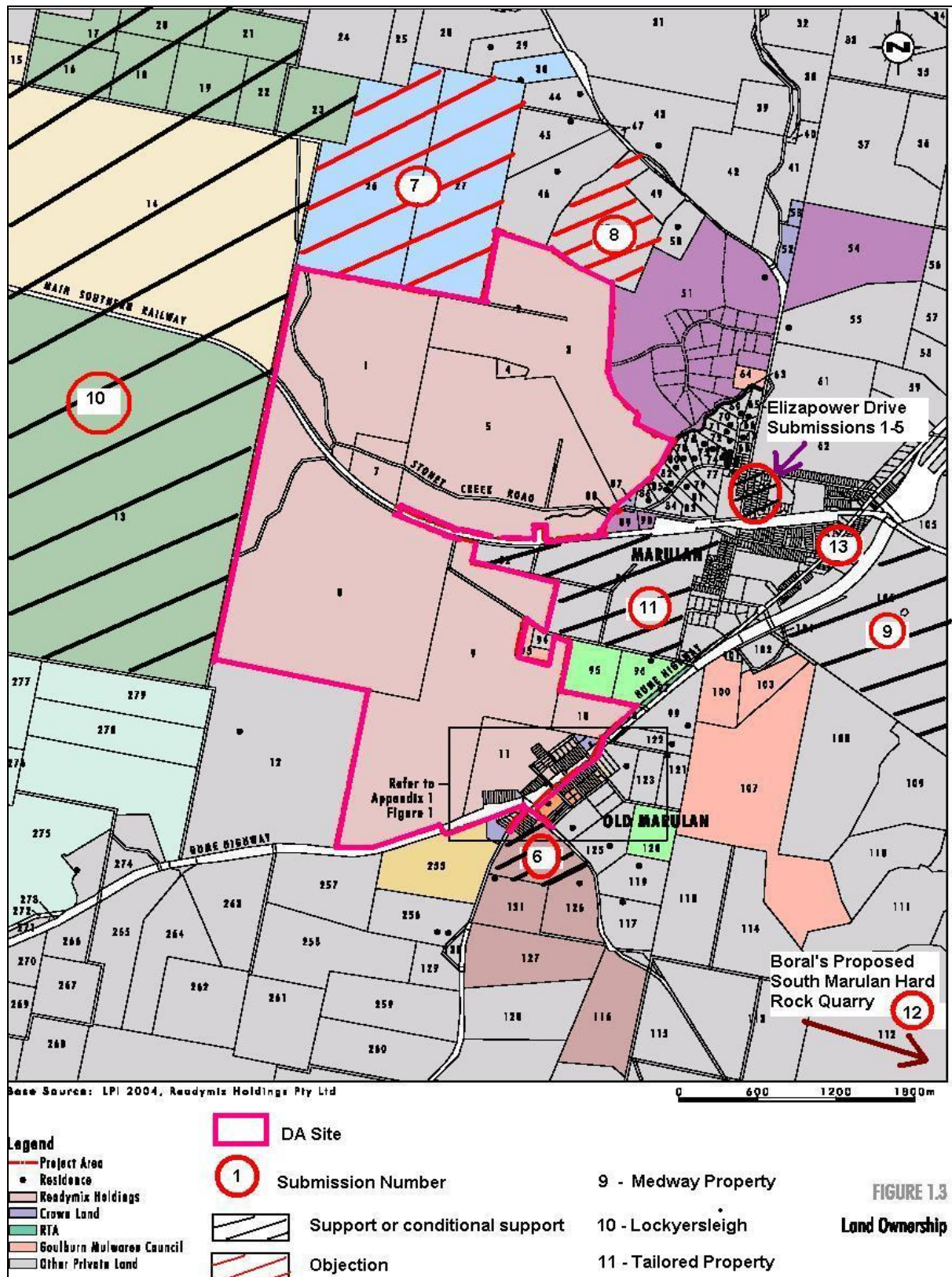


FIGURE 1.3
Land Ownership

Figure 5 – Location of Submissions

Submissions were received from 3 properties which are proposed to be developed for residential and employment purposes, the Medway Property (submission 9), Lockyersleigh (submission 10) and Tailored Property (submission 11). These submissions did not object to the proposal, but requested that consideration be given to the impacts of the quarry on their future development. The submissions from Lockersleigh and Tailored Property requested that environmental impacts such as

noise, air quality, vibration, surface and groundwater, and visual are mitigated, and that the quarry should comply with DEC guidelines to ensure there are no amenity impacts for future residential development. The Medway submission requested consideration of proposed water usage and supply, and dust and visual impacts on the future residential development of the property. The submission from the property adjoining the proposed Hume Highway interchange (submission 6), supported the upgrading of the Hume Highway, South Marulan Road and Jerrara Road intersection.

Two objections from properties north of the site (submissions 7 and 8) raised concerns about noise impacts on future residential development. Submission 8 stated the air and noise modeling did not take into account future residential uses, that noise affected properties should be acquired, and the community consultation process did not involve landowners not yet resident in the area. Submission 7 stated that vehicular access from Stoney Creek Road would be denied by the proposal.

4.3 Special Interest Groups

Submissions were received from 2 special interest groups:

- Boral Construction Materials NSW supports the proposal (submission 12).
- The Marulan Business & Tourism Association supports the proposal, subject to conditions of consent to ensure there are no adverse impacts on existing and future residents of Marulan and the collection of a levy to fund community cultural and recreational projects (submission 13).

5. SECTION 79C CONSIDERATION

Section 79C of the EP&A Act sets out the matters that a consent authority must take into consideration when it determines a DA. The Department's consideration of these matters is presented below.

5.1 Environmental Planning Instruments

The following environmental planning instruments are relevant to the proposal:

- *State Environmental Planning Policy No. 11 – Traffic Generating Developments;*
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development;*
- *State Environmental Planning Policy No. 44 – Koala Habitat;*
- *State Environmental Planning Policy No. 55 – Remediation of Land;*
- *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply;*
- *Draft Regional Plan – Sustaining the Catchments;* and
- *Mulwara Local Environmental Plan 1995.*

The Department's assessment of the proposal in relation to each of these instruments is presented in **Appendix A**.

Apart from the permissibility issue of zones 1(b) and 1(c) under the Mulwara Local Environmental Plan 1995, as discussed in Section 3.1, the Department is satisfied that the proposal can be constructed and operated in a manner that is broadly consistent with the relevant requirements of the applicable environmental planning instruments.

5.2 Environmental Impacts

The key issues raised in the submissions to the proposal and/or identified during the Department's assessment are:

- Noise;
- Blasting and vibration;
- Air quality;
- Water quality;
- Traffic and transport;
- Flora and fauna;
- Heritage; and
- Visual

The Department's assessment of the key issues, as well as other issues associated with the proposal, is presented in the following sections.

5.2.1 Noise

Issue

The proposal has the potential to generate construction, operational and transport noise.

Consideration

The proposed quarry would produce a maximum of 5 million tonnes of quarry product a year on a 24-hour 7 days a week basis. Operations have been scheduled to occur at times that would limit the potential for disturbance to neighbouring residences. The proposed operational hours are shown in **Table 2**.

Activity	Hours of Operation
Clearing and topsoil/overburden removal and emplacement	7.00am to 6.00pm, 7 days a week
Drilling	7.00am to 6.00pm, 7 days a week
Blasting	9.00am to 5.00pm, Monday-Saturday (excluding Sundays and Public Holidays)
Extraction of Primary Raw Feed	7.00am to 10.00pm, 7 days a week
Crushing and screening	24 hours, 7 days a week
Loading, delivery and distribution	24 hours, 7 days a week
Maintenance activities	24 hours, 7 days a week

Table 2 – Proposed Operational Hours

Construction Noise

Construction of the development is expected to last about two years and involves bulk earthworks, operation of mobile construction plant such as crushers and concrete plants, construction of roads, railway and processing and quarry plant infrastructure, and extraction of material for fill and construction materials. The extraction and excavation of material is likely to require blasting.

Earthworks and foundation works require the largest amount of plant and equipment to be used during the construction period. The Noise Assessment concluded that noise levels from earthworks and foundation construction would meet the project specific construction noise limits (see **Table 3**).

Location	Noise Limit (LA ₁₀ (15 minute))	Predicted (LA ₁₀)	
		Earthworks	Foundation Works
Location 1	35	<30	<30
Location 2	42	<30	<30
Location 3	42	<30	<30
Location 4	35	<30	<30
Location 5	35	34	<30
Location 6	35	35	<30
Location 7	45	31	<30
Location 8	45	30	<30
Location 9	48	<30	<30
Location 10	47	<30	<30
Location 11	39	39	33
Location 12	42	<30	<30
Location 13	42	31	<30
Location 14	39	39	33

Table 3 – Predicted Construction Noise Limits for Period Greater Than 26 Weeks

The Department is satisfied that construction of the proposal is unlikely to result in noise exceedances at the nearest dwellings. However, the Department believes the Applicant should be required to prepare an Environmental Management Strategy which provides the strategic context for environmental management of the development to mitigate any construction noise impacts that may be generated by its construction.

Operational Noise

Noise modelling was undertaken of 11 residences and 3 potential residential locations which represent the closest residential receivers to the site. The noise modelling indicated that the operation of a hard rock quarry at the site is predicted to meet all project specific noise criteria for operation during the day, evening and night time periods at all residential receivers under calm and prevailing weather conditions with noise control measures implemented. The modelling results are shown in **Table 4**.

The noise modelling incorporated various noise mitigation measures, including:

- enclosure of crushing and screening facilities except the primary gyratory crusher and spalls plant;
- enclosure of the pug mill in a building;
- lining of the base of the truck and train loading bins;
- attenuation of the trucks dumping on the leading row of the eastern emplacement area;
- operation of various plant (spalls) and equipment (graders and overburden and emplacement fleet) during the daytime period only; and
- limiting finished product truck movements at night (maximum 32/hour).

Location	Project Specific Noise Limit LA _{eq} (15 minute) dBA			Predicted Noise Levels LA _{eq} (15 minute) dBA					
	Day	Evening	Night	Calm			Prevailing Wind		Temperature Inversion
				Day	Evening	Night	Evening	Night	Night
Location 1	35	35	35	<30	<30	<30	<30	<30	32
Location 2	42	38	38	<30	<30	<30	<30	<30	<30
Location 3	42	38	38	<30	<30	<30	<30	<30	<30
Location 4	35	37	36	<30	<30	<30	33	31	31
Location 5	35	37	36	<30	<30	<30	32	32	32
Location 6	35	37	36	<30	<30	<30	34	34	34
Location 7	45	45	41	<30	<30	<30	33	33	33
Location 8	45	45	41	<30	<30	<30	33	33	34
Location 9	48	47	46	<30	<30	<30	33	32	34
Location 10	47	45	40	37	37	37	40	40	39
Location 11	39	38	37	<30	<30	<30	<30	<30	32
Location 12	42	38	38	<30	<30	<30	34	<30	<30
Location 13	42	38	38	<30	<30	<30	35	35	32
Location 14	35	37	36	32	<30	<30	<30	<30	32

Table 4 – Predicted Operational Noise Modelling Results for Year 30

The Applicant considered that truck and train loading had the most potential to cause sleep disturbance impacts. Modelling of these activities was undertaken for all weather conditions. The modelling predicted the noise levels to be below project specific sleep disturbance goals for night time operation of the quarry (see **Table 5**).

Location	Project Specific Noise Goal LA ₁ (15 minute) dBA	Predicted Noise Level LA ₁ (15 minute) dBA
Location 1	45	39
Location 2	48	<30
Location 3	48	<30
Location 4	46	40
Location 5	46	42
Location 6	46	45
Location 7	55	42
Location 8	55	44
Location 9	56	45
Location 10	53	44
Location 11	47	44
Location 12	48	42
Location 13	48	44
Location 14	47	44

Table 5 – Sleep Disturbance Noise Modelling Results

Submissions from 4 adjoining properties (submissions 7, 8, 10 and 11) raised concerns about noise impacts on future residential development of the land. The submissions from Lockyersleigh (submission 10) and Tailored Property (submission 11) advised the properties were subject to development proposals and requested that operation of the quarry comply with DEC noise guidelines. The submissions from the properties to the north of the site (submissions 7 and 8) raised objection to the proposal about noise impacts. Submission 7 requested acoustic fencing or landscaping along the southern boundary of its land. Submission 8 requested compensation or acquisition of the property should quarry noise disturb or devalue the land.

The noise modelling concluded the project complies with the noise criteria at all the nearest residential locations. Part of the adjoining land is affected by the 35 to 45 dBA noise contour, however there are no residential dwellings within the contours and the land is used for rural purposes. A subdivision application has been lodged for the creation of 36 rural lots on the Lockyersleigh property. The application has not yet being determined. The proposed lots range in area from 40 to 100 ha, with an average of 55 ha. The Applicant has advised that negotiations for the lease of land on the Lockyersleigh property for a quarry buffer area (1 km width) has not yet been finalised. Tailored Property has lodged a rezoning application with Council for development of the land for employment and residential purposes. The Tailored Property land adjoins the eastern boundary of the site, to the south of the Main Southern Railway Line. The residential component of the Tailored Property proposal adjoins Marulan and employment land is proposed between the residential area and the quarry site. The noise modelling predicted that part of the proposed residential area is within the 35 dBA contour, which complies with the project specific noise criteria for the quarry. The Applicant states that the land owned by submission 8 is within the project specific noise criteria for the quarry and the land is not adversely affected by the proposal and acquisition or compensation is not warranted.

Council's submission requested the maintenance of noise attenuation resources.

The DEC has recommended adoption of the predicted noise levels (L_{Aeq}) for the residential receivers that are classified as rural. However, for the residential receivers that are classified as suburban (the residential areas to the east and the proposed residential locations (Tailored Properties)), the DEC has adopted stricter noise limits.

Rail Noise

The Applicant has undertaken an assessment of the noise from rail operations. The proposal includes 6 trains (12 rail movements) a day of up to 3500 tonnes capacity each, with rail loading and dispatch to occur 24 hours, 7 days a week on the rail loop. The noise assessment includes typical noise sources such as locomotive engine and exhaust noise (throttle), wheel/rail noise (speed) and wagon type. The noise predictions for rail noise are shown in **Table 6**.

Description	Distance to Residential Receiver					
	25 m		50 m		100 m	
	L_{Aeq} (24 hour)	L_{Amax}	L_{Aeq} (24 hour)	L_{Amax}	L_{Aeq} (24 hour)	L_{Amax}
Existing rail movements	58.2	88.2	55.8	84.8	52.7	78.3
Proposed quarry movements	49.8	80.2	47.2	76.4	44.7	72.7
Total rail movements with 6 proposed quarry trains	59.1	88.2	56.6	84.8	53.6	78.3
Predicted increase in noise levels	0.9	-	0.8	-	0.9	-

Table 6 – Predicted Noise from Rail Movements

Currently 166 trains (or 332 train movements) pass through Marulan daily. This would be increased by 6 quarry trains (or 12 movements) resulting in an increase of 0.9 dBA in a 24-hour period at a distance of 25 m from the Main Southern Railway Line. The contribution of the proposal towards rail noise is 49.8 dBA L_{Aeq} (24 hour) and 80.2 dBA L_{Amax} , which is below the DEC criterion of 60 dBA and 85 dBA, respectively. The L_{Amax} criterion or maximum noise generated by a train passby, is exceeded by existing train movements, but the noise modelling does not expect that the additional quarry train movements would increase the L_{Amax} level. The Applicant considers the noise impact of 6 additional trains on the Main Southern Railway Line to be minor. Train noise on the rail loop was considered in the noise assessment of the quarry operations.

Submissions were received from residents in Eliza Power Drive (Submissions 1-5), a residential area to the north of and adjacent to the Main Southern Railway Line. The submissions raised concerns about noise from increased rail movements and requested the erection of sound barriers to reduce noise levels.

The Applicant states the proposal will result in a minor increase in the number of train movements on the Main Southern Railway Line. The noise modelling of rail noise predicted the proposed quarry trains comply with DEC guidelines and the additional increase in train movements of 0.9 dBA would be imperceptible to residential receivers along the railway line. The Applicant does not believe a noise barrier is required as the proposal complies with the relevant DEC criteria and the minor predicted increase in noise levels. The Applicant states that an existing rail ballast loading facility at Marulan which receives ballast from the Johniefields Quarry for loading onto trains would be relocated to the rail loop, which would remove an existing noise source.

The submission from Tailored Property stated train movements at night has potential to cause noise disturbance and it would be appropriate to implement mitigation measures to existing and future residences in Marulan, including the Tailored Property site. The noise modelling of train noise outside the site predicted the additional 6 quarry trains a day would increase continuous noise levels, LA_{eq} (24 hour) by 0.9 dBA. The LA_{max} from train passbys currently exceeds the DEC criteria, however, the proposal does not increase the existing noise levels. The Applicant states the proposal would have an imperceptible increase in noise levels in residences along the Main Southern Railway Line.

Road Traffic Noise

The assessment of traffic noise from construction and operation of the proposal was undertaken. The construction traffic noise was assessed to be 53 dBA LA_{eq} (1-hour) at 40 m, which is below the 55 dBA DEC guideline for local roads, contained in *Environmental Criteria for Road Traffic Noise*. The main construction access to the site is Portland Avenue/Wilson Drive on the southern side of the railway line. The access route passes through the industrial area of Marulan and would service the site until the access road to the Hume Highway was constructed.

During the early phases of construction prior to completion of the rail overpass, limited access to the northern part of the site is gained via Stoney Creek Road and Brayton Road. This route passes through residential and rural residential areas and would only be used until the rail overpass was completed. Stoney Creek Road is the current access to the site. Although there is an existing railway level crossing on the property, the Applicant states that for safety reasons that would not be used and as the predicted traffic noise is below the DEC guideline and the Stoney Creek Road access is temporary, the amenity of the residences along the construction traffic route would not be adversely affected.

Modelling of existing and predicted traffic noise levels was undertaken. Based on current road traffic data, heavy vehicles comprised 15% of the day time traffic and 54% of the night time traffic on the Hume Highway. The existing and predicted road traffic noise levels are shown in **Table 6**.

Description	Distance to Receiver					
	25 m		50 m		100 m	
	Day LA_{eq} (15 hour)	Night LA_{eq} (9 hour)	Day LA_{eq} (15 hour)	Night LA_{eq} (9 hour)	Day LA_{eq} (15 hour)	Night LA_{eq} (9 hour)
Existing traffic flows	67.9	65.2	64.1	61.5	59.8	57.3
Total traffic movements with proposed quarry movements	68.1	65.6	64.3	61.9	60.0	57.7
Predicted increase in noise levels	0.2	0.4	0.2	0.4	0.2	0.4

Table 6 – Predicted Road Traffic Noise Levels

Under the DEC's *Environmental Criteria for Road Traffic Noise* where the traffic noise goal is exceeded, traffic generated by the development should not lead to an increase in existing noise levels of more than 2 dBA. The exiting Hume Highway traffic flows exceed the DEC noise guidelines by 7.9 dBA and 10.2 dBA during the day and night time periods, respectively. The Applicant states the proposal would increase road traffic noise on the Hume Highway by 0.2 dBA during the day time and 0.4 dBA during the night time, which would be imperceptible to residential receivers along the highway. The minor increase is also within the 2 dBA increase permitted by the DEC guidelines. Traffic on the internal access road is considered to be an operational noise source and predictions were carried out at the nearest affected receivers.

Conclusion

The Department and DEC are satisfied that the construction and operation of the proposal can be managed and that with the implementation of engineering and operational noise mitigation measures the quarry would comply with relevant DEC guidelines and would not result in significant noise impact on existing and future residential receivers. The Department recommends, should the Minister approve the proposal, conditions which would require the Applicant to:

- comply with noise criteria and hours of operation;
- implement all reasonable and feasible noise mitigation measures;
- develop and implement a noise monitoring program; and
- communicate with the community and maintain and manage a complaints system.

5.2.2 Blasting and vibration

Issue

The proposal has the potential to cause impacts on adjacent residential and sensitive receivers.

Consideration

Blasting is proposed to be carried out on a weekly basis with up to 300 holes per blast to create 15 m quarry benches with minimum blasts of approximately 115,000 tonnes of rock. Modelling of airblast and ground vibration levels were undertaken of the nearest residential receivers. The criteria used are a maximum airblast of 115 dB and ground vibration peak particle velocity (PPV) of 5 mm/sec. The predicted blasting level for year 20 and 30 is shown in **Table 7**. The modelling predicted airblast and ground vibration levels would comply with the ANZECC/DEC criteria for residential receivers.

Receiver Location	Predicted Blasting Level	
	Airblast (dB linear)	Ground Vibration (mm/s)
1	103.2	0.5
2	111.3	0.5
3	108.0	0.3
4	107.9	1.1
5	108.6	1.2
6	108.8	1.2
7	105.3	0.7
8	105.4	0.7
9	104.2	0.6
10	102.8	0.5
11	105.7	0.8
12	114	2.6
13	107.3	1.0
14	106.1	0.8

Table 7 – Predicted Blasting Levels Residential Receiver Years 20 and 30

Modelling was undertaken of the impacts from blasting on the Main Southern Railway Line (including bridges and culverts) to the south of the proposed quarry, a natural gas pipeline located adjacent to the proposed quarry (north west corner) and a proposed drinking water reservoir adjacent to the proposed quarry (to the north east). The results of the modelling are shown in **Table 8**.

Blasting Location	Receiver Location	Predicted Blasting Level (mm/s)	
		Ground Vibration	Criteria
Year 1	Reservoir	3.4	25
	Pipeline	3.1	100
	Railway	23.9	25
Year 5	Reservoir	4.0	25
	Pipeline	5.2	100
	Railway	24.6	25
Year 10	Reservoir	6.7	25
	Pipeline	6.6	100
	Railway	24.7	25
Year 15	Reservoir	13.3	25
	Pipeline	46.5	100
	Railway	24.7	25
Year 20	Reservoir	19.3	25
	Pipeline	46.5	100
	Railway	17.0	25
Year 30	Reservoir	19.3	25

	Pipeline	46.5	100
	Railway	24.7	25

Table 8 – Predicted Blasting Levels Infrastructure Receiver

The predicted vibration level at the closest point of the natural gas pipeline and the proposed reservoir is below the level likely to cause an impact on the structures. However, control over the size of blasting charge would be required at the closest point of the quarry pit to the Main Southern Railway Line to ensure vibration levels are below the level likely to cause impact.

The Applicant proposes to monitor blasting by establishing a blast monitoring reference location within the project area to monitor all blasts and to undertake periodic monitoring (quarterly) at the nearest residential dwelling to the quarry (adjacent to the eastern project area boundary).

The submission from Tailored Property requested consideration of the impacts from blasting on future residential use of the land. The submission from Lockyersleigh requested compliance with DEC guidelines. The Applicant's modelling of blasting impacts on residential receivers predicted that airblast and ground vibration levels complied with DEC guidelines. The modelling predicted that at the receiver location on the Tailored Property site (Receiver Location 13), the airblast level would increase slightly from around 106.1 dB Linear in Year 1 to 107 in Year 5, and 107.3 in Years 20 and 30. The ground vibration level would increase from 0.8 mm/s in Year 1 and remain at 1.0 mm/s from Year 5 to Year 30. The relevant DEC guidelines are 115 dB and 5 mm/s.

Council's submission requested that specific blast design controls be included in any approval for the proposal and that a community notification program for scheduled works such as blasting be implemented.

Conclusion

The Department and DEC are satisfied with the assessment of blasting impacts and believes that blasting activities are unlikely to result in any significant impact on nearby residential and infrastructure receivers. However, the Department is of the view that the Applicant should implement best practice blasting techniques to ensure no flyrock leaves the site, protect the safety of people, livestock and property and minimise dust and fume emissions, and develop and undertake a blasting monitoring program.

The Department recommends, should the Minister approve the proposal, conditions which would require the Applicant to:

- comply with relevant DEC airblast and ground vibration standards;
- establish a community notification program; and
- monitor blasting impacts.

The DEC has advised it is able to grant a Licence for the proposal under the *Protection of the Environment Operations Act 1997* and has provided its general terms of approval.

5.2.3 Air quality

Issue

The proposal could generate dust from extraction, processing and transportation activities.

Consideration

The extraction operations are proposed to progress from south to north with the main sources of dust from drilling and blasting of rock, vehicles travelling on unpaved surfaces, crushing and screening of rock in the processing plant, loading and unloading of material to crushers, stockpiles, trains and trucks, and wind erosion from stockpiles and unpaved exposed areas. The Applicant undertook an air quality assessment of the proposal, which modelled total suspended particulates (TSP), particulate matter (PM₁₀) and dust deposition. The modelling of the dispersion of dust and particulates was based on weather conditions of the area. At the time the modelling was conducted there was insufficient meteorological data from the on-site weather station so meteorological data from a nearby location (the Wangi property 8 km southwest of the site) was used.

Following a request from DEC, the Applicant has remodelled the air quality impacts of the proposal using data from the on-site weather station. The main difference in the weather pattern from the Lynwood data was a predominant east or west wind pattern, whereas the Wangi data showed common westerly winds but a pattern showing an even spread of wind across all directions.

The revised air modelling predicted that the project would meet all relevant air quality goals at all locations except dust deposition levels in Years 20 to 30 at location R5 (north east of the site). There was a minor exceedance of the 2 g/m²/month project specific goal, however the background level goal of 4 g/m²/month was not exceeded. Location R5 is on the boundary of the site and land to its east is approved for rural residential development, however, the subdivision has not yet occurred and there are no residences in the subdivision. The modelling predicted that in the worst case year 20 operation approximately 7% of the land area of the lot is affected. The Applicant considers the land is not adversely affected by dust from the proposal. The results of the revised modelling are shown in **Table 9**.

Receiver Location	Year 2	Year 5	Year 10	Year 15	Year 20	Year 25	Year30
Maximum 24-hour average PM₁₀ concentration (µg/m³) Goal = 50 µg/m³							
R1	3.6	5.3	5.5	5.8	5.9	5.6	5.6
R2	2.6	4.7	4.9	5.1	5.1	5.2	5.2
R3	6.6	11.3	12.2	10.7	11.1	11.1	11.2
R4	8.5	13.9	14.3	14.5	14.5	14.4	14.5
R5	23.7	39	37.2	38.8	39.4	38.3	38.6
R6	4.2	6.3	6.1	6.5	6.3	6.2	6.2
R7	7.2	9.2	9.3	9.3	9.5	9.8	9.8
R8	6.6	10.0	9.2	8.9	8.9	8.7	8.7
Predicted annual average PM₁₀ concentration (µg/m³) Goal = 30 µg/m³							
R1	0.8 (13.8)	1.3 (14.3)	1.5 (14.5)	1.8 (14.8)	1.8 (14.8)	1.7 (14.7)	1.7 (14.7)
R2	0.4 (13.4)	0.6 (13.6)	0.7 (13.7)	0.8 (13.8)	0.8 (13.8)	0.7 (13.7)	0.7 (13.7)
R3	3.7 (16.7)	6.2 (19.2)	6.3 (19.3)	5.2 (18.2)	5.3 (18.3)	5.3 (18.3)	5.3 (18.3)
R4	2.3 (15.3)	3.4 (16.4)	3.5 (16.5)	3.8 (16.6)	3.7 (16.7)	3.7 (16.7)	3.7 (16.7)
R5	4.9 (17.9)	8.6 (21.5)	10.3 (23.3)	11.5 (24.5)	12.0 (25.0)	11.6 (24.5)	11.7 (24.7)
R6	1.6 (14.6)	2.1 (15.1)	2.2 (15.2)	2.1 (15.1)	2.2 (15.2)	2.2 (15.2)	2.2 (15.2)
R7	1.3 (14.3)	1.6 (14.6)	1.6 (14.6)	1.6 (14.6)	1.7 (14.7)	1.7 (14.7)	1.7 (14.7)
R8	2.8 (15.8)	3.7 (16.7)	3.9 (16.9)	3.6 (16.6)	3.7 (16.7)	3.6 (16.6)	3.7 (16.7)
Predicted annual average TSP concentration (µg/m³) Goal = 90 µg/m³							
R1	0.9 (33.9)	1.5 (34.5)	1.7 (34.7)	2.5 (35.1)	2.5 (35.1)	1.9 (34.9)	2.0 (35.0)
R2	0.4 (33.4)	0.7 (33.7)	0.8 (33.8)	0.9 (33.9)	0.9 (33.9)	0.8 (33.8)	0.8 (33.8)
R3	4.5 (37.5)	7.9 (40.9)	8.1 (41.1)	6.2 (39.2)	6.3 (39.3)	6.2 (39.2)	6.2 (39.2)
R4	2.6 (35.6)	3.7 (36.7)	3.8 (36.8)	3.9 (39.6)	4.1 (37.1)	4.0 (37.0)	4.0 (37.0)
R5	5.4 (38.4)	9.5 (42.5)	12.0 (45.0)	13.6 (46.6)	14.2 (47.2)	13.7 (46.7)	13.8 (46.8)
R6	1.8 (34.8)	2.3 (35.3)	2.5 (35.5)	2.4 (35.4)	2.5 (35.5)	2.5 (35.5)	2.5 (35.5)
R7	1.5 (34.5)	1.8 (34.8)	1.8 (34.8)	1.7 (34.7)	1.9 (34.9)	1.9 (34.9)	1.9 (34.9)
R8	3.3 (36.3)	4.4 (37.4)	4.6 (37.6)	4.1 (37.1)	4.3 (37.3)	4.2 (37.2)	4.3 (37.3)
Average annual dust deposition (g/m²/month) Goal – 2 for project and 4 with estimated background							
R1	0.04 (1.74)	0.07 (1.77)	0.1 (1.8)	0.12 (1.82)	0.12 (1.82)	0.11 (1.81)	0.11 (1.81)
R2	0.01 (1.71)	0.02 (1.72)	0.03 (1.73)	0.03 (1.73)	0.03 (1.73)	0.03 (1.73)	0.03 (1.73)
R3	0.59 (2.29)	1.07 (2.77)	1.16 (2.86)	0.61 (2.310)	0.6 (2.3)	0.6 (2.3)	0.6 (2.3)
R4	0.07 (1.77)	0.09 (1.79)	0.1 (1.8)	0.1 (1.8)	0.11 (1.81)	0.11 (1.81)	0.11 (1.81)
R5	0.32 (2.02)	0.78 (2.48)	1.54 (3.24)	1.96 (3.66)	2.14 (3.84)	2.06 (3.76)	2.07 (3.77)
R6	0.09 (1.79)	0.1 (1.8)	0.11 (1.81)	0.1 (1.8)	0.12 (1.82)	0.13 (1.83)	0.14 (1.84)
R7	0.04 (1.74)	0.04 (1.74)	0.04 (1.74)	0.04 (1.74)	0.05 (1.75)	0.05 (1.75)	0.05 (1.75)
R8	0.35 (2.05)	0.34 (2.04)	0.41 (2.11)	0.31 (2.01)	0.34 (2.04)	0.36 (2.06)	0.36 (2.06)

Note – predicted background levels with project specific levels are shown in brackets.

Table 9 – Air Quality Modelling Predictions

The Applicant proposes to implement a number of measures to control dust generation. These include engineering controls such as shielding and enclosing crushers and screens, conveyors and transfer points and dust suppression sprays on stockpiles and drills, and cleaning of conveyors; operational controls such as confining traffic to haul routes, removal and rehabilitation of unnecessary roads, keeping exposed areas to minimum, cleaning of areas where fine material builds up and varying operations in adverse meteorological conditions; and planning controls such as the establishment of adequate buffer areas between the dust sources and sensitive receivers.

Four submissions commented on air quality issues. The submissions from the Lockyerseigh, Tailored Property, and Medway property (submission 9) requested compliance with DEC guidelines. The submission from a property to the north east (submission 8) questioned the relevance of the air quality modelling as it did not consider existing rural lots which have a dwelling entitlement. The revised air quality modelling predicted that operation of the development would comply with relevant DEC

guidelines, except for a minor exceedance of the dust deposition at receiver location 5. The modelling predicted the proposal would comply with the DEC guidelines at each of the 5 properties that commented on air quality.

Conclusion

The Department and DEC are satisfied that the proposal would not have a significant impact on the air quality of the surrounding area. The exceedances of the 2 g/m²/month average annual dust deposition for the project at a property to the east of the site in years 20 to 30 is considered to be minor (0.14 to 0.6 g/m²/month) and does not exceed the 4 g/m²/month standard for the estimated background level (the contribution from the proposal and existing background level).

The Department recommends, should the Minister approve the proposal, conditions which would require the Applicant to:

- comply with relevant DEC guidelines at all phases of the development;
- establish and maintain an air quality monitoring program; and
- implement the proposed mitigation measures proposed in the EIS.

The DEC has advised it is able to grant a Licence for the proposal under the *Protection of the Environment Operations Act 1997* and has provided its general terms of approval.

5.2.4 Water quality

Issue

The proposal has the potential to affect water flows and quality of the Joarimin, Lockyersleigh and Marulan Creek catchments and lower groundwater levels in the area.

Consideration

A comprehensive assessment of groundwater and surface water impacts was undertaken for the proposal.

Surface Water

The site is located in the catchments of the Joarimin, Lockyersleigh and Marulan Creeks (comprising some 14%, 4% and 8%, respectively, of these catchments). The Joarimin and Lockyersleigh Creeks drain into the Wollondilly River and the Marulan Creek into the Shoalhaven River. The Wollondilly and Shoalhaven Rivers are in the Sydney drinking water catchments. The proposal would result in the loss of some sections of the lower order tributaries of the Joarimin and Lockyersleigh Creeks, damming of some of the tributaries and some creek realignment. The construction of haul and access roads will also impact on the upper catchments of the creeks. Marulan Creek is largely unaffected although the quarry access road will require a creek crossing.

The Applicant has undertaken a water balance of the proposal (see **Table 10**). The main water users are the crushing and screening plant, haul road and stockpile dust suppression, and potable water. The key features of the water management system include clean water drains, creek realignments around the quarry pit and infrastructure areas, catch drains to convey dirty water to sediment control dams (5 in total) and 2 water storage dams. Runoff from the footprint of the year 30 disturbed areas would be captured for re-use on the site.

Rainfall Condition	Annual rainfall (mm)	Water Balance (ML/year)				
		Year 1	Year 5	Year 12	Year 20	Year 30
Dry year	407	51	-70	-83	-65	-48
Average year	607	193	69	54	80	93
Wet year	872	421	297	283	303	320

Table 10 – Predicted Water Balance

In dry rainfall years the quarry at full production would be a net water user. An external water supply would be required to make up the water deficit. During average and wet years the sediment control dams would release water into the catchments. The Applicant suggests two possible external water sources to supplement water supply during low rainfall years:

1. purchase of an existing allocation and conversion to an industrial allocation, including possible use of the existing industrial allocation from Johniefields Dam (the allocation of 74 ML is currently used at Readymix's Johniefields Quarry); and
2. supply of treated effluent from the Marulan Wastewater Treatment Plant.

The proposed capture of runoff from the year 30 quarry footprint for treatment and reuse will impact on annual flow volumes from in the Lockyersleigh and Joarimin Creeks. The Applicant estimates the reduction in flow volumes for Joarimin Creek at the site boundary to range from 6% to 25% and a reduction at Johniefields Dam (6.5 km downstream) between 2% and 8%. The reduction in annual flow volumes for Lockyersleigh Creek at the site boundary would range from 31% to 93% and at 1 km downstream a range of 16% to 33%. The Applicant estimates the reduction in flow volume at the confluence of Lockyersleigh Creek and the Wollondilly River is between 1% and 6%, which represents a reduction of less than 0.1% of the volume of the Wollondilly River.

The Applicant proposes to implement erosion and soil control measures during construction of the development to control the water quality of runoff. Water quality measures would be implemented during operation to minimise impacts on the surrounding environment, with all discharge waters to be treated to maintain the quality of downstream waters.

The submission from Lockyersleigh requested that surface water impacts on land to the west of the buffer area do not exceed DEC guidelines. The Medway submission stated that Council requires industrial developments to provide their own water supply and would not be allowed to use the Council's residential water supply, and they have discussed with Council the use of treated effluent for grey water use within the Medway residential development.

The Applicant states that there would be a reduction in annual flow volumes of Lockyersleigh Creek at 1 km downstream of the site boundary (west of the buffer area), of 6% to 33%, depending on rainfall. The proposal is unlikely to have significant adverse impacts on surface water quality downstream with measures such as clean water drains around the disturbed areas, collection of dirty water in sediment control dams and treatment of discharge waters.

A number of options have been explored for the provision of an external water supply during low rainfall years, including the use of treated effluent from the Marulan Wastewater Treatment Plant. Council's submission stated that reuse of treated effluent by the proposal is being examined, but operations at the quarry should not exceed the available water supply until an external supply has been secured. Council is of the opinion that the proposed water supply arrangements are not expected to have a significant impact on the town water supply.

The Applicant states that potable water demand of up to 3.5 ML/year would be generated and that subject to agreement, it would be sourced from the Marulan Town Water Supply.

The Sydney Catchment Authority (SCA) considered the proposal could be designed, constructed and operated to maintain its water quality on site and it satisfies clause 10 *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply*. The SCA recommended conditions to cover construction and operational environmental management plans, preparation of soil and water management plans, and water quality monitoring and reporting.

Groundwater

A detailed groundwater assessment and modelling of the proposal was carried out by the Applicant. Based on groundwater monitoring the groundwater table is generally well below ground surface, in the vicinity of Joarimin Creek the water table is approximately 6 m below surface level. In the vicinity of the proposed quarry pit the water table is expected to be encountered at depths of between 10 and 30 m below the ground level. The existing groundwater table ranges from 630 m to 675 m AHD.

The proposed quarry would not extend below the water table during the first year, but thereafter some parts of the pit will be below the water table. By the end of Year 30 the pit floor will be more than 100 m below the existing surface level. The proposed pit floor levels are shown in **Table 11**.

Year	Lowest Pit Elevation (m AHD)	Average Inflow Rate	
		m ³ .day	ML/year
1	660	0	0
2	645	2.0	0.7
5	630	11.1	4.0
10	630	16.0	5.5
15	630	22.8	8.3
20	615	38.2	13.9
25	615	47.8	17.6
30	570	72.8	26.6

Table 11 – Proposed Quarry Pit Floor Levels and Groundwater Inflow Rates

The proposal will require dewatering of the pit from the second year and this has the potential to impact on the groundwater system locally. The predicted groundwater inflows to the quarry pit are shown in **Table 11**.

The groundwater modelling of the quarry predicted that during the 30 year life of the quarry the groundwater impact is limited to within 1.5 km of the quarry pit. The maximum drawdown of 75 m would occur in the (deepest) eastern part of the pit while the 10 m groundwater drawdown contour would extend approximately 200 m from the quarry pit. No existing groundwater supply is predicted to be impacted by the proposal.

Following cessation of quarrying potential evaporation is expected to exceed the predicted rate of groundwater inflow into the pit. The pit is likely to become a permanent groundwater sink and groundwater would flow inwards towards the pit. The modelling predicted that in a 100 year period after quarrying there would be a lowering of the groundwater by between 5 and 10 m at a distance of about 1 km east of the pit. There would be no further significant change in groundwater levels in other locations after quarrying. The Applicant proposes to implement a monitoring program, which would:

- monitor pit water;
- monitoring of water levels in piezometers; and
- sampling of water quality.

The Tailored Property submission raised concern that the groundwater drawdown within 1.5 km of the quarry would impact on the north western part of its property which is proposed to remain vegetated. The Lockyersleigh submission requested groundwater impacts east of the buffer area to comply with DEC guidelines.

The groundwater assessment concluded the proposal has no significant impact on existing groundwater users or groundwater dependent ecosystems. The predicted decline in salinity is considered by the Applicant to be a positive impact on local groundwater quality.

Conclusion

The Department is satisfied the Applicant has considered the likely impacts of the proposal on groundwater and surface water in the surrounding area. From the modelling undertaken the Department is of the view the proposal has minimal impact on existing groundwater users and the impact of drawdown of the groundwater resource is localised.

The proposal is likely to result in the removal, damming and realignment of tributaries of the Lockyerseigh, Joarimin and Marulan Creeks on the site. The Department is satisfied the proposed changes and consequent reduction in annual flow volumes has minimal impact on downstream users and the Sydney drinking water's catchments. However, to effectively manage surface and groundwater resources, the Department believes the Applicant should be required to prepare and maintain an Integrated Water Management Plan for the development. This plan would include:

- a Water Balance to manage and minimise water use;
- a comprehensive surface and groundwater monitoring program; and
- an Erosion and Sediment Control Plan.

The Department of Natural Resources has determined that it is able to provide an approval for the proposal under the *Water Act 1912* and *Rivers and Foreshores Improvement Act 1948* and has provided its general terms of approval for the development.

5.2.5 Traffic and transport

Issue

The quarry would generate 570 vehicles per day, of which 340 are heavy vehicles.

Consideration

The proposal would involve the transportation of up to 1.5 million tonnes of product a year by road to local (Goulburn/Southern Highlands) and regional (ACT, southern Sydney outskirts) markets. This results in the generation of an average of 162 laden trucks a day (or 324 truck movements) and 20 truck movements (10 in/10 out) an hour. The traffic movements generated by the proposal represent 3.1% of all vehicles and 6.5% of heavy vehicles on an average weekday. The Hume Highway at present carries about 20,000 movements (AADT) of which 22% are heavy vehicles. The increase in traffic using the Hume Highway is considered to be small and the Highway has the capacity to absorb the traffic increase.

All trucks would use the new access road to the Hume Highway with the majority expected to travel north east towards Sydney and a small proportion travelling south west towards Goulburn and Canberra. The Applicant expects the proportion travelling to the south west may increase in the future. A grade separated interchange (see **Figure 6**) would be constructed by the Applicant at the Hume Highway and South Marulan Road intersection, providing direct access from the quarry to the Hume Highway. The proposed interchange provides a bridge over the Hume Highway with north east and south west on and off-ramps linking the new quarry access road, South Marulan Road and Jerrara Road with the Hume Highway. The interchange replaces an at grade intersection.

Construction traffic would use the Portland Road/Wilson Drive route to the site, which passes through industrial land uses. At peak construction the proposal would generate 270 movements a day (135 in/135 out) of which 36 movements are heavy vehicles (18 in/18 out). The traffic assessment concluded the additional traffic volumes would have minimal impact on the local road network and intersections and traffic conditions are satisfactory. The Applicant proposes to upgrade the construction route to improve its condition. The use of Stoney Creek Road for construction access to the northern part of the site would be restricted to 40 movements a day, of which 20 are expected to be heavy vehicles. Once the bridge over the Main Southern railway Line is constructed Stoney Creek Road would be closed. The traffic study considered the use of Stoney Creek Road by construction vehicles would have minimal impacts.

The submission from the property to the north of the quarry (submission 7) objected to the location of the quarry and emplacements areas which would obstruct Stoney Creek Road and the right of way along the western boundary, and deny vehicular access to the land locked property. The Applicant has advised the property currently has a number of legal access points. Lot 214 has access from Stoney Creek Road and Crown roads linking to Carrick Road to the west. Neither of these legal accesses is fully formed. Stoney Creek Road does not currently provide access to the properties and with its closure, legal access to the west is maintained. Lot 215 has frontage to Brayton Road and neither this access nor the Crown road reserve along its southern boundary is affected by the proposal. Council suggests the proposal should make financial contributions towards the cost of maintenance and restoration of damage caused to the main road network by extractive industries, in accordance with the Mulwree Development Contributions Plan. The Department does not consider it appropriate for a contribution to be levied by Council for the use of the Hume Highway which is a State road maintained by the RTA.

Conclusion

The Department is satisfied that the proposal would not result in a significant impact on traffic volumes and movements on the Hume Highway, and from construction traffic on the local roads. The construction of an access road to the Hume Highway and a grade separated interchange with the Hume Highway removes traffic from Marulan and improves the safety of the existing at grade intersection of South Marulan Road, Jerrara Road and the Hume Highway.

To minimise the impacts of construction traffic on Marulan, the Department believes the Applicant should be required to prepare a Construction Traffic Management Plan and undertake dilapidation surveys of public roads used by construction traffic and repair damage caused by construction traffic.

The RTA has advised it is able to grant an approval under the *Roads Act 1993* for the proposed grade separated interchange and has given its general terms of approval for the proposal. The Department of Lands has given its general terms of approval for the closure of Crown roads, use of Crown roads for construction access and Crown roads affected by the highway interchange works.

5.2.6 Flora and fauna

Issue

The proposal involves the clearing of vegetation which has the potential to impact on threatened species, populations or ecological communities and their habitats.

Consideration

The site is currently used for cattle grazing and is located in a region which has been subject to a long history of vegetation clearing for agricultural purposes. A substantial portion of the northern part of the site is covered with woodland with the majority of the remainder of the site being cleared grazing land with scattered patches of remnant vegetation. The site is drained by three main creeks, Marulan Creek runs along the south-eastern boundary and supports riparian woodland vegetation, Joarimin Creek drains most of the property and exits the site in the central northeast and is partially wooded, and Lockyersleigh Creek in the north-western part is partly vegetated with riparian woodland. All three creeks are ephemeral.



Base Source: Readymix Holdings Pty Ltd (Aerial Photo March 2005)

0 100 200 250m

Legend
- - - Project Area

FIGURE 3.17
Proposed Interchange

Figure 6 - Proposed Interchange

Flora

The proposal involves the removal of approximately 103 ha of native vegetation. The impacts of the proposal on each vegetation type is summarised in **Table 12**.

Vegetation Community	Approximate Area Within the Site	Approximate Area to be removed	Area remaining
Tableland Grassy Box – Gum Woodland	75 ha (7%)	43 ha (57%)	32 ha (43%)
Tableland Low Woodland	111 ha (11%)	15 ha (14%)	96 ha (86%)
Western Tablelands Dry Forest	172 ha (17%)	25 ha (20%)	137 ha (80%)
Riparian Gum – Box Apple Woodland	33 ha (3%)	8 ha (24%)	25 ha (76%)
Camden Woollybutt Low Woodland	0.18 (0.02%)	0.18 ha (100%)	0
Miscellaneous Planted Areas	1.8 ha (0.2%)	1.8 ha (100%)	0
Derived Pasture	633 ha (62%)	345 ha (55%)	288 ha (45%)
Total of Woodland and Forest Vegetation	393 ha (100%)	103 ha (26%)	290 ha (74%)

Table 12 – Impact on Vegetation Communities

A comprehensive flora survey was undertaken of the site, which targeted threatened flora species and endangered ecological communities known or with potential to occur in the area. The survey did not locate any threatened flora species on the site. However, the NSW Scientific Committee has made a preliminary determination to list Camden woollybutt as a vulnerable species. An isolated stand of about 0.2 ha of Camden woollybutt was recorded on the site to the south of the Main Southern Railway Line. The Applicant considers the species was probably planted on the site given that it is devoid of other species except for sparse grasses.

Two endangered ecological communities (EEC), the Northern Temperate Grassland of the Southern Tablelands of NSW and the ACT and the White Box Yellow Box Blakely's Red Gum Woodland are known to occur in the region. The survey did not locate any of these communities on the site, although in places the Riparian Gum Box Apple Woodland community visually resembled the Box Gum Woodland.EEC. The Applicant states a detailed examination of the floristic composition did not support such a classification.

The DEC requested further information on endangered ecological communities and believed the vegetation surveys incorrectly categorised the Tablelands Grassy Box Gum Woodland community and the Riparian Gum Box Apple Woodland community. DEC believed the correct categorisation of these communities is White Box Yellow Box Blakely's Red Gum Woodland.

The Applicant does not agree that the vegetation communities on the site have been incorrectly categorised. The vegetation classifications are correct and based on comprehensive flora surveys which included plot based sampling. The Applicant believes DEC's comments rely on regional vegetation mapping undertaken by DIPNR and a brief site inspection, neither of which are reliable systematic survey techniques.

The Applicant's conclusion that the Box Gum Woodland EEC did not occur on the site was based on sound survey methodology undertaken in accordance with recognised survey guidelines including the draft DEC Flora and Fauna Survey Guidelines. EECs cannot be determined through rapid visual assessment but require detailed systematic plot work. The Applicant submits that in most cases groundcovers are the drivers of the vegetation community classification, not canopy species. Canopy species are readily recognised year round, unlike many groundcover species. The survey data has been reanalysed to review those plots in areas that have some visual resemblance to Box Gum Woodland. To determine whether the sites contained the EEC the floristic data was compared to the list of diagnostic species identified on the NSW Scientific Committee's final determination for the EEC. The total number of plants recorded was 207 species of which 154 were native, of which 25 species are listed in the Box Gum Woodland.EEC's final determination. Of the plots with potential Box Gum Woodland vegetation, a total of 105 species were recorded of which 81 are native and of these, 19 species are listed in the Box Gum Woodland EEC. The EEC species recorded comprised 20% of the species listed in the Box Gum Woodland EEC final determination and only comprised about 18% of

the species recorded in these plots. The Applicant states that although some Box Gum Woodland species exist on the site, these constitute only a minor component of the species diversity in these vegetation associations. As the vast majority of the diagnostic species listed in the final determination were absent and that most of the species recorded in the vegetation communities are not listed, the Applicant considers the Box Gum Woodland.EEC is not present. Further, the presence or absence of a listed species is generally not important, rather it is the association of species that is important. In this case the proportion of species listed on the final determination is not substantial enough for the vegetation communities to be categorised as an EEC.

The DEC requested further information on the impacts of the proposal on native grasses as the areas mapped as derived pasture also supported intact native grassland, particularly the rocky outcrops which have escaped intensive pasture modification. The Applicant states that small pockets of native grassland were recorded in rocky areas but these were too small to be mapped separately. The majority of these small pockets of native grasses were in the southern portion of the site which will remain largely unaffected by the proposal. Since the majority of these areas are unaffected, additional ameliorative measures are not necessary.

The DEC considered the proposed offsets and management strategies to be insufficient to reduce the impacts and suggests an improved offsets package is required. The Applicant states the proposed vegetation offsets and management strategies have been designed to exceed the Director-General's requirements for the proposal which encouraged a no net loss principle for vegetation. The key features of the vegetation management and mitigation measures are:

- Clearing of approximately 103 ha of woodland/forest vegetation over 30 years;
- Establishment of a 130 ha Habitat Management Area on the site. The proposed HMA contains approximately 105 ha of woodland/forest vegetation and has development consent for a rural residential subdivision, which if not protected by the Applicant, would be cleared within 5 years;
- Rehabilitation of the Joarimin Creek riparian corridor to the north of the Main Southern Railway Line to create a 30 ha riparian habitat management area. The area presently has about 10 ha of woodland vegetation;
- Establishment of an additional 50 ha of native woodland/forest vegetation through assisted regeneration and/or planting;
- Management of the remaining native vegetation on the site through a Property Management Plan; and
- Linking of the management areas through a habitat corridor.

A further 100 ha of land disturbed by the quarry operations would be rehabilitated to woodland/forest vegetation over the 30 year life of the development. At the end of the quarry life a total of 260 ha of the site would contain woodland/forest vegetation, of which 145 ha comprises revegetation. Therefore there is no net loss with 103 ha of woodland/forest vegetation being removed and 145 ha of revegetation, an overall gain of 42 ha of woodland/forest vegetation.

Fauna

The fauna surveys recorded 111 species of which 5 were threatened species. The threatened species were the squirrel glider, speckled warbler, eastern bent-wing bat, eastern firetail bat and eastern false pipistrelle. The site also contained potential habitat for a number of threatened species which are known to occur in the region. No threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were listed although potential habitat for listed species known to occur in the region was present on the site. Five migratory species listed under the EPBC Act were recorded, the Australian wood duck, Pacific black duck, grey teal, Australian hobby and nankeen kestrel.

The proposal will result in the removal of over 100 ha of native vegetation which would impact on fauna species utilising that habitat. The Applicant does not consider that the impact would be significant from a regional perspective due to the proximity of similar quality adjoining vegetation and the mitigation measures proposed to be implemented. These measures include the establishment of the habitat management area in the northeastern part of the site, erection of nest boxes and implementation of detailed clearing procedures to reduce the impact on native fauna.

The proposal has the potential to contribute to localised fragmentation as the vegetation on the site and local area is generally highly fragmented into pockets of vegetation of varying sizes, features and habitat quality. The proposal is likely to contribute towards the fragmentation of the existing vegetation on the site, however, mitigation measures including the conservation of large areas of

continuous vegetation and revegetation of disturbed areas would increase connectivity through the site to adjoining habitats.

The Applicant undertook 8-part tests for the 5 threatened species recorded on the site, which concluded that a Species Impact Statement was not required as the proposal did not have a significant impact on these species. Assessment of a further 15 species that could potentially use the habitats on the site were undertaken. The assessment concluded the proposal would not significantly impact on these species. Assessments were also undertaken of the migratory species recorded on the site, which concluded the site did not comprise an important habitat for the listed species and the proposal is unlikely to have a significant impact on the migratory species.

The Applicant proposes a range of management strategies to limit impacts on flora and fauna on the site, including:

- Management of noise and dust to minimise impacts on adjoining vegetation communities and fauna;
- Feral animal and noxious weed control;
- Surface water, erosion and sediment control measures to minimise disturbance to adjoining vegetation communities and aquatic systems; and
- Bush fire management.

In addition to these operational measures, the Applicant proposes to salvage and relocate suitable tree hollows and ground fauna into adjacent undisturbed areas and replace tree hollows on a 1:1 basis using salvaged tree hollows and nest boxes.

The DEC requested further information to demonstrate that the proposal would not exert a significant impact on the Squirrel glider and assessment of the impact of the proposal on the pink-tailed worm lizard and glossy black cockatoo. The Applicant does not agree with DEC's assertion that 80-100% of the squirrel gliders habitat would be lost. The fauna survey recorded 4 squirrel gliders in the north western part of the site and possible recordings through hair sample analysis in other parts of the site. The Applicant states that it is generally difficult to distinguish between the hair of the squirrel glider and the sugar glider, and the two are known to co-exist in suitable habitats. Both species were recorded on the site and the hair samples could be from either species.

Based on the survey results the squirrel glider likely uses a large proportion of the Gum Box Apple Woodland vegetation as well as other woodland/forest communities, particularly the Western Tablelands Dry Forest and Tableland Grassy Box-Gum Woodland found on the northern half of the site. The squirrel glider was recorded on the north western part of the site and the sugar glider in the southern area near Marulan Creek. Hair samples from one of these species were found in the southern, central and north eastern parts of the site. The habitats of both species are similar and it is likely that much of the site provided habitat for the squirrel glider. The proposal will remove vegetation in the area where the squirrel glider was recorded but this is not the full extent of its habitat on the site. The Applicant states that in areas such as the Hunter Valley the squirrel glider ranges in the order of 28 to 38 hectares and it is unlikely that the Riparian Gum Box Apple Woodland in which it was recorded would provide sufficient habitat to support 4 individuals. The species is likely to use the majority of the riparian woodland and other woodland/forest habitats on the site and about 300 ha of this habitat is retained, the proposal does not remove 80-100% of the gliders potential habitat. Furthermore the proposal involves the revegetation of about 20 ha of the Riparian Gum Box Apple Woodland community in the Joarimin Creek Riparian Corridor. The Applicant concludes the proposal does not significantly impact on the squirrel glider and a species impact statement is not required.

The Applicant undertook further assessment of the pink-tailed worm lizard and glossy black cockatoo and concluded the proposal does not significantly impact on these species.

Conclusion

The Department is satisfied that the proposal does not have any significant impact on flora and fauna, including threatened species. The Applicant has demonstrated that the vegetation communities on the site do not comprise endangered ecological communities and that the proposed vegetation offset strategies and management measures would not result in a net loss of vegetation. However, the Department recommends, should the Minister approve the development, conditions which require the preparation and implementation of a Rehabilitation and Landscape Management Plan to rehabilitate the site, implement the Habitat and Riparian Management Areas, manage the remnant vegetation and landscape the site to mitigate any visual impacts.

5.2.7 Heritage

Issue

The proposal affects areas of indigenous and non-indigenous heritage significance.

Consideration

The Applicant undertook a comprehensive Aboriginal archaeological and cultural heritage assessment in accordance with DEC guidelines and in consultation with the Pejar Local Aboriginal Land Council and the Gundungurra Tribal Council Aboriginal Corporation. An assessment of historic (non-indigenous) archaeology was undertaken in accordance with the NSW Heritage Manual.

Non-indigenous heritage

The only listed heritage item that is of relevance to the proposal is the State Heritage Register (SHR) listing of the Old Marulan Township. The heritage listing affects part of the southern boundary of the site and specifically the proposed access road and Hume Highway intersection works. The SHR listing applies generally to the subdivision pattern shown in **Figure 7**. Old Marulan Township's State heritage significance relates to its form and function as an early colonial service town and the way of life of its inhabitants.

The SHR area straddles the Hume Highway intersection with South Marulan Road and Jerrara Road. The various road improvement works such as widening and realignment of the former Great South Road, now the Hume Highway, and its duplication in the 1980s have caused disturbances to structures (both surface and sub-surface) remaining in the SHR area. The Applicant states there is potential for evidence of outbuildings such as stables and privies and associated structures such as cisterns for water supply to remain in the subsurface context in the remaining road reserves on either side of the present highway.

The ground surface along the Hume Highway is covered by tree regrowth and/or long grassy vegetation which largely obstruct visibility of any remaining surface features of the Old Marulan Township. Little surface evidence remains in the western side of the Highway, however, the potential for subsurface structures is high. The eastern side contains clear surface evidence of former structures which are largely located on private land outside the project area. The potential impacts on the SHR area are excavations for construction of the interchange along the eastern and western road reserve and movement of machinery, vehicles and personnel.

A survey of the project area was undertaken for the site, which identified 9 non-indigenous sites, of which 4 are located in the SHR area. A Statement of Heritage Impact has been prepared which concluded the impact on heritage values may be mitigated by the archaeological management of any known and/or exposed material evidence. The loss of heritage values will be offset by the potential for archaeological investigation, recording and interpretation resulting in an increased knowledge of the historical occupation and use of the Marulan region. The Statement recommends a number of management measures in relation to management of heritage areas, recording of relics/material to be disturbed/destroyed and interpretation.

The Applicant investigated a number of locations for the proposed Hume Highway interchange with the RTA. However, the South Marulan Road intersection was the RTA's preferred option and that they were unlikely to approve connection to the highway at any of the other locations considered. The construction of the interchange will result in the disturbance of approximately 3.5 ha of the SHR outside of the existing road reserves (see **Figure 7**). This equates to approximately 10% of the SHR area currently unaffected by road reserves, on the western side of the Highway. On the eastern side, all road works are located within the existing road reserve.

Indigenous heritage

A field survey of the project area was undertaken with representatives of the local Aboriginal community, which located 50 previously unrecorded archaeological sites. The sites comprised:

- 29 artefact scatters (with 2 or more artefacts);
- 12 isolated finds;
- 7 scarred trees; and
- 2 stone arrangements.

With the previously recorded sites on the project site (2 artefact scatters and 3 isolated finds), a total of 54 archaeological sites (one of the previously recorded sites was re-recorded) was assessed for

their cultural and archaeological significance. **Table 13** summarises the cultural and archaeological significance of the 14 sites which would be impacted by the proposal. The Applicant undertook the survey work with the Pejar Local Aboriginal Land Council (PLALC) and the Gundungurra Tribal Council Aboriginal Corporation (GTCAC).

Of the 14 sites which would be impacted by the proposal, the Aboriginal community assessed an artefact scatter (MRN27) as having high cultural heritage significance. The Applicant considered the site had moderate archaeological significance and warranted subsurface testing and salvage of any artefacts uncovered.

The Applicant does not consider the scarred tree (MRN31) and the stone arrangement (MRN32) to be archaeological sites but these were recorded as requested by the Aboriginal community. The scarred tree was assessed as having moderate Aboriginal cultural significance and the stone arrangement had low Aboriginal cultural significance.

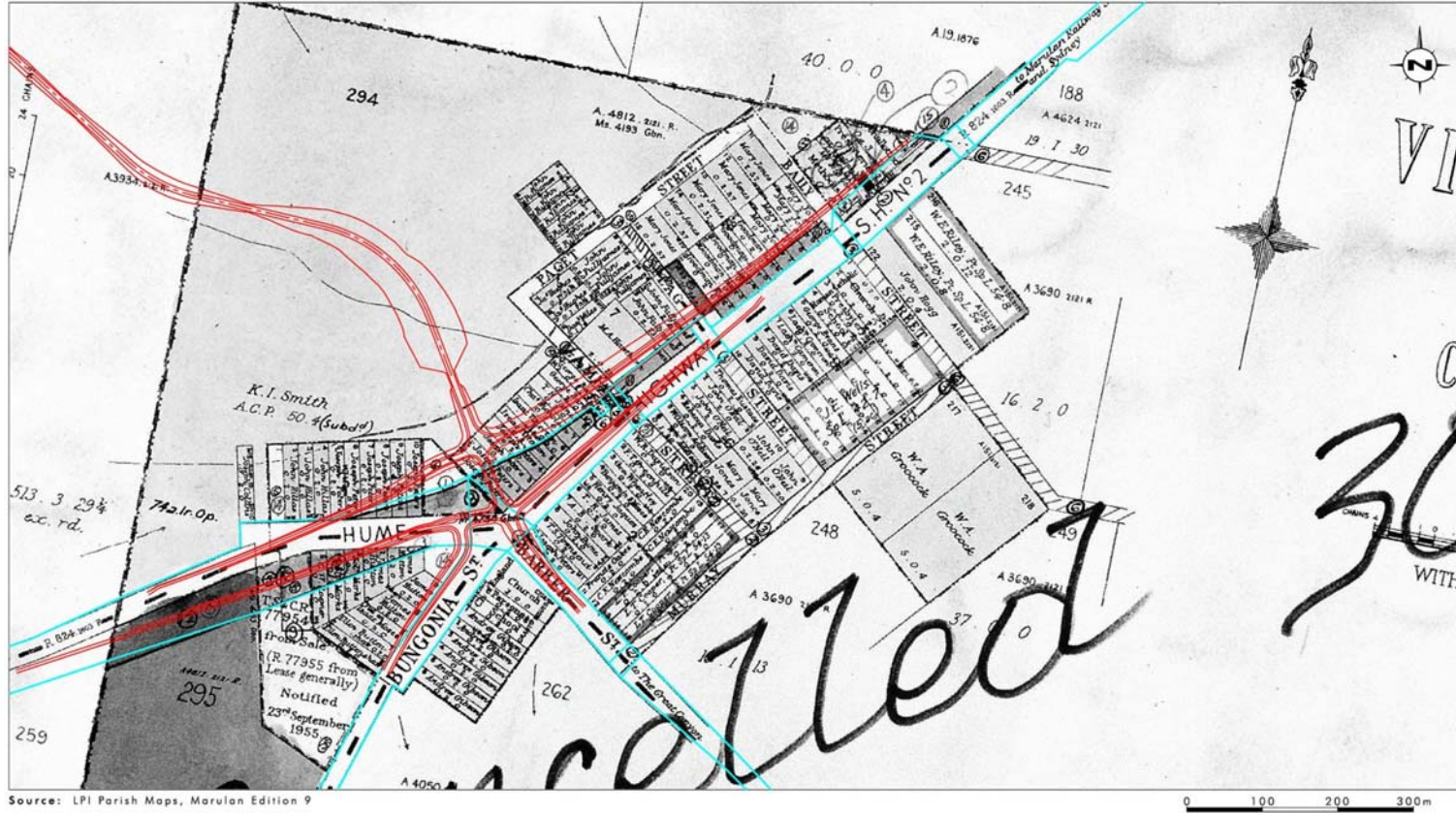
The stone arrangement and scarred tree are located in close proximity to each other and are within the proposed quarry pit. The GTCAC concurs with the recommendation of the archaeological report for removal of the stone arrangement. The PLALC does not agree with the Applicant's recommendation and is of the opinion the stone arrangement should be protected.

The DEC requested further investigation of the stone arrangement and 3 scarred trees to determine whether they are Aboriginal relics or are natural. The Applicant states that 5 archaeologists (3 from the Applicant's consultant and 2 from DEC) are in agreement that the stone arrangement is a natural outcrop of stones and that it is not an Aboriginal stone arrangement. As requested by DEC the Applicant engaged an independent geologist to inspect the stone arrangement who concluded it was a natural weathering product and not of human origin. The Applicant submits the GTCAC considered the stone arrangement had low cultural significance and agreed with its removal. However the views of the PLALC to protect the stone arrangement are unlikely to be changed. It is the Applicant's view that based on the assessments of 5 archaeologists and an independent geologist that the arrangement is a natural feature, and it was recorded at the request of the Aboriginal community, the removal of the site from the Aboriginal sites register is justified.

In relation to the scarred trees the Applicant states only 1 is proposed to be removed. The other 2 trees are retained within the proposed Cultural Heritage Management Area which would be retained as a conservation area. The Applicant considers the scar on MRN31 to be of natural origins and that further assessment is not required. This assessment is based on the DEC's criteria for assessing Aboriginal cultural heritage. The PLALC have advised the site is not a scarred tree and the GTCAC assessed the tree as having low cultural significance and did not object to its removal. The Applicant has proposed to move the tree to the Cultural Heritage Management Area and considers further assessment of the site is not necessary.

The DEC has requested further subsurface assessment of artefact scatters MRN5, 7, 20, 25, 27, 28, 36 and 48 which would be affected by the development. The Applicant advises that site MRN20 is not affected by the proposal and it is proposed to be retained in the proposed Heritage Management Area. The Applicant does not agree with the DEC request for further subsurface assessment as the basis for an application under section 90 of the *National Parks and Wildlife Act 1974* (NPW Act) to destroy an archaeological site. It is submitted that this requirement differs from the position taken by other DEC Directorate's for similar proposals and is not justified by the archaeological testing undertaken and the position of the Aboriginal community. The requirement for subsurface testing is normally based on the potential for increased archaeological knowledge, the presence of potential archaeological deposits and/or at the request of the Aboriginal community.

The archaeological assessment for the proposal concluded subsurface investigation of the artefact scatter sites nominated by the DEC was not warranted due to a number of factors, including prior disturbance levels, large areas of exposure that revealed only very small number of artefacts and/or the skeletal nature of the soils. Only four of the sites listed by the DEC were thought to contain sufficient soil depth to warrant subsurface testing, however, all four sites are disturbed with wombat burrows which provide more information about the subsurface extent of archaeological material than would be expected from an extensive subsurface testing program. Of the four sites, the wombat burrowing indicate that only site MRN27 is likely to have a sufficient number of subsurface artefacts to warrant subsurface testing. The Applicant believes that subsurface testing under section 87 of the



Legend
 — Hume Highway Road Reserve
 — Proposed Interchange

FIGURE 5.28

Existing Hume Highway Road Reserve & Proposed Interchange on 1958 Parish Map

File Name [A4]: R03_V1/1829_277.dgn

Figure 7 – Old Marulan Township Subdivision Pattern

NPW Act is not required as the wombat burrows indicate the general extent of the site and therefore subsurface salvage under section 90 of the NPW Act was proposed. The PLALC and the GTCAC agreed with the archaeological assessment of the artefact sites within the quarry disturbance area and agreed that subsurface salvage of MRN27 and collection of artefacts from the other scatter sites in the disturbance area was an appropriate management option.

Site Name	Site Type	Aboriginal significance	Archaeological significance
MRN5	Artefact scatter	Low	Low
MRN7	Artefact scatter	Low	Low
MRN25	Artefact scatter	Moderate	Low
MRN26	Isolated find	Low	Low to moderate
MRN27	Artefact scatter	High	Moderate
MRN28	Artefact scatter	Moderate	Low to moderate
MRN31	Scarred tree	Moderate	N/A
MRN32	Stone arrangement	Low	N/A
MRN33	Isolated find	Low	Low
MRN35	Isolated find	Low	Low
MRN36	Artefact scatter	Low	Low
MRN37	Isolated find	Low	Low
MRN48	Artefact scatter	Low	Low to moderate
MRN52	Isolated find	Low	Low

Table 13 – Significance of Sites Impacted by the Proposal

The Applicant states that further subsurface testing of the scatter sites in the proposed quarry area is not warranted from an archaeological research potential or Aboriginal cultural heritage significance perspective and is not consistent with other DEC Directorates.

Conclusion

The Department is satisfied that the Applicant has adequately addressed all indigenous and non-indigenous heritage matters. The Applicant proposes to implement measures for archival recording, salvaging and protection of historic sites within the project area. The Department agrees with the Applicant that a comprehensive assessment has been made of Aboriginal sites within the site and the conclusions that the stone arrangement and scarred tree within the proposed quarry are natural rather than of human origins. The Department believes that additional subsurface investigation of the artefact scatter sites in the proposed disturbance area is not warranted and has been justified by the Applicant. The proposed management option of collection of all artefacts within the quarry area and removal of the scarred tree and stone arrangement is justified. The Applicant proposes to establish a Heritage Management Area near the south western portion of the site for the conservation of a number of Aboriginal sites which have archaeological and cultural heritage significance.

The DEC has advised it is able to grant an approval for the proposal under the *National Parks and Wildlife Act 1974* and has provided its general terms of approval. These require the Applicant to undertake subsurface testing of the identified Aboriginal sites and monitoring of ground disturbing works such as topsoil stripping in the unsurveyed areas of the site. The Department believes that the Applicant should be required to prepare and implement a Conservation Management Plan for the Cultural Heritage Management Zone and all Aboriginal objects that would be retained in situ.

The NSW Heritage Council has advised it is able to grant an approval under the *Heritage Act 1977* and has provided its general terms of approval for the proposed interchange works in the Old Marulan Township State Heritage Register (SHR) area. The general terms of approval require the Applicant to undertake a detailed investigation of the archaeological potential of the proposed works in the SHR area, including archaeological testing.

5.2.8 Visual

Issue

The proposal could result in visual impacts to surrounding land uses.

Consideration

The topography of the site consists of vegetated ridges to the north and south with the largely cleared Joarimin Creek valley located in the centre of the site. The valley is bisected by the Main Southern

Railway Line. The hills and ridges to the north screen the site from land to the north. The northern ridge has a spur which runs along the eastern edge of the site providing visual separation between the site and the rural residential and residential areas to the east. The eastern spur continues to the south of the Main Southern Railway Line, although at a lower elevation and provides some visual separation between the site and Marulan township. To the south the low ridge separating the Joarimin Creek and Marulan Creek catchments shields the project area from the Hume Highway. The dominant visual features of the proposal are the eastern, western and railway overburden emplacement areas to the north of the Main Southern Railway Line and the eastern and western excess product emplacement areas on the southern part of the site. The visibility of the quarry infrastructure is likely to be low from most viewing points, with views likely to be possible from a residence to the south and the Main Southern Railway Line. The Hume Highway interchange and quarry access road would be visible from the Hume Highway and residences in the vicinity of the Old Marulan Township.

A visual assessment of the proposal was carried out which concluded that views of the quarry and infrastructure were not available from representative locations to the north and north-east, south and the west. Detailed transect analysis was undertaken of representative locations to the east (Maclura Drive rural residential area and western edge of Marulan to the north and south of the Main Southern Railway Line) and a residence to the south west of the site. The assessment concluded that views from the east were dominated by the proposed emplacement areas to the north and south of the Main Southern Railway Line. Views of the quarry infrastructure and quarry pit were not available from these locations. The Applicant states that these views would be available until vegetation screening of remnant vegetation and/or the emplacements had been revegetated and rehabilitated, which would be from about Year 10-12.

The Applicant states that views across the majority of the quarry and associated infrastructure would be available from an elevated residence to the south west. The provision of vegetation screening and rehabilitation of the emplacement areas would provide some visual relief in Year 15 and Year 30, however, they would not be completely screened. The Applicant states the only possible visual mitigation to limit these views is treatment at the viewing location and the immediate foreground, however, the existing topography prevents effective on-site measures.

In order to limit the visual impacts of the proposal, the Applicant proposes:

- Planting of native vegetation between the eastern overburden emplacement area and the eastern boundary of the site to assist in the screening on the emplacement area;
- Cladding of buildings in natural toned colours;
- Timely rehabilitation of disturbed areas to minimise visual impacts; and
- Design and location of lighting to prevent direct light emission from the site.

Three submissions commented on the visual impacts of the proposal. The submission from Tailored Property noted that the natural topography of the site surrounding the eastern overburden emplacement area is unlikely to have any long term visual impacts, however, requested that the southern slopes of the emplacement be appropriately contoured and revegetated and that new vegetation be maintained for a sufficient period after planting. The submission from Locykersleigh requested consideration of visual and lighting impacts on the property to the west of the quarry buffer area. The submission from Medway requested the presentation of a video drive through of the visual impacts from the Hume Highway. The visual assessment of the proposal found the only views from the Hume Highway are of the interchange and quarry access road. Views of the site from the Lockyersleigh homestead are screened by a north-south ridge to the west of the site. The visual assessment found that views from the east are largely screened by the existing topography with views available through the remnant vegetation. The Applicant proposes the timely revegetation and rehabilitation of the eastern emplacement area and ongoing monitoring of the rehabilitated areas.

Conclusion

The Department is satisfied that the operation of the proposal is unlikely to result in a significant impact on the visual amenity of the area. However, the Department believes the Applicant should be required to minimise visual and lighting impacts of the proposal and ensure the ongoing monitoring and maintenance of the revegetation and rehabilitation of the disturbed and emplacement areas.

5.3 Suitability of the Site

The Department is satisfied the site is suitable for the proposed development. The site adjoins major transport corridors, the Hume Highway for distribution of product by road, and the Main Southern Railway Line for distribution of product by rail to the Sydney market. The Applicant has identified a significant hard rock resource on the site which is economically viable and is not constrained by surrounding land uses.

The development is likely to result in the loss of use of part of the site for grazing purposes and a minor reduction in flows of the Joarimin and Lockyersleigh Creeks. The Applicant states that environmental flows would be sufficient to ensure that a similar volume of water is stored in the chain of ponds within the creek systems during periods of low rainfall.

The development will result in the removal of approximately 103 ha of existing woodland/forest vegetation. However, the Applicant proposes implement a conservation and revegetation program to replace vegetation cleared for the proposal and enhance existing remnant vegetation in the Joarimin Creek riparian corridor, Habitat Management Area on the north eastern part of the site and create vegetation corridors linking pockets of remnant vegetation with the management areas.

The Department has concluded, following its assessment of the proposal, that the construction and operation of the quarry can be managed so that it would not have a significant adverse impact on the surrounding residents and environment.

5.4 Submissions on the Proposal and the Public Interest

During the exhibition period the Department received 13 submissions on the proposal, of which 2 were objections and 11 supported the proposal conditionally or unconditionally. No public authorities objected to the proposal.

The Department's consideration of the issues raised in the submissions is contained in section 5.2 of this report. The issues raised by the two submissions which made an objection have been satisfactorily addressed by the Applicant and there is unlikely to be any significant adverse impact on the properties.

The Department believes that approval of the proposal is in the public interest as:

- The proposal can be constructed and operated in accordance with acceptable environmental criteria;
- The socio-economic benefits of the proposal, including the generation of 115 full time positions and a capital investment in the quarry and associated infrastructure, and Hume Highway interchange of \$195 million; and
- The need to ensure the ongoing supply of construction materials, following the closure of the Penrith lakes Scheme, to the Sydney and regional construction markets.

6. RECOMMENDED CONDITIONS OF CONSENT

The Department has recommended conditions of consent for the proposal and the Applicant has agreed to the proposed conditions. A summary of the recommended conditions of consent is provided in **Appendix B**. The conditions are required to:

- Prevent, minimize and offset adverse environmental impacts;
- Set standards and performance measures for acceptable environmental performance; and
- Provide for regular monitoring and reporting and ongoing management of the development.

The recommended conditions include the general terms of approval of the integrated development agencies (DEC, Department of Lands, Department of Natural Resources, NSW Heritage Council, and RTA).

7. CONCLUSION

The Department has assessed the DA, the EIS, additional information provided by the Applicant and the submission received on the proposal from public authorities and the general public and is satisfied that the impacts of the construction and operation of the development can be managed and/or mitigated to ensure an acceptable level of environmental performance.

The Applicant has demonstrated that the proposal can be constructed and operated to comply with relevant environmental standards and criteria. The proposal has been designed to minimise its environmental impacts with the retention (and creation) of buffer areas between the quarry and surrounding land uses to reduce potential land use conflicts.

The proposal provides social and economic benefits to the region by ensuring a long term and economically viable supply of construction materials for the Sydney and regional construction markets following the closure of the Penrith Lakes Scheme in 2010. The proposal involves a significant capital investment for the region and permanent employment for 115 people.

The site is suitable for the proposal, as it adjoins existing transport corridors (the Hume Highway and Main Southern Railway Line), utility services and Marulan township. The proposal is likely to have social benefits for the local community and is supported by the existing community.

The Department concludes the significant benefits of the proposal outweigh its potential costs, and consequently believes it is in the public interest and recommends that the proposal should be approved.

8. RECOMMENDATION

It is RECOMMENDED that the Minister:

- Consider the findings and recommendations of this report; and
- Approve the DA (DA-128-5-2005) submitted by Readymix Holdings Pty Ltd for the proposed Lynwood Quarry, subject to conditions under Section 80 of the *Environmental Planning and Assessment Act 1979*.

Endorsed:

David Kitto
A/Director
Major Development Assessment

Chris Wilson
A/Executive Director

APPENDIX A

CONSIDERATION UNDER SECTION 79C

Section 79C of the *Environmental Planning and Assessment Act 1979* requires that the consent authority, when determining a development application, takes into consideration the following matters:

(a) *The provisions of:*

(i) *any environmental planning instrument;*

In relation to the proposed development, the following environmental planning instruments apply.

State Environmental Planning Policy No. 11 – Traffic Generating Development

State Environmental Planning Policy No. 11 – Traffic Generating Development (SEPP 11) applies to the proposal as 'extractive industry or mining' (Schedule 1(m)). The proposal was referred to the Roads and Traffic Authority, who subsequently confirmed that they had no objection to the proposal and gave their general terms of approval for the proposed Hume Highway interchange and quarry access road under section 138 of the *Roads Act 1993*.

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

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) applies to any proposed development that has the potential to create an off-site risk or offence to people, property or the environment.

The Applicant states that the proposal would store, at any one time, on the site various quantities of dangerous goods, including bottled gases (such as acetylene, LPG and argon), flammable liquids (diesel and engine oils), and corrosive substances (paints and primers). The dangerous goods are stored in bunded storage facilities or in workshops which are located between 350 to 450 m from the site boundary. The closest residence to the site is approximately 1.6 km to the south. Based on the Department's risk screening procedures the Applicant has concluded the proposal is not a potentially hazardous industry and SEPP 33 does not apply.

A development is classified as potentially offensive development if in the absence of safeguards the proposal would emit a polluting discharge which would cause a significant level of offence. The Applicant has concluded that as the proposal requires an Environment Protection Licence under the *Protection of the Environment Operations Act 1997* and its assessment that potential pollution discharges comply with relevant DEC Guidelines, it is not a potentially offensive development and SEPP 33 does not apply.

The Department is satisfied the proposal is not a potentially hazardous or potentially offensive development, and the DEC has advised that it is able to issue its general terms of approval under the *Protection of the Environment Operations Act 1997*, that SEPP 33 does not apply to the proposal.

State Environmental Planning Policy No. 44 - Koala Habitat Protection

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) applies to development applications 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 Applicant undertook an assessment of whether the site contained potential koala habitat. The ecological assessment did not identify any species of koala feed trees and concluded the site did not contain potential koala habitat and SEPP 44 did not apply.

State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) introduces state-wide planning controls for the remediation of contaminated land. The Policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed.

The Applicant states there are no known areas of contaminated land on the site with the previous uses limited to agricultural purposes. The land does not require any site remediation, therefore SEPP 55 does not apply to the proposed development.

State Environmental Planning Policy No. 58 – Protecting Sydney’s Water Supply

State Environmental Planning Policy No. 58 – Protecting Sydney’s Water Supply (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 creeks on the site drain into the Wollondilly River and Shoalhaven River catchments, which supplies Sydney’s drinking water. The Applicant has undertaken an assessment under clause 10 of SEPP 58, and concluded:

Head of Consideration	Impact Assessment
a) - whether the development or activity will have a neutral or beneficial effect on the water quality of rivers, streams or groundwater in the hydrological catchment, including during periods of wet weather,	All surface runoff from disturbed areas would be captured and treated in the sediment control dams, which would ensure water overflows are of an acceptable quality. The proposed water management system treats all water that is discharged to ensure downstream water quality is maintained. A Property Management Plan would be developed to rehabilitate parts of the site which have significant erosion to reduce sediment levels and improve downstream water quality.
b) - whether the water quality management practices proposed to be carried out as part of the development or activity are sustainable over the long term,	The proposed water management system would control and treat all water runoff from the disturbed areas. Soil and erosion control measures have been designed in accordance with the Department of Housing's Guidelines. The water quality modelling indicated the proposal will result in an overall improvement of water quality at the site boundary and the proposal will not have a long term adverse impact on Sydney's drinking water catchment area.
c) - whether the development or activity is compatible with relevant environmental objectives and water quality standards for the hydrological catchment when these objectives and standards are established by the Government.	The proposal is compatible with the Warragamba Catchment Blueprint; Southern Catchment Blueprint; Hawkesbury Nepean and Shoalhaven Statements of Joint Intent; and State Water Planning Outcomes.

The Sydney Catchment Authority has advised they are satisfied the proposal can be designed, constructed and operated to contain its water quality impacts on site and that the matters for consideration in clause 10 of SEPP 58 have been satisfactorily addressed by the Applicant.

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.

Mulwaree Local Environmental Plan 1995

The majority of the site is zoned 1(a) General Rural under the *Mulwaree Local Environmental Plan 1995* (LEP). Approximately half the site to the north of the Main Southern Railway Line is zoned 1(c) Rural Small Holdings. Part of the site to the south of the Main Southern Railway Line is zoned 1(b) Rural-Urban Investigation.

The proposal is permissible with consent in the 1(a) zone but prohibited in the 1(b) and 1(c) zones. Under section 76A (8)(c) of the EP&A Act part of development that is State significant development, is permissible with consent. In this case the proposal in the 1(a) zone is State significant development under clauses 7(1(a) and (b) of Schedule 1 of *State Environmental Planning Policy (State Significant Development) 2005*, therefore the components of the proposal in the 1(b) and 1(c) zones is part of State significant development and is permissible with consent.

Prior to the formation of the Goulburn Mulwaree Council, the former Mulwaree Shire Council had adopted a Settlement Strategy for the Shire. The Strategy has been endorsed by the Goulburn Mulwaree Council and Council is currently undertaking a broad planning study in order to refine the Settlement Strategy and Local Environmental Plans for the whole local government area.

The Mulwaree Settlement Strategy recognised the importance of the hard rock resource and under the Greater Marulan Structure Plan the majority of the Applicant's land holdings were proposed to be zoned 1(e) Rural Employment (see Figure 1). The proposed 1(e) zone includes the portion of the site zoned 1(b) and part of the 1(c) land within the site. The balance of the 1(c) zoned land on the site (the north eastern portion) retains the Rural Small Holdings zoning under the Greater Marulan Structure Plan.

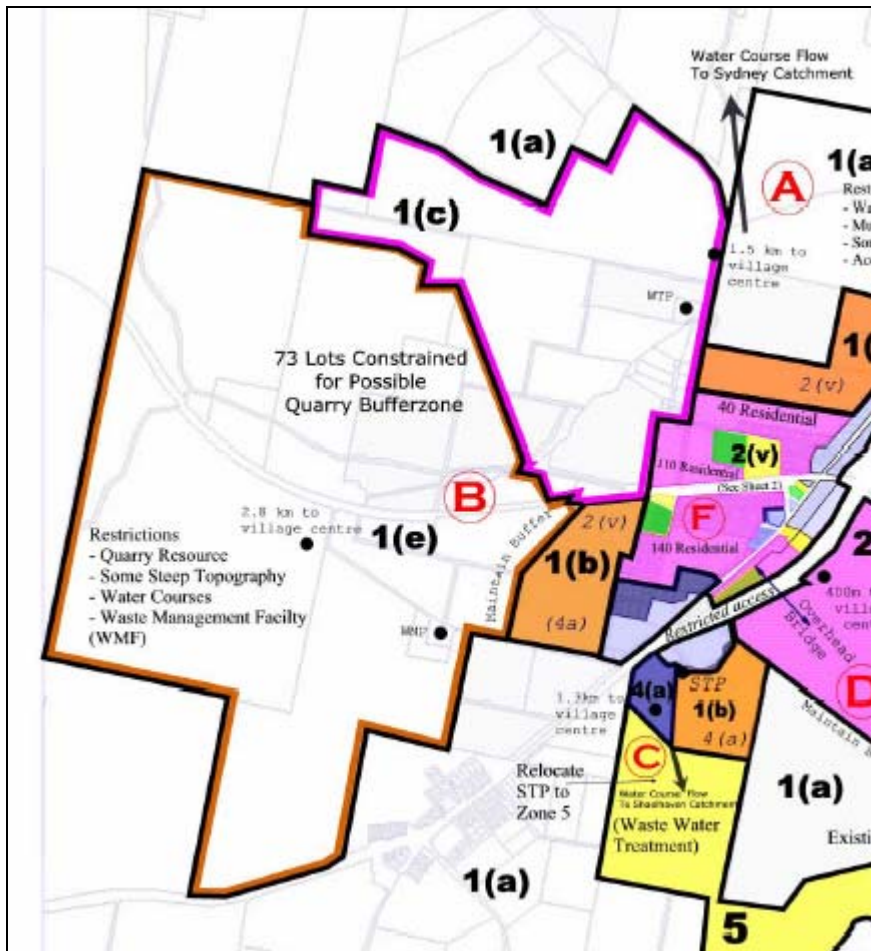


Figure 1 – Extract from Greater Marulan Structure Plan

The proposal is considered to be consistent with the Mulwaree Settlement Strategy, which aims to protect the resource by providing an appropriate zoning and buffer area to the resource to protect it from potential future land use conflicts.

The Council noted the proposal includes land zoned 1(c) which forms part of the quarry buffer area to nearby rural residential development and Marulan is greater than the buffer identified in the Greater Marulan Structure Plan. This loss of rural residential development potential may place additional pressures on other areas of Marulan for expansion. The Council advised the Tailored Property site is within the proposed quarry buffer area, for which a residential zoning has been sought. The Council notes the western portion of the Tailored Property site would likely be used for compatible land uses such as employment/industrial with the residential area closer to Marulan. The proposal locates the quarry pit in the north western part of the site which is the furthest point from residential uses.

The objectives of the 1(a) General Rural zone is:

The objectives of this zone are to promote the proper management and utilisation of resources by:

(a) promoting, enhancing and conserving:

(i) agricultural land, particularly prime crop and pasture land, in a manner which sustains its efficient and effective agricultural production potential,

(ii) soil stability by controlling and locating development in accordance with soil

capability, as identified by the Department of Conservation and Land Management,

(iii) forests of existing and potential commercial value for timber production,

(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,

(v) trees and other vegetation in sensitive areas and in any place where the conservation of the vegetation is significant to the protection of scenic amenity or natural wildlife habitat or is likely to control or contribute to the control of land degradation,

(vi) water resources and water catchment areas for use in the public interest,

(vii) localities of significance for nature conservation, including localities with rare plants, wetlands, permanent watercourses and significant wildlife habitat, and

(viii) places and buildings of archaeological or heritage significance, including aboriginal relics and places,

(b) minimising the costs to the community of:

(i) fragmented and isolated development of rural land, and

(ii) providing, extending and maintaining public amenities and services, and

(c) providing land for future urban development, for rural residential development and for development for other non-agricultural purposes, in accordance with the need for that development, and subject to the capability of the land and its importance in terms of the other objectives of this zone.

The quarry pit western and railway emplacement areas, quarry infrastructure, excess product emplacement areas and access road are located within this zone. The proposal meets the objectives of the zone by promoting the use of a valuable hard rock resource while managing the impacts on the ecology, water resources, areas of archaeological and heritage significance and surrounding agricultural land uses.

The objectives of the 1(b) Rural-Urban Investigation zone are:

(a) to identify land surrounding the City of Goulburn, and surrounding other land within the Mulwaree area that is within the Village Zone, which may be required to accommodate the future urban growth of the City and villages,

(b) to permit interim development of the land within this zone for purposes that will not compromise their possible future use for urban and related development and which will maintain the existing character of the locality,

(c) to set aside land uncommitted to other uses for the determination of its long term use in the light of future circumstances and demand, including demand for adequate areas of land for industrial and residential purposes,

(d) to permit detailed investigation of the suitability of the land for a variety of urban purposes consistent with general and particular future requirements,

(e) to restrict development of the land for any purpose which may prejudice the eventual future use of the land for urban purposes,

(f) to ensure that development conserves, enhances and does not adversely affect the physical characteristics, environmental qualities and scenic attributes of perimeter urban lands, and

(g) to ensure that development does not create an unreasonable or uneconomic demand for the provision or extension of public amenities or services.

The only components of the proposal in the 1(b) zone is part of the quarry access road in the south western corner of the zone and the Joarimin Creek Riparian Management Zone and the Habitat Corridor where the existing remnant vegetation is proposed to be enhanced by additional planting, otherwise the land remains as agricultural land within the site. Council proposes to change the zoning to 1(e) Rural Employment in accordance with the Greater Marulan Structure Plan to protect the hard rock resource and limit potential future land use conflicts.

The objectives of the 1(c) Rural Small Holdings zone are:

(a) to promote the development of land identified as suitable for rural residential or hobby farm development,

(b) to permit home industries which are compatible with the environmental capabilities of the land and which will not adversely affect the quality of water resources in the vicinity, and

(c) to preserve and enhance the amenity of the rural residential and hobby farm area by ensuring that development is carried out in a sympathetic manner.

The eastern emplacement area, eastern rim of the quarry pit and Habitat Management Area are located in the 1(c) zoned land. Under the Greater Marulan Structure Plan the emplacement area and part of the quarry pit is proposed to be zoned 1(e) while the north eastern part of the site containing the proposed Habitat Management Area would retain the 1(c) zoning.

The Department is satisfied the proposal is consistent with the *Mulwaree Local Environmental Plan 1995* and the *Mulwaree Settlement Strategy* in terms of protecting a regionally significant hard rock resource and ensuring that future land use conflicts are minimised.

- (ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority;

Draft Drinking Water Catchments Regional Environmental Plan No. 1 – Sustaining the Catchments

The draft *Drinking Water Catchments Regional Environmental Plan No. 1 – Sustaining the Catchments* applies to the proposal and requires development within the drinking water catchment to demonstrate a neutral or beneficial effect on water quality.

The Applicant has demonstrated that the proposal contains the water quality impacts on the site with the treatment of all water runoff to the sediment control dams. Water quality monitoring at downstream locations is proposed to ensure that downstream water quality is not impacted by the proposal. The Applicant considers that the employment of water quality management and mitigation measures ensures an offset strategy is not required.

The SCA is satisfied the proposal is consistent with the draft REP. The Department believes the proposal has a neutral and/or beneficial impact on water quality in the catchments of the Shoalhaven and Wollondilly Rivers and therefore minimal impact on the quality of Sydney's drinking water supplies.

(iii) *any development control plan;*

Mulwarae Section 94 Development Contributions Plan

The Mulwarae Section 94 Development Contributions Plan requires extractive industries to contribute towards the maintenance of roads to cover the increased level of road deterioration.

A new access road to the Hume Highway would be used by all quarry trucks (and other vehicles generated by the proposal) during the operation of the development. No Council roads will be required for the road transport of quarry products. The Applicant submits that a contribution under the Section 94 Contributions Plan is not necessary.

The Applicant proposes to upgrade and repair damage to the construction access routes in consultation with Council.

The Department believes that as there is no nexus between the proposed road transport and extractive materials direct to the Hume Highway and the maintenance of local roads the payment of a levy in accordance with Council's Section 94 Contributions Plan is not warranted.

(iv) *any matters prescribed by the regulations that apply to the land to which the development application relates;*

Clause 92 of the *Environmental Planning and Assessment Regulation 2000* requires the following matters to be taken into consideration by a consent authority in determining an application:

- *The Government Coastal Policy (where relevant);*

N/A.

- *In the case of a DA for the demolition of a building, the provisions of Australian Standard AS 2601-1991: The demolition of structures, as in force 1 July 1993;*

The recommended conditions of consent require demolition to be carried out in accordance with AS 2601 – 1991.

APPENDIX B

SUMMARY OF RECOMMENDED CONDITIONS OF CONSENT

The Department has recommended a number of conditions of consent, including requirements to:

- Limit the approval to 32 years and a production and transportation limit of 5 million tonnes a year.
- Permit a maximum of 5 million tonnes a year by rail and 1.5 million tonnes a year by road;
- Comply with strict criteria and develop and implement monitoring programs for noise, air, water and blasting/vibration;
- Develop and implement a Management Plans to manage and mitigate construction traffic and undertake a Dilapidation Survey of the public roads used by the construction traffic;
- Develop and implement a Water Management Plan for the development, which includes a Water Balance, Erosion and Sediment Control Plan, and Surface and Ground Water Monitoring Programs;
- Develop and implement a Rehabilitation and Landscaping Management Plan which includes a Riparian Area Management Plans, and details measures to rehabilitate the site, implement the Habitat Management Areas, manage the remnant vegetation and habitat, and landscape the site to mitigate any visual impacts;
- The lodgement of a substantial rehabilitation bond;
- Establish and maintain a comprehensive Environmental Management Strategy for the development, prepare detailed Annual Environmental Management reports and commission regular independent audits of the quarry operations;
- Undertake periodic reviews of the Management Plans and Environmental Management Strategy; and
- Establish and maintain a Community Consultative Committee for consultation throughout the life of the quarry.