

Submissions Report for the **Karuah South Quarry**

State Significant Development 17_8795



Prepared by:

R.W. CORKERY & CO. PTY. LIMITED

October 2019

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Submissions Report

for the

Karuah South Quarry

State Significant Development 17_8795

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1. INTRODUCTION

1.1 SCOPE

This *Submissions Report* has been compiled to provide a response to the key issues raised in submissions lodged with the Department of Planning and Environment (DPE) during the exhibition period for the *Environmental Impact Statement* (EIS) for the Karuah South Quarry (the Project) proposed by Wedgerock Pty Ltd (the Applicant). The EIS and supporting *Specialist Consultant Studies Compendium* (SCSC) were exhibited by the DPE from 24 April 2019 to 21 May 2019. During that period, 61 submissions were received by DPE from the public, community organisations and government agencies.

The Applicant notes that, as more than 25 submissions by way of objections were received by the DPE during the public exhibition of the EIS, the development application will be determined by the Independent Planning Commission, acting under the delegation of the Minister. DPE will prepare an assessment report and provide recommended conditions of consent to assist with this process. The Applicant is confident that the issues raised in the various submissions have been addressed satisfactorily and that the concerns and objections raised in the submissions have been appropriately identified and addressed.

This document has been finalised following the presentation of an overview of the key responses to a Community Information Session on 11 September 2019 (see Section 3.3.1). As such, minor amendments have been included in this document that reflect the discussions at that session.

The Applicant considers that this *Submissions Report*, when reviewed with the EIS and supporting documents, provides sufficient information for the Independent Planning Commission to determine the development application.

1.2 DOCUMENT FORMAT

Preparation of this *Submissions Report* has involved contributions from a multi-disciplinary team including many of the specialist consultants who were involved in the original assessments for the EIS. Supplementary assessments and/or more detailed information has been incorporated into this review to address the issues raised in the various submissions.

This document has been compiled in five sections with seven appendices.

- Section 1: introduces the scope and format of this document and the assessment process to date.
- Section 2: presents an analysis of submissions categorised according to the issues raised.
- Section 3: provides a summary of the actions undertaken since the exhibition period to address the issues raised in submissions.
- Section 4: provides a detailed summary of the Applicant's response to the issues raised in submissions.
- Section 5: presents an evaluation of the merits of the Project, drawing upon the relevant responses to the issues raised in submissions.

A set of appendices is attached to this document including supplementary assessments prepared to support the *Submissions Report*.

Appendix A Submissions Summary

Appendix B Register of Submitters

Appendix C Community Information Session – Public Notice, Flyer and Presentation Slides

Appendix D Correspondence with NSW Farmers Association: Oyster Committee and Port Stephens Shellfish Program

Appendix E Relevant extracts from the Updated Biodiversity Development Assessment Report

Appendix F Blasting Fly-rock Control Assessment

Appendix G Relevant extracts from the Updated Aboriginal Cultural Heritage Assessment & Updated Archaeological Report

2. ANALYSIS OF SUBMISSIONS

2.1 BREAKDOWN OF SUBMISSIONS

During the exhibition period, 61 submissions were received by the DPE from the public, community organisations and government agencies and included the following.

- 41 submissions from individuals objecting to the Project.
- 11 submissions from organisations objecting to the Project.
- 9 submissions from public authorities providing comment.

A comprehensive Submissions Summary is presented in **Appendix A** with the Register of Submitters presented as **Appendix B**. **Table 2.1** presents a summary of the locations of the individuals who made a submission in relation to the Project. In summary, approximately 39% (16) of the individual submissions originated from people residing within the local area¹ with approximately 39% (16) and 22% (9) of the individual submissions received from people residing with the region and broader community, respectively. It is noted that whilst no form letters were received, several submissions included similar text and/or did not relate to specific Project-related issues. Rather, they relate to administrative issues such as the DPE's website.

Table 2.1
Summary of Locations of Individual Submitters

Location	Object	Comment	Support
Local (<5km from the Site)			
Karuah	14	-	-
North Arm Cove	2	-	-
Regional (5km to 100km from the Site)			
Soldiers Point	5	-	-
Raymond Terrace	3	-	-
Limeburners Creek	3	-	-
Booral	2	-	-
Bulga	1	-	-
Corlette	1	-	-
The Branch	1	-	-
Broader Community (>100km from the Site)			
Wahroonga	2	-	-
Charlotte Bay	1	-	-
Elizabeth Beach	1	-	-
Oatley	1	-	-
Old Bar	1	-	-
Possum Brush	1	-	-
St Ives	1	-	-
Wingham	1	-	-
Total	41	-	-

It is noted that one community group from within the local area provided a submission regarding the Project with all other community groups based >5km from the Site.

¹ For the purposes of this report the local area refers to persons residing within 5km of the Site

2.2 CATEGORISATION OF ISSUES

For the purposes of the *Submissions Report*, the topics raised in submissions have been grouped in the following categories.

- The Project (e.g. matters relating to the Site, Project timing, etc).
- Procedural Matters (e.g. level or quality of engagement, compliance with SEARs, etc).
- Environmental, Social and Economic Impacts (e.g. matters relating to amenity, air quality, biodiversity, heritage, etc.).
- Out of Scope (e.g. broader policy issues beyond the scope of the Project).

All topics raised in submissions are comprehensively addressed in Section 4 of this document.

Figure 2.1 displays the frequency of environmental, economic and social topics raised in the submissions by individuals, groups and public authorities. Surface water quality was the issue most frequently identified in submissions with impacts to flora, fauna, air quality and noise also frequently raised. Concerns regarding noise generated by the Project included both operational and road traffic noise. It is noted that there were no individual or community group submissions received in support of the Project.

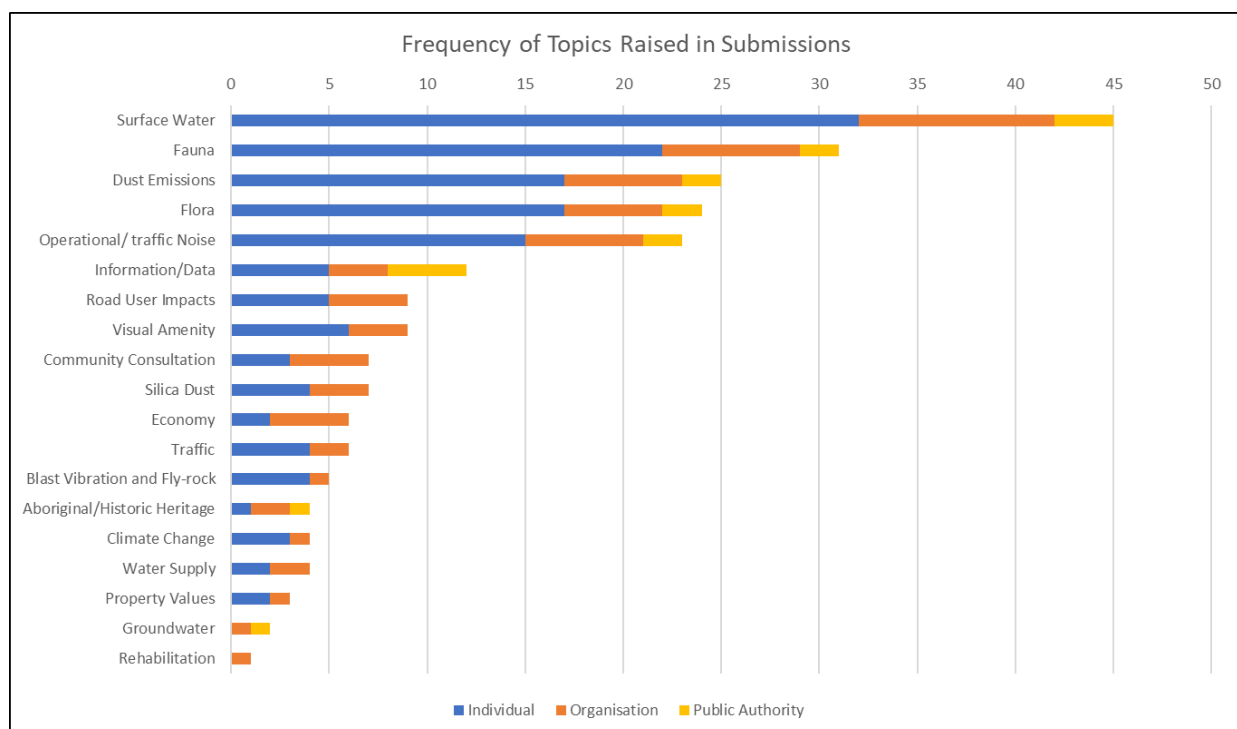


Figure 2.1 Frequency of Topics Raised in Submissions

3. ACTIONS TAKEN SINCE PUBLIC EXHIBITION

3.1 INTRODUCTION

The submissions received from individuals, community organisations and government agencies by the DPE during the public exhibition period and provided to the Applicant for response prompted a review of some components of the Project. As a result of this review, a minor amendment was made to a component of the Project to address the concerns raised. The following subsections provide a description of the one amendment made to the Project, a summary of additional community and stakeholder engagement undertaken by the Applicant and a summary of the supplementary assessments commissioned by the Applicant in relation to surface water, ecology air quality, noise, fly-rock management and Aboriginal cultural and historic heritage.

3.2 AMENDMENTS TO THE PROJECT

The key amendment to the Project since the completion of the EIS (RWC, 2019a) has involved a commitment by the Applicant to construct an enclosure above and on three sides around the key items of processing equipment of the mobile processing plant following the commissioning of the processing plant to mitigate air quality impacts on surrounding sensitive receptors. The Applicant proposes that the enclosure would be similar to that displayed in **Plate 3.1** with adjustments to accommodate conveyors. The implications of the construction of the enclosure above and around the mobile processing plant on dust dispersion modelling are provided in Section 4.3.3.



Plate 3.1 Indicative Mobile Processing Plant Enclosure

3.3 COMMUNITY AND STAKEHOLDER ENGAGEMENT

3.3.1 Community Consultation

RWC continued to undertake community consultation for the Project on behalf of the Applicant following the exhibition period. A Community Information Session was held on 11 September 2019 at the Karuah Community Hall between 6:00pm and 7:30pm, principally to provide an overview of the responses to the key issues raised in submissions prior to the lodgement of the Submissions Report.

A flyer was distributed to the residents of Karuah, North Arm Cove, Carrington and The Branch during the week commencing 26 August 2019 inviting community members to attend the session. This flyer (**Appendix C**) was also distributed to community members living beyond these localities where an address and/or email address was available (i.e. submitters and community members who had registered for Project updates). Furthermore, an advertisement was placed in the *Port Stephens Examiner* and *Myall Coast News of the Area* newspapers on 5 September 2019 notifying the broader community of the meeting (**Appendix C**).

The Community Information Session was attended by a total of eight community members three of which were representatives of Hunter Quarries. At the session, a presentation was made highlighting the key amendment made to the Project and the modifications to the assessments since the exhibition period and the results of supplementary assessments that were undertaken to address matters raised in submissions (**Appendix C**). Questions raised by community members were also answered at the meeting. The discussion at the session enabled the draft text within the Submissions Report to be slightly modified to more clearly explain the information assembled in some responses. **Table 3.1** presents a summary of the principal matters raised by community members at the Community Information Session and where each issue is addressed in this report.

Table 3.1
Coverage of Key Matters Raised at the Community Information Session
in the Submissions Report

Matter / Issue	Relevant Section(s)
Orientation of the mobile processing plant enclosure and potential impacts on dust dispersion modelling results.	4.3.3
Noise generated by trucks / loading of trucks after 5:00am and potential impacts on surrounding residents.	4.3.4.1 & 4.3.4.2
Noise generated by processing and the mitigating effects of the processing plant enclosure.	4.3.4.2
Sediment-laden runoff from the extraction area and quarry infrastructure area.	4.3.1
Pollutants in surface water runoff e.g. nitrates, flocculants	4.3.1.1 & 4.3.1.2
Design capacity of sediment basins and potential discharge during extreme weather events.	4.3.1 & 4.3.1.3
EPBC Act referral for potential impacts to Koala habitat.	4.3.2.9

3.3.2 Oyster Committee and Port Stephens Shellfish Program

RWC consulted with the NSW Farmers Association: Oyster Committee and the Port Stephens Shellfish Program following the public exhibition of the EIS to identify potential issues of concern to the local oyster industry. Based on discussions with representatives from these organisations held at Karuah on 1 August 2019, two key areas of concern were identified.

1. Disappointment that no approach was made by either the Applicant or NSW government agencies regarding to the Project, despite the potential implications to the oyster industry as the result of upstream land use changes.
2. The potential for sediment-laden discharges from the Site to impact on water quality at Port Stephens and the subsequent implications on the oyster industry.

During the discussions with the representatives of the organisations, RWC was able to explain the mitigation measures that would be adopted. It was also learnt that key issues affecting water quality in the various oyster leases were sewerage discharge, septic tank overflows, contaminated sediments and stormwater runoff. The RWC representative was able to assure the representatives that the Karuah South Quarry would not pose a risk to water quality from the Site as a result of sediment in stormwater runoff being generated on a contaminated catchment. In addition, it was identified that the Quarry would utilise a pump-out system for the management of human waste and would ensure that this system was properly maintained and operated.

In subsequent correspondence, dated 16 August 2019 (**Appendix D**), RWC provided a formal response to the concerns raised by the Committee and the Port Stephens Shellfish Program including a detailed analysis of the mitigation measures that would be implemented by the Quarry Operator to manage the risk of sediment-laden runoff.

A written response from the Chair of the NSW Farmers Association: Oyster Committee (Mr Dean Cole) was received on 24 September 2019 which acknowledged that all members of the Committee were satisfied with the outcomes of the consultation undertaken by RWC in relation to the proposed Karuah South Quarry. A copy of this correspondence is included in **Appendix D**. The Applicant will continue to engage with the Committee, as required, including in the event of any discharge from the Site.

3.3.3 Hunter Quarries

As discussed in Section 1.5.2 of the EIS, two existing quarry operations are located adjacent to the Site, namely:

- Karuah Quarry – operated by Hunter Quarries Pty Ltd (Hunter Quarries); and
- Karuah East Quarry – operated by Karuah East Quarry Pty Ltd (a fully-owned subsidiary of Hunter Quarries).

The Karuah Quarry operations are presently conducted on the central section of Lot 11 DP 1024564 by Hunter Quarries under a licence agreement with Mr Kiely, the Managing Director of Wedgerock Pty Ltd, and sections of Lot 21 DP 1024564 owned by Hunter Quarries. Due to the overlap between the Stage 2 Extraction Area and Karuah Quarry's approved limit of extraction, the Applicant has continued to engage with Hunter Quarries to determine their expected date when extraction and rehabilitation is planned to cease within Lot 11 DP 1024564.

Since the lodgement of the EIS, information has been provided to the Applicant by legal representatives of Hunter Quarries which confirms that extraction and rehabilitation activities within the Karuah Quarry would be completed no later than 6 May 2021. In reality, it is anticipated that extraction activities will be completed before 6 May 2021 to enable the last active area of extraction to be rehabilitated. Based on this advice, it is unlikely that any substantive operations at the Karuah South Quarry would occur concurrently with extraction operations at the Karuah Quarry.

3.4 SUPPLEMENTARY ASSESSMENTS

The Applicant commissioned five Specialist Consultants to prepare responses to a number of the issues raised in the submissions. Their input has been included directly into Section 4.3 and, where necessary, minor modifications were made to the respective assessments. Copies of extracts of the minor modifications to the assessments are included as appendices of this document. One additional assessment was commissioned by the Applicant with respect to fly-rock management. The following subsections provide an overview of the approach to the supplementary assessments undertaken by the various specialist consultants. These subsections and the related information are presented in an order that reflects the frequency that the topics were raised in submissions.

3.4.1 Surface Water

A number of submissions were received regarding potential impacts to surface water as a result of the Project. In particular, the potential discharge of sediment-laden water from the Site was identified as an issue of concern. As such, the Applicant commissioned RWC to provide detailed responses to the submissions received during the public exhibition period and to further explain the design intent of the water management strategy at the Quarry.

Detailed responses to issues relating to surface water are presented in Section 4.3.1.

3.4.2 Ecology

Ecoplanning Pty Ltd was commissioned by the Applicant to address issues raised in submissions relating to the Biodiversity Development Assessment Report (BDAR) prepared for the Project including clarification regarding the methodology used during the preparation of the BDAR, potential impacts of the Project on habitat connectivity, cumulative impacts on biodiversity and further justification regarding the decision not to refer the current Project to the Commonwealth Department of Environment and Energy (DoEE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The BDAR was also updated to reflect the updated listing of “Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions” Endangered Ecological Community (EEC) which replaced the previously listed “Lower Hunter Spotted-Gum Ironbark Forest in the Sydney Basin Bioregion” on 31 May 2019. A copy of the updated text from the updated BDAR is included as **Appendix E**. A full copy of the updated BDAR has been provided to the Biodiversity Conservation Division of DPIE.

Detailed responses to issues relating to biodiversity are presented in Section 4.3.2.

3.4.3 Air Quality

Predictive modelling of dust dispersion was undertaken by Northstar Pty Ltd to incorporate additional mitigation and management measures and to provide additional information requested in the submissions. In particular, the updated modelling reflects the proposed installation of an enclosure above and around the mobile processing plant. Cumulative air

quality impacts were also remodelled to reflect the cessation of extraction operations at the Karuah Quarry in accordance with the advice received from Hunter Quarries' legal representatives (see Section 3.3.3).

Detailed results of the updated air quality modelling and responses to other air quality-related issues are presented in Section 4.3.3.

3.4.4 Noise

The Applicant commissioned Spectrum Acoustics Pty Ltd to provide further analysis and respond to submissions relating to operational and traffic noise impacts. The noise-related responses are addressed in Section 4.3.4.

3.4.5 Fly-Rock Management

The Applicant commissioned Prism Mining Pty Ltd to undertake a blasting assessment for fly-rock control to provide assurance that fly-rock would be appropriately controlled and that there would be no need to close the Pacific Highway at any time during any blast. A copy of the report by Prism Mining is reproduced as **Appendix F**. The report presents methods to estimate potential fly-rock range and determine suitable blast clearance distances for the proposed Karuah South Quarry, in order to manage the risks associated with fly-rock from blasting. Preliminary blast parameters, clearance distances and associated factors of safety are provided using published guidelines, with further operational adjustments to be made once blasting commences, based on site experience. Specific issues relating to fly-rock management are discussed in Section 4.3.6.

3.4.6 Aboriginal Heritage

In its submission, the then Office of Environment and Heritage (OEH) identified the need for further archaeological survey work within the southern section of the Site. In response to this request, the Applicant commissioned Biosis Pty Ltd (Biosis) to undertake an additional field survey which was undertaken on 24 July 2019. The results of the survey and comments from Registered Aboriginal Parties (RAPs) have been included in an updated Aboriginal Cultural Heritage Assessment (ACHA) and Archaeological Report (AR). A copy of the updated text and figures from the ACHA and AR are included as **Appendix G**. A full copy of both reports have been provided to the Biodiversity Conservation Division and RAPs.

Responses to submissions relating to Aboriginal cultural and historic heritage are included in Section 4.3.10.

4. RESPONSE TO SUBMISSIONS

4.1 THE PROJECT

Representative Comment(s)

Clarification of interaction between the proposed development and Karuah Quarry (project boundary appears to overlap to the north – the EPA cannot issue an Environment Protection Licence (EPL) with overlapping premises boundaries).

Environment Protection Authority Submission

Response

WedgeRock Pty Ltd acknowledges that the EPL for the Karuah South Quarry would not overlap with the EPL for the Karuah Quarry whilst the Karuah Quarry is operational. Given that the extraction and rehabilitation activities are currently planned to be completed on or before 6 May 2021 within the Karuah Quarry, there will be no need for any activities to be undertaken in the overlap area until Hunter Quarries Pty Ltd vacates the Karuah Quarry. Following the receipt of development consent, Wedgerock Pty Ltd proposes to apply for its EPL covering the area of Lot 11 DP1024564 south of the area covered by EPL 11569 held by Hunter Quarries Pty Ltd. A variation request would be subsequently lodged over the remainder of the Site following the cancellation of EPL 11569.

Representative Comment(s)

Proponent should be required to provide annual production data for the Quarry to DRG as a condition of development consent.

Division of Resources and Geoscience Submission

Response

WedgeRock Pty Ltd accepts that a conditional requirement will be included in a development consent requiring the provision of annual production data from the Karuah South Quarry. The requested production data would be provided on the Form S1 – Statistical return for extractive materials and a summary included in the relevant Annual Reviews.

Representative Comment(s)

The Hunter Quarries property and the Karuah South Property are not on the same level, there is a ridge line. Michael Kiely has either allowed Hunter Quarries to impact his land (permission or trespass) or has cleared his own land. The ridge is still present and EIS mapping is inaccurate and misleading.

Ironstone Community Action Group Inc. Submission - 390466

EIS maps falsely show the property has already been impacted by Hunter Quarries boundary line - this is incorrect.

A. Albury Submission - 390081

Response

This claim reflects a misunderstanding by the submission author regarding the plans of Wedgerock Pty Ltd to recover the pillar of rock remaining between the Karuah Quarry and the northern side of the Karuah South Quarry.

Representative Comment(s)

24 hour maintenance operations - maintenance operations need to be clearly defined.

Ironstone Community Action Group Inc. Submission - 390466

Response

Provision of 24hr maintenance is a common feature of many quarries to ensure that those activities that generate little or no noise, e.g. conveyor belt repairs and/or electrical work can be undertaken outside normal operational hours. Wedgerock would accept a condition that any maintenance undertaken outside the approved operational hours should satisfy the EPA's sleep disturbance criteria.

4.2 PROCEDURAL MATTERS

4.2.1 General

Representative Comment(s)

EIS does not contain a TOC - intentionally misleading.

A. Albury Submission - 390081

Response

The EIS does in fact include a Table of Contents which comprises pages vii to xii of the document. Reference to the document on the DPIE website confirms its presence.

4.2.2 Consultation

Representative Comment(s)

Objects to 28 day submission period over ANZAC Day, Mother's Day, and during school holidays. Suspects deliberate attempt to reduce submission numbers.

A. Albury Submission - 390081

Response

It is understood that the DPE chose to exhibit the EIS following Easter 2019. The DPE has allowed submissions regarding the Karuah South Quarry to be submitted after the closure of the exhibition period.

Representative Comment(s)

Flyers/ information was not distributed to local residents. Requests for information were not answered. Requests information re. distribution locations of the 18 flyers.

A. Albury Submission - 390081



Response

Formal consultation with surrounding landowners commenced on 28 July 2017 when RWC distributed a *Community Information Newsletter* to eighteen surrounding landowners. This newsletter provided a summary of the Project and the development assessment process and an invitation to community members to raise any concerns or questions regarding the Project for coverage in the EIS. **Table 4.1** presents the distribution list for the initial consultation. It is noted that further consultation with surrounding landowners and the broader community was undertaken throughout the EIS process as detailed in Section 3.2.1 of the EIS.

Table 4.1
Address List for Initial Landowner Consultation – 28 July 2017

Address
5887 Pacific Highway, Karuah NSW 2324
5893 Pacific Highway, Karuah NSW 2324
5915 Pacific Highway, Karuah NSW 2324
59 Huntview Road, North Arm Cove NSW 2324
2 Halloran Road, North Arm Cove NSW 2324
21 Halloran Road, North Arm Cove NSW 2324
83 Halloran Road, North Arm Cove NSW 2324
1613 The Branch Lane, Karuah NSW 2324
1714 The Branch Lane, Karuah NSW 2324
1714 The Branch Lane, Karuah NSW 2324
789 Tarean Road, Karuah NSW 2324
827 Tarean Road, Karuah NSW 2324
767 Tarean Road, Karuah NSW 2324
670 Tarean Road, Karuah NSW 2324
54 Mill Hill Close, Karuah NSW 2324
62 Mill Hill Close, Karuah NSW 2324
64 Mill Hill Close, Karuah NSW 2324
74 Mill Hill Close, Karuah NSW 2324

Representative Comment(s)

CCC meetings do not involve community representatives. ICAG requests that their secretary Amanda Albury is involved in the CCC if the Project is approved. Concerned re. combining CCC meetings with Hunter Quarries.

Ironstone Community Action Group Inc. Submission - 390466

Response

The Community Consultative Committee (CCC) for the Project would be established in accordance with the Community Consultative Guideline (DPE, 2019) and would include an independent chairperson, up to seven community and stakeholder representatives, a council representative from each of the local government areas concerned and up to three representatives from the Quarry Operator. It is noted that the selection of community representatives for the CCC would be overseen by the independent chairperson with the Planning Secretary of the Department (or a nominated representative) responsible for their appointment.

4.3 ENVIRONMENTAL, ECONOMIC AND SOCIAL IMPACTS

4.3.1 Surface Water

Preamble

Given a number of submissions received relate to the potential discharge of sediment-laden water from the Site, this response commences with the following brief overview of the design intent of the water management strategy at the Quarry.

The key areas of the Quarry from which sediment-laden runoff may occur are the extraction area and the Quarry infrastructure area. The entire extraction area and the upper surface of the infrastructure area would both drain internally to a sump located within the floor of the active extraction area and not from the Site. The extraction area floor would be below the level of the Quarry infrastructure area by the end of the first year of Quarry operations thus precluding the possibility of discharge from the extraction area sump.

The two other areas of the Quarry containing quarry-related infrastructure with the potential to discharge to downstream watercourses would be the external slopes of the Quarry infrastructure area and a section of the quarry access road. Runoff from these two areas would report to the western and southern sediment basins. Runoff from the external slopes of the Quarry infrastructure area and the Quarry Access Road (until sealed) would be directed to the western and southern sediment basins. Once constructed, the batter slopes would be covered with placed topsoil and vegetated to achieve a minimum 60% cover of perennial grass, to stabilise the surface and landform.

The intent of the 60% vegetated cover would be to achieve a C (cover)-factor of 0.1 or less, which would substantially reduce sediment loads in any runoff generated. As noted in Appendix A of the NSW erosion and sediment control guidelines, “*Managing Urban Stormwater: Soils and Construction*” (Landcom, 2004), (refer Section A6 and Table A3), vegetated cover reduces the area of bare soil exposed to raindrop impact, which has the potential to dislodge individual sediment grains but also retards the velocity of runoff and hence its erosive potential.

As the result of the staged development of the Quarry infrastructure area during Stage 1 operations and the vegetation of the batter slopes as they are constructed, the sediment basin design volumes significantly exceed the minimum volumes as required under “*Managing Urban Stormwater: Soils and Construction*” (Landcom, 2004) for all stages of the Quarry, as shown in **Table 4.2**.

With the exception of the southern sediment basin during the site establishment and construction stage and Stage 1C, the minimum sediment storage zones required for either sediment basin would be less than 150m³ in any Quarry stage.

Table 4.2
Constructed Versus Required Stage Volumes for Western and Southern Sediment Basins

Stage	Western Sediment Basin/Dam			Southern Sediment Basin/Dam		
	Constructed volume (m³)	Minimum Sediment Storage (m³) ¹	Minimum Required volume (m³) ¹	Constructed volume (m³)	Minimum Sediment Storage (m³) ¹	Minimum Required volume (m³) ¹
Site establishment and construction	7 700	105	568	17 100	211	1 078
1A		10	473		21	888
1B		18	163		135	1 147
1C		11	517		160	1 533
2A					33	1 406
2B						
2C						
Note ¹ : As per calculations for Type D and Type F soils, refer Landcom (2004), Section 6.3.4						

Subsequently, in accordance with Section 6.3.2 (Landcom, 2004), once 60% grass cover is established, the proposed sediment basins are not required for the management of sediment-laden runoff. The management, monitoring and maintenance of the requirement for a minimum 60% effective grass cover on the batter slopes of the Quarry infrastructure area would be detailed in a *Rehabilitation Management Plan* that would form part of the post-approval documentation that would be required prior to the commencement of Quarry operations.

The primary purpose of the sediment basins would be the capture and storage of runoff for use in quarry-related activities and this capture and storage is permissible under the maximum harvestable rights provisions of the *Water Management Act 2000* and that any discharge that may be required from either the western or southern sediment basin would be considered as “clean” (i.e. of similar or better quality than runoff presently being generated on the catchments and sub-catchments of the Karuah River).

For clarity and consistency, the following sub-sections will refer to the western and southern sediment basins as sediment basins/dams.

In addition, two clean water diversion (CWD) drains (CWD East and CWD West) would be constructed to direct runoff from undisturbed areas upslope of the active extraction area. The clean water diversion drains would flow into the drainage infrastructure along Blue Rock Close before ultimately entering the tidally influenced section of Yalimbah Creek, downstream of the Pacific Highway.

4.3.1.1 Surface Water Impacts and Assessment

Representative Comment(s)

Many submissions have raised concerns about potential impacts to receiving waterways from waters that may overflow from the proposed quarry's sediment dams. ... Matters raised include:

- *whether the discharges from the site are likely to contain or produce biotoxins, algal blooms (enhanced nutrient loads) or heavy metals;*

- *frequency and likely sediment load of discharges from the site;*
- *quantification of any impacts to Yalimbah Creek, the Karuah River and the Port Stephens Marine Park; and*
- *the desire for direct consultation with the Shellfish Industry. Consequently, in preparing your RTS, please consult with both NSW Farmers and the Port Stephens Shellfish Program.*

Department of Planning and Environment Correspondence

Response

Whilst nitrogenous compounds would be imported as part of blasting operations at the Quarry, any residues would be confined to the internally draining extraction area that would not form any part of the contributing catchments of either sediment basin/dam and therefore would not enter runoff that could potentially be discharged from the Site.

The Applicant does recognise that there may be a need to apply nitrogenous or phosphatic fertilisers over a short period of time to assist with vegetation establishment on the batter slopes of the Quarry infrastructure area. As these batter slopes form the contributing catchment for both sediment basins/dams, during the vegetation establishment phase it is possible that nutrients may be present in any discharge from either sediment basin/dam should it be required. However, given the design of both sediment basins/dams considerably exceeds the required design criteria for the management of potentially sediment-laden runoff and any collected runoff from the batter slopes would be recycled to assist with vegetation establishment, the likelihood of discharge of the collected water is low and should it be required, the nutrient loads would be negligible in comparison to those from the broader Karuah River catchment and the risk of algal bloom in receiving watercourses as the direct consequence of Quarry discharge is also low.

With regard to heavy metals, as the processing of the hard rock resource to produce quarry product requires only crushing, it is anticipated that any discharge from the sediment basins/dams would be of similar water quality to runoff presently being generated on the Site. As noted in Section 3.2.2.5 of the Surface Water Impact Assessment (RWC, 2019b), the results of sampling at monitoring locations downstream of the Site (refer Table 8 of RWC, 2019b) indicate that, with the exception of aluminium and despite the presence of industrial activities (e.g. quarrying) in the upstream sections of the Yalimbah Creek catchment, concentrations of heavy metals are below water quality trigger values. It is, however, noted that no sampling was undertaken downstream of the Pacific Highway and it is likely that this would represent a potential source of suspended solids, hydrocarbons and heavy metals in runoff (Yannopoulos et al, 2012).

This notwithstanding, water quality parameters such as pH, turbidity and electrical conductivity in the sediment basins/dams would be regularly monitored to ensure that it meets any requirements of the Quarry's environment protection licence issued by the NSW Environment Protection Authority (EPA).

Representative Comment(s)

The Surface Water Assessment is required to be revised to include the following.

- *More information on the erosion and sediment controls to be used during the site establishment and construction phase.*
- *Confirmation that the Proponent can consistently meet proposed water quality limits during establishment and Quarry operations (limits: TSS 40 mg/L (not turbidity); oil and grease 5mg/L or none visible; pH range 6.5-8.5.*
- *Detail of the effluent management system - location of irrigation area, assessment of irrigation area soil depth and type, clarification re. surface or sub-surface irrigation proposed, size of the proposed irrigation area, demonstration of area sufficiency (based on loadings and local climate), controls to prevent discharge to surface water bodies.*

Environment Protection Authority Submission

Response

As noted in the Preamble above, **Table 4.2** and in Section 2.4.1 of the EIS (RWC, 2019a), construction of the western and southern sediment basins/dams and associated drainage infrastructure would occur in the locations shown on EIS Figure 2.4 and remain throughout all stages of quarry development. It is proposed that the first activity on site following the approval of all relevant post-approval documents would be the construction of the western and southern sediment basins/dams, principally to ensure that adequate storage is available to contain and manage sediment-laden runoff from the batter slopes of the Quarry infrastructure area until they are adequately revegetated. During the construction of both sediment basins/dams, a suite of erosion and sediment controls would be implemented to control impacts of the construction activities i.e. the outer slopes would be stabilised through hydroseeding the topsoiled surfaces. A network of silt-stop fencing would be positioned close to the base of the outer slopes to manage sediment-laden runoff until the slopes are vegetated.

Once established, the grass cover on the contributing catchments of the sediment basins/dams would limit the generation of sediment-laden runoff whilst the design storage volumes of the sediment basins/dams and use of stored water would limit the need to discharge from either of the sediment basins/dams on the Site.

Therefore, any discharge from the sediment basins/dams would be of similar quality to that of runoff presently leaving the Site (refer Table 8 RWC, 2019b).

Representative Comment(s)

The location and gradients of the access road and resultant batters are not shown/detailed. It is unclear whether the road construction will extend into Yalimbah Creek. Further information is required. A condition will be imposed to ensure that there is adequate distance from the internal road to Yalimbah Creek.

MidCoast Council Submission

Response

The document titled “*Guidelines for controlled activities on waterfront land: Riparian Corridors*” (NRAR, 2018) is the principal guidance on the management of “Waterfront Land”, as designated by the *Water Management Act 2000*.

The full extents of the Quarry infrastructure area are shown on Figure 6 of the Surface Water Impact Assessment (RWC, 2019b), whilst the local drainage features of the Site are discussed in Section 3.3.2 of RWC, 2019b. In summary, the local drainage features of the Site are characterised by relatively small contributing catchments, a short flow path and, if evident at all, a low capacity channel.

No quarry-related infrastructure is proposed to be located within the distances to a watercourse as established in NRAR (2018). It is noted in NRAR (2018), that any watercourse must also exhibit features such as a defined channel with bed and banks which is not the case within the Site. Essentially, no quarry-related infrastructure or landforms encroach onto “Waterfront Land” as defined by NRAR (2018).

Representative Comment(s)

EIS does not adequately portray creeks present on the property.

A. Albury Submission - 390081

Response

Whilst a review of NSW topographic mapping suggests the presence of a number of drainage features on the Site which are presented as “blue lines” on the maps, these drainage features are based on interpretation of contours and not the result of a field inspection. As noted in Section 3.3.2 of RWC, 2019b, these first order drainage features are topographically controlled and ephemeral, such that discharge occurs only after rainfall and for a short duration. In light of the above and, as no quarry-related infrastructure is in the vicinity of these drainage features, the presentation of the mapped “blue lines” is considered irrelevant.

Representative Comment(s)

The company is seeking off-site discharge of sediment-laden water... all this discharge water will make its way in time into Yalimbah Creek, Karuah and Port Stephens.

A. Albury Submission - 390081

Proponent seeks to discharge sediment laden water from the quarry's holding dams into Yalimbah Creek, which flows directly into the Karuah River, threatening to compromise water quality and affect mangroves and oyster farms.

B. Tehan Submission - 389996

The Proponent should not be allowed to discharge dirty mining waste water into the surrounding waterways. Proper treatment of the gravel quarry waste to an adequate standard should not be technically difficult or expensive.

G. Tlaskal Submission - 390021

The inevitable run off of waste water into the river system will have a devastating impact on the sensitive eco-systems of our waterways. The flow on effect will not only affect the local tourism industry in Port Stephens - but also cause local oyster farmers long term ecological and social devastation / financial hardship.

M. Jut Submission - 390056

Response

As noted in the Preamble to this section, contributing catchments to the sediment basins/dams would be stabilised and vegetated soon after construction. Any discharge from sediment basins/dams on the Site would be of similar or better quality to that of runoff from rural properties in the broader Karuah River catchment, such as those which currently discharge from farms with septic systems, grazing paddocks containing animal faeces, gardens fertilised with nutrients and unsealed roads/driveways with sediment-laden runoff. Subsequently discharge from the Site would not to compromise the water quality of the receiving system.

Representative Comment(s)

Concerned that discharge from the Quarry will impact oyster harvest, oyster stock health, and consumption safety for humans. Request direct consultation re. water discharge procedures to be implemented.

NSW Farmers - Port Stephens Branch Submission - 390001

Response

As noted in the NSW Department of Primary Industry's (DPI) "Oyster Industry Sustainable Aquaculture Strategy" (DPI, 2016), water quality may impact the suitability of oysters for human consumption via bacteria, viruses, marine biotoxins and environmental pollutants whilst oyster growth may be affected by suspended solids (sediments), pH and toxic elements and substances.

The Applicant recognises the concerns of Port Stephens oyster farmers and based on the nature of the proposed operations (i.e. extraction, crushing, stockpiling and loading) recognises the principal risks to downstream water quality from the Site as being the discharge of sediment-laden runoff. The Applicant proposes to manage the risk of sediment-laden runoff via the measures described in the Preamble to ensure that the catchments generating runoff entering the sediment basins/dams would be vegetated to reduce sediment loads in any runoff.

Whilst it is recognised that measures would be undertaken to reduce the potential for sediment-laden discharge from the Site, should discharge be required from the sediment basins/dams, the Applicant would assess total suspended levels in the sediment basins/dams and, should these levels be greater than 40mg/L, treat the water with a flocculant to reduce turbidity. The Applicant would use a biodegradable biopolymer such as chitosan which is derived from chitin, a fundamental compound in the shells of prawns and oysters, further reducing the risk of discharge from the Site impacting the livelihood of Port Stephens oyster farmers.

Representative Comment(s)

No industry representatives were consulted. The EIS did not cover matters relevant to harvest criteria (i.e. biotoxins, algal blooms, heavy metals).

Port Stephens Shellfish Program Submission - 389956

Response

It is noted that whilst the Port Stephens Shellfish Program and NSW Farmers Association: Oyster Committee were not consulted during the preparation of the EIS, consultation was undertaken with a local oyster supplier on 12 December 2019 during informal interviews conducted with local business owners and their employees in Karuah (RWC, 2019c). Based on discussions with this supplier, water management was identified as an important component of the Project. It was noted that conditions for oysters had been excellent over the past 10 years and concerns with water quality related principally to upstream chicken farming practices rather than existing quarry operations.

A representative of RW Corkery & Co. Pty Limited met with representatives from the NSW Farmers Association: Oyster Committee and the Port Stephens Shellfish Program on 1 August 2019, to further discuss the concerns of the oyster industry in relation to the Project. The Applicant recognises that the discharge of sediment-laden runoff as being the principal risk to oyster fisheries downstream of the Site. The measures noted in the Preamble as well as the proposed monitoring and management of discharge from the sediment basins/dams would further reduce this risk.

A written response from the Chair of the NSW Farmers Association: Oyster Committee (Mr Dean Cole) was received on 24 September 2019 which acknowledged that all members of the Committee were satisfied with the outcomes of the consultation undertaken by RWC in relation to the proposed Karuah South Quarry. A copy of this correspondence is included in **Appendix D**. The Applicant will continue to engage with the Committee, as required, including in the event of any discharge from the Site.

Representative Comment(s)

Dispute validity of Landcom Blue Book as a source - written by a company involved in housing developments.

Ironstone Community Action Group Inc. Submission - 390466

Response

The document entitled “*Managing Urban Stormwater: Soils and Construction*” (Landcom, 2004) is the principal reference document for the management and control of sediment-laden runoff in NSW with the SEARs for the Project, issued by the (then) NSW Department of Planning and Environment as well as the NSW Environment Protection Authority specifically requesting their application. Landcom is an NSW Government State Owned Corporation tasked with improving the supply of new housing in NSW.

Managing Urban Stormwater – Volume 2E Mines and Quarries (DECC, 2008) is a companion reference document to Landcom (2004) which provide guidelines, principles and recommended minimum design standards for erosion and sediment control at mines and quarries. It is noted that the capacity of both the western (0.77ML) and eastern (1.71ML) sediment basins exceed the 5-day 95th percentile conditions (91.5mm) stipulated in Table 6.1 of DECC (2008).

Representative Comment(s)

*Request for details re. construction of open channel drains leading to/from sediment basins.
Request that construction permit wildlife crossing.*

Ironstone Community Action Group Inc. Submission- 390466

Response

Whilst detailed design of the proposed drainage infrastructure for the Quarry would be completed upon receipt of development consent (reflecting the approved layout), the small size of contributing catchments and the topography is such that the design peak discharge volume would require trapezoidal open channels in the order of 0.5m depth, 0.5m base channel width, 1(V):3(H) side slopes and therefore a top width of 3.5m.

4.3.1.2 Surface Water Mitigation and Monitoring

Representative Comment(s)

The Department also requires the RTS to consider whether flocculants would be used to assist in settling sediment from water contained in the sediment dams. If flocculants may or would be used, please advise what type of flocculants would be deployed and what would be the potential effects of their use on downstream aquatic and marine environments, shellfish, crustaceans and fish.

Department of Planning and Environment Correspondence

Use of chemicals / flocculants (citrus based products) to settle particles in basins - toxic to the environment. How will the Company dispose of accumulated sediment? Will Halo Klear natural flocculants have impacts on oysters, fish, plant life, nutrients, etc?

A. Albury Submission - 390081

Response

As noted in the Preamble to this section, the vegetated nature of their contributing catchment would significantly reduce the sediment load in any collected runoff such that treatment of stored water is unlikely to be required prior to discharge.

Notwithstanding this expectation, when sediment basin/dam levels reach a certain height, the Applicant would measure turbidity of stored water and in the unlikely event that testing identifies the need for treatment, the Quarry operator would apply a biodegradable, biopolymer flocculant such as chitosan to reduce turbidity. Chitosan (chemical formula $[C_6H_{11}NO_4]_n$) is a type of polysaccharide (carbohydrate) produced from chitin (chemical formula $[C_8H_{13}O_5N]_n$). Chitin is found in the shells of prawns and oysters and is estimated to have a natural production rate of 10^{12} - 10^{14} kilograms per year resulting in chitin being the most abundant polysaccharide in marine ecosystems. In addition to its use as a flocculant, chitosan has multiple applications in the production of food, drink and medicines for human consumption. Whilst chitosan for flocculants is produced from chitin, it too is naturally occurring.

Therefore, this naturally occurring compound that would be used for the removal of sediment in discharge would be broken down in the receiving environment by natural processes and taken up again by aquatic biota for essential development and as such are not considered harmful to aquatic organisms.

Representative Comment(s)

Within the Environmental management plan for the Quarry, the Proponent must outline the responsibilities and position responsible for management and maintenance of the sediment ponds to ensure that proposed procedures are implemented.

MidCoast Council Submission

Response

As noted in the Preamble to this section, the vegetated stabilisation of the contributing catchments to the sediment basins/dams would be undertaken soon after completion of the construction activity such that there would be no requirement for erosion and sediment control infrastructure following stabilisation, as identified under Landcom (2004).

The methods for monitoring and maintenance of the vegetated cover, as well as the responsible person at the Quarry would be detailed in a *Rehabilitation Management Plan* that would form part of the post-approval documentation for the Quarry operations.

4.3.1.3 Flooding

Representative Comment(s)

Some submissions have questioned the adequacy of the proposed sediment dams in times of large rainfall events such as the June 2007 "Pasha Bulker" storm and the April 2015 storms associated with severe flooding of Dungog. Please provide a response to this matter by describing and estimating the effect of such severe rainfall events on all elements of the water management system proposed for the quarry.

Department of Planning and Environment Correspondence

Current design of detention dams would allow uncontrolled discharge of dirty water and clean water in the event of a 1 in 50 year rainfall event. High rainfall events are becoming more frequent and stronger as climate changes.

H. Fitzpatrick Submission - 390076

Response

The basis for the design of any infrastructure relating to water management involves:

1. the intensity of the design rainfall event (i.e. mm/hr);
2. the frequency of the design rainfall event (i.e. how often does a rainfall event of a given intensity occur); and
3. the duration of the design rainfall event.

Infrastructure required to safely discharge (pass) the volume of water generated on the upstream catchment without obstruction, such as a culvert, pipe, floodway or bridge is designed on the basis of the frequency of the rainfall event that would limit the safe function of the infrastructure (i.e. its immunity). The nature of the upstream catchment (i.e. vegetated cover and topography) dictates the timing of peak catchment discharge (i.e. time of concentration or critical duration) which in turn determines the intensity and duration of the design rainfall event. Therefore, the criticality of a given piece of infrastructure in ensuring a continued level

of function should dictate its level of design immunity. For example, key routes out of flood prone areas should be designed so that they can still function (i.e. allow evacuation) despite flooding in surrounding areas.

Infrastructure required to capture and store the volume of water generated within an upstream catchment without the need for discharge, such as a sediment basin or dam is designed on the basis of the frequency and duration of the rainfall event that would ensure the collection of the runoff without discharge. The nature of the upstream catchment (i.e. vegetated, cleared or contaminated) dictates the risk of catchment discharge to the downstream environment which in turn determines frequency and duration of the design rainfall event (i.e. its volume). For example, a dam holding low pH, metal rich processing effluent poses a higher risk to the downstream environment than a dam holding water with elevated sediment loads and thus the design rainfall event for the former would be for a less frequent rainfall event of longer duration than the latter.

Rainfall events such as those which occurred in Dungog on 21st April 2015 (233.4mm/24 hour, as recorded at Dungog Post Office) and Newcastle (as recorded at Nobbys Signal Station) in 2007 between June 7th (82.0mm/24 hour), 8th (21.6mm/24 hour, 103.6mm/48 hour) and 9th (209.8mm/24 hour, 313.4mm/72 hour) were events that exceeded the design capacity of infrastructure at that time and which resulted in flooding.

Based on a review of the Bureau of Meteorology's rainfall IFD (intensity-frequency-duration) system, which utilises recorded rainfall data to interpolate the exceedance probability (i.e. percent chance of the event happening on a given day) of a rainfall event, the Dungog (21st April 2015, 233.4mm/24 hour) and Newcastle (9th June 2007, 209.8mm/24 hour) rainfall events were as follows:

- Dungog – between 2% (1 in 50 year) and 1% (1 in 100 year) annual exceedance probability.
- Newcastle - between 10% (1 in 10 year) and 5% (1 in 20 year) annual exceedance probability.

It should be noted, however, that the rainfall events recorded in 2007 and 2015 are included within the dataset on which the exceedance probabilities above are based and therefore influence the results.

Contemporary analysis at the time suggested that the Newcastle event was less than 1% annual exceedance probability (Watson et al, 2007) as was the Dungog event (MHL, 2015).

By way of comparison, the design rainfall depth for the sizing of the proposed sediment basins/dams on the Site is 130mm which, should it occur over a 24 hour period, represents an annual exceedance probability between 50% (1 in 2 year) and 20% (1 in 5 year). Therefore, should a rainfall event of similar magnitude to those experienced in Dungog and Newcastle occur, it is likely that the sediment basins/dams would discharge however, as noted in the Preamble, the vegetated nature of the contributing catchments would be such that the sediment loads in the discharge would be quite low. However, based on the duration of maximum disturbance in the catchment areas of the sediment basins/dams would occur, there is a 1% chance that sediment-laden discharge may occur should a rainfall event of similar magnitude to those discussed above occur.

Due to the relatively steep nature of the topography within the Site, the indicative design of the clean water diversion drains detailed above would have sufficient capacity to convey peak flows, as would the drains directing runoff to the sediment basins/dams. In addition, from Year 2, the extraction area and upper surface of the Quarry infrastructure area would be internally draining and any runoff would flow to the extraction area with a floor below the level of the natural ground, precluding the chance of discharge from these catchments.

In addition, should rainfall of similar magnitude occur, the quality of runoff from other areas of the Karuah River catchment would be severely impaired as the result of infrastructure in these areas also being unable to cope with the flows that would be generated and this would likely include septic systems, wastewater treatment plants (i.e. bypass flows), chicken sheds, unsealed roads and urban runoff.

Representative Comment(s)

There is the potential for increased nuisance flooding across the Pacific Highway

The proponent needs to demonstrate that there will be no adverse impacts on the Pacific Highway. Changes in site drainage may increase the peak discharge at the Pacific Highway culverts. This is because the clean water diversion drain will collect and concentrate overland sheet flow into channel flow. This drain, as well as the southern sediment basin, then discharge to Blue Rock Close and then under the Pacific Highway. If the discharge exceeds the capacity of the Pacific Highway culverts, there may be an increase in nuisance flooding across the highway.

Recommendation 8 – OEH recommends that the proponent demonstrate that proposed site drainage will not result in increased nuisance flooding across the Pacific Highway.

Office of Environment and Heritage – Heritage Division Submission

Response

The proposed water management infrastructure at the Site would not increase the chance of nuisance flooding across the Pacific Highway for the following reasons.

- Discharge from the catchments upstream of the Pacific Highway currently enters the longitudinal and cross drainage infrastructure of Blue Rock Close before entering culverts under the Pacific Highway.
- Development of the extraction area and Quarry infrastructure area reduces the size of the contributing catchment, thus reducing peak flows discharging into the Blue Rock Close and Pacific Highway culverts.
- Development of the clean water diversion drains would advance the timing of peak discharge from the Site, thus reducing the volume of the design peak discharge at either of the culverts.
- Should discharge occur from the sediment basins/dams, the timing and magnitude of discharge entering the Blue Rock Close culverts would be attenuated as the result of the storage and detention times in the sediment basins/dam than would otherwise occur.

- Discharge from the Blue Rock Close culverts would be tailwater controlled due to the flat terrain/low slope and should afflux develop upstream of the Blue Rock Close culverts, Blue Rock Close would act as an hydraulic control (i.e a broad crested weir) which would then attenuate flow entering the Pacific Highway culverts and limit their potential to be overtopped, causing flooding of the highway itself.

4.3.1.4 Effluent Management

Representative Comment(s)

Septic system should be a closed tank requiring pump out rather than a transpiration pit.

Ironstone Community Action Group Inc. Submission - 390466

Response

No reference is made in the EIS to a transpiration pit and wastewater management would be undertaken in accordance with best practice. The Quarry Operator would operate and maintain a suitable effluent storage facility to the satisfaction of Council and EPA.

4.3.2 Ecology

4.3.2.1 General

Representative Comment(s)

Nominated survey period for all threatened flora species should be shown.

*The Biodiversity Development Assessment Report (BDAR) Table 8 shows nominated survey months for threatened flora species (OEH, 2018) against months when flora surveys were undertaken for the BDAR. Some flora species identified in the BDAR with potential to occur are not shown in Table 8, including *Angophora inopina*, *Corybas dowlingii*, *Diuris praecox* and *Melaleuca groveana*. Table 8 of the BDAR should include these species, nominated survey months (OEH, 2018) and months when the flora surveys were undertaken for the BDAR to demonstrate these species have been adequately surveyed.*

Recommendation 1 – OEH recommends survey period for all threatened flora species is reported.

Office of Environment and Heritage – Heritage Division Submission

Response

Table 8 of the BDAR shows the nominated survey months for threatened flora species predicted by the 'Biodiversity Assessment Method' (BAM; OEH 2017) Calculator to occur within the proposed area of disturbance based upon the IBRA region and the Plant Community Types (PCTs) present. Additional species were subject to targeted surveys including species predicted to occur based upon additional PCTs within the Site (but outside the proposed area of disturbance) such as *Angophora inopina*, *Corybas dowlingii* and *Diuris praecox*. The surveys undertaken for these species were within the allowable survey period as nominated within the BAM Calculator and BioNet (OEH 2018) and shown in **Table 4.3**. References to surveys for

these species were removed from the BDAR, as the PCTs within the proposed area of disturbance were not identified as potential habitat for these species by the BAM Calculator and BioNet (OEH 2018). Details of survey effort for each of these species is outlined as follows.

Table 4.3
Nominated survey period for threatened candidate flora species

Species	Nominated survey months (OEH 2017)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Angophora inopina (Charmhaven Apple)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Asperula asthenes</i> (Trailing Woodruff)	Y	Y	Y							Y	Y	Y
<i>Callistemon linearifolius</i>	Y	Y	Y						Y	Y	Y	Y
Corybas dowlingii (Red Helmet Orchid)						Y	Y	Y				
<i>Cryptostylis hunteriana</i> (Leafless Tongue Orchid)	Y	Y									Y	Y
<i>Cynanchum elegans</i> (White-flowered Wax Plant)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Diuris praecox (Rough Doubletail)							Y	Y				
<i>Eucalyptus glaucina</i> (Slaty Red Gum)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Grevillea guthrieana</i> (Guthrie's Grevillea)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Grevillea parviflora</i> subsp. <i>parviflora</i> (Small-flower Grevillea)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Melaleuca biconvexa</i> (Biconvex Paperbark)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Melaleuca groveana (Grove's Paperbark)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Pomaderris queenslandica</i>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Pterostylis chaetophora</i>									Y	Y	Y	
<i>Rhizanthella slateri</i> (Underground Orchid)									Y	Y	Y	
<i>Senna acclinis</i> (Rainforest Cassia)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Solanum sulphureum</i>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Syzygium paniculatum</i> (Magenta Lilly Pilly)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<i>Tetradlea juncea</i> (Black-eyed Susan)							Y	Y	Y	Y	Y	Y
Modified after Ecoplanning (2019) – Table 8												
BLUE columns indicate months of surveys												
BOLD text indicates threatened candidate species added for the Submissions Report												

Surveys for *Angophora inopina* can be conducted in any month of the year and this species was identified as a candidate species prior to commencement of surveys. Initial targeted flora surveys for *Angophora inopina* were undertaken by two ecologists on the 12 to 15 February 2018 (total survey effort 64-person hours) in conjunction with the mapping of PCTs and completion of vegetation integrity plots. As a component of traversing the Site and vegetation zones, habitat for candidate threatened flora species was identified and traverses were undertaken within areas of suitable habitat. This species was also considered as part of additional targeted surveys on 21 and 22 June, 22 and 23 August, 2 and 3 October, 4 and 13 December 2018.

In accordance with OEH's *NSW Guide to Surveying Threatened Plants* (OEH 2016), surveys for candidate threatened orchid species including *Corybas dowlingii* and *Diuris praecox* were undertaken during the flowering period of the species as confirmed by visiting a reference

population of each species. Targeted surveys for *C. dowingii* were undertaken by two ecologists on the 21 and 22 June 2018 (total survey effort 30-person hours). These surveys were timed to coincide with the flowering period of the species as confirmed from a reference population located at Soldiers Point (**Plate 4.1**).



Plate 4.1 *Corybas dowingii* at Reference Site
(photo taken on 14 June 2018)

These surveys were undertaken by walking parallel traverses separated by approximately 5 m through areas of potential habitat within the proposed area of disturbance in accordance with OEH (2016). While corresponding habitat for this species, as identified within the Threatened Biodiversity Data Collection (BioNet; OEH 2018), was limited to the area mapped as PCT1618, all PCTs and habitat within the proposed area of disturbance was surveyed as part of this survey, apart from large patches of dense *Lantana camara*. Figure 7 of the BDAR outlines the survey effort and locations as part of targeted surveys for *Corybas dowingii*.

Targeted surveys for *Diuris praecox* were undertaken by one ecologist on the 22 and 23 August 2018 (total survey effort 15-person hours). These surveys were timed to coincide with the flowering period of the species as confirmed from a reference population located at Glenrock State Conservation Area (**Plate 4.2**).



Plate 4.2 *Diuris praecox* at Reference Site
(photo taken on 23 August 2018)

These surveys were undertaken by walking parallel traverses separated by approximately 5 m through areas of potential habitat within the proposed area of disturbance in accordance with OEH (2016). Although areas of potential habitat for this species predicted by the BAM Calculator and BioNet (OEH (2018) were limited to PCT 1618, all areas with an open canopy or minimal canopy including disturbed easements and forest edges across all PCTs were surveyed. Figure 7 of the BDAR outlines the survey effort and locations as part of targeted surveys for *Diuris praecox*.

Melaleuca groveana was not predicted by the BAM Calculator or BioNet (OEH 2016) to occur within any of the PCTs present within the Site or proposed area of disturbance at the time of surveys. This species was not identified as a candidate species as part of targeted surveys, however targeted surveys were undertaken for the related myrtaceous shrub species *Callistemon linearifolius* and *Melaleuca biconvexa*. While *Melaleuca groveana* was not specifically identified as a candidate threatened species during targeted surveys, targeted surveys for morphologically similar species were undertaken during the allowable survey period and did not detect any *Melaleuca groveana* individuals.

Representative Comment(s)

Plot field data sheets and digital shape files should be submitted

The Biodiversity Assessment Method (BAM) Table 25 lists the minimum information requirements for BDARs, including plot field data sheets and digital shape files for all maps and spatial data. Submission of plot field data sheets and digital shape files aids in the interpretation of vegetation mapping and gives context to threatened species habitat assessment.

Recommendation 5 – OEH recommends plot field data sheets and digital shape files for all maps and spatial data are submitted.

Office of Environment and Heritage – Heritage Division Submission

Response

Spatial data associated with the BDAR was uploaded via the Biodiversity Assessor Accreditation System prior to finalisation of the BAM Calculator on 04 March 2019, i.e. prior to submission of the BDAR. Field data sheets were not used to collect plot data, rather plot data for the BDAR was collected using tablets with the Ecoserver software. Data recorded within this database software is included within Annexure 2 of the BDAR.

Representative Comment(s)

The ecological assessment appears to deal only with the Biodiversity Conservation Act 2016 methods, but does not discuss other pertinent instruments and statutes, such as:

s4.15 of the Environment Planning and Assessment Act 1979, and

s4.1 of the Great Lakes Development Control Plan 2014

MidCoast Council Submission

Response

The BDAR has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the Project. Section 4.15 of the EP&A Act requires that a consent authority take into consideration the provisions of environmental planning instruments, development control plans, regulations, the likely impacts of the development, the suitability of the site for development, submissions and the public interest. Section 3.3 of the EIS directly addresses how the Project meets the requirements of NSW legislation and planning policies as well as regional and local planning issues. The likely impacts of the Project are directly addressed in Section 6 of the BDAR and Section 5 of the EIS. The suitability of the Site for development is addressed in Section 7 of the EIS.

In accordance with Clause 11 of the *State Environmental Planning Policy (State and Regional Development) 2011*, Development Control Plans do not apply as the Project is State significant development.

4.3.2.2 Field Surveys

Representative Comment(s)

There is a question as to the adequacy of the field investigations conducted and the findings of the biodiversity investigation. Of the three threatened flora species and fifteen threatened fauna species known to occur on the subject land and its vicinity, the current BDAR surveys detected no threatened plants and only four (4) of the known threatened animals of that local landscape. Trapping effort in the field survey was particularly scant. The field surveys on which the BDAR are based thus appear to be inadequate and lead to a general under-stating of the biodiversity significance of the land that is to be modified for the proposal.

The inadequacy of the survey effort leads to uncertainty with respect to the status of threatened species populations and the importance of the habitat on the subject lands, in my opinion.

MidCoast Council Submission

Response

Survey effort for flora and fauna species is fully documented within Section 4 of the BDAR and is consistent with relevant guidelines (OEH 2016; DEC 2004).

Survey effort for threatened flora was in accordance with OEH's *NSW Guide to Surveying Threatened Plants* (OEH 2016) and included inspections of known habitat within adjacent properties (inspections undertaken with Tim Grugeon, Environmental Officer, Hunter Quarries, on 15th March 2018). Based upon inspections of habitat for threatened flora species outside the proposed area of disturbance, the habitat for two of these threatened species (*Grevillea parviflora* subsp. *parviflora* and *Tetratheca juncea*) is generally associated with less mesic, woodland / forest compared to the sheltered south-facing slope within the proposed area of disturbance. Nonetheless, targeted surveys for these species were conducted. One threatened flora species, *Tetratheca juncea*, was identified during targeted surveys although individuals were located to outside the proposed development footprint. During field surveys, individuals of *Grevillea parviflora* subsp. *parviflora* were tentatively identified within the Site (south eastern corner and outside the proposed area of disturbance), however specimens lodged with the Royal Botanic Gardens confirmed these individuals were actually of the morphologically similar *Grevillea humilis* subsp. *humilis* (**Appendix E**) which is not listed as threatened.

Targeted fauna surveys are documented in Section 4.3.2 of the BDAR and included nocturnal watercourse searches for amphibians, call playback, spotlighting, diurnal bird surveys (incidental and 20 min / 2 ha surveys), hollow-bearing trees and nest searches, remote camera trapping, hair tubes (small [50 mm] and large [110x70 mm]), ultrasonic sound detection (Anabats), arboreal Elliott traps (A, B and E traps), pitfall traps (30 cm diameter) and searches for indirect evidence of fauna species (white wash, pellets, scats, tracks, scratches). Surveys were undertaken in accordance with the survey effort requirement outlined within DEC (2004) except where noted within the BDAR (including pitfall traps). Trapping surveys included a combination of arboreal Elliott A trapping, arboreal Elliott B trapping, terrestrial Elliott E trapping and pitfall trapping which was also supplemented with other survey techniques including Reconyx HC600 remote camera detection and artificial nest detection.

Six Elliott trap stations were set up at along each of the four fauna transects (except in the rainforest where three stations were set up due to the small size of this vegetation zone). At each trap station an arboreal Elliott A, arboreal Elliott B and terrestrial Elliott E trap were located. The terrestrial Elliott E traps were positioned in low shrubs and grass clumps. The arboreal Elliott A and B traps were placed on a platform which was attached to the trunk of large canopy trees, approximately 3m above the ground. The Elliott traps were baited with a universal bait (honey, oats, peanut butter) and beef stock. All traps were checked in the hour following dawn and rebaited, as required. The Elliott traps were covered in calico bags and filled with bedding. Total survey effort for each Elliott trap size was 61 trap nights (28 in Dry Sclerophyll Forest and 33 in Wet Sclerophyll Forest). The survey effort exceeded the minimum 24 trap nights recommended (per 50 ha stratification unit) for arboreal mammals by DEC (2004a), although is less than the 100 recommended nights for terrestrial mammals (per 50ha stratification unit). Nonetheless, given the total survey area was approximately 16ha, the 61 trap nights for terrestrial mammals in conjunction with 592 trap nights with remote cameras, is considered sufficient for the purpose of the assessment.

Artificial nests, specifically targeted Eastern Pygmy-possums, included artificial nests tied to a low shrub or tree near flowering shrubs. A remote camera was positioned to detect any activity in or near the artificial nests. The nests and remote cameras were left in the proposed area of disturbance for between 27 and 29 days/nights (total survey effort included 592 trap nights with cameras facing artificial nests). Pitfall trapping included three pitfall traps (30cm wide x 50cm deep) connected using plastic drift fencing to encourage species to the traps (total 11 trap nights).

Four threatened fauna species were detected during the targeted surveys. A number of other fauna species have previously been recorded within the proposed area of disturbance (as detailed in Section 3.1 and Section 4 of the BDAR). It is noted that consistent with the requirements of the BAM, much of the surveys undertaken for the BDAR, involve surveys for breeding habitat of threatened fauna species. Table 4 of the BDAR, identifies those threatened species for which the proposed area of disturbance has been identified as foraging habitat, with no further surveys for foraging habitat of these species required (in accordance with the BAM). Impacts to these fauna species have been assessed in conjunction with the impacts the Plant Community Types (consistent with the requirements of the BAM).

In conclusion, the claim that the survey effort was inadequate is incorrect.

4.3.2.3 Flora

Representative Comment(s)

*The issue of threatened species on the site has been raised in many submissions, including the report by MidCoast Council's ecologist. The RTS should carefully consider the issues raised in Council's submission, including those that are critical of the accuracy of the BDAR, the quantum of the field survey effort and the presence of threatened species that are or may be located on the site. In particular, Council's submission has provided details on the expected occurrence of *Asperula asthenes* on the site, as a continuation of the occurrence of this plant on adjacent land to the east.*

Department of Planning and Environment Correspondence

Asperula asthenes was not detected during the BOAR field surveys. It is however known and described on the adjacent Lot 12, where ERM 2002 said "an extensive population of this species was detected in the moist open forest habitat. .. The minimum extent of the local population is approximately 4.5-hectares ... This local population is likely to extend into adjacent moist open forest habitat south-west of the study area, which could not be inspected during the current survey due to site access constraints." The habitat so described sits on the subject land for this quarry proposal and so there is evidence that *Asperula asthenes* was present on that land.

*To my knowledge, this area comprises the known south-eastern limit of *Asperula asthenes* distribution and thus is of special significance.*

The project affects mesic and rainforest communities, which are not well represented elsewhere in this habitat patch and the loss of such may therefore result in a serious effect on species dependent on these moist forest communities, such as the Stephens banded snake. This resident species would not be able to readily migrate to suitable local habitats in the event that the proposed operation proceeds.

MidCoast Council Submission

Response

Survey effort for flora and fauna species is fully documented within Section 4 of the BDAR and as previously concluded, the claim regarding the survey effort being inadequate is incorrect. With regard to *Asperula asthenes*, this species was identified as a candidate species prior to the commencement of field surveys. In order to maximise the chance of detecting this species, an inspection of the population within the offset area of the Karuah East Quarry was arranged with Tim Grugeon (Environmental Officer, Hunter Quarries). However, at the time of the inspection of the known habitat (15th March 2018) no *Asperula asthenes* were observed which was attributed to the very dry conditions at the time. Nonetheless, this inspection provided an opportunity to identify the habitat preferences of the local population.

The known habitat for the *Asperula asthenes*, as identified by Tim Grugeon and shown in the MidCoast Council Submission includes moist open forest habitat which occurs in association with Yalimbah Creek and its tributaries. It is noted that the downstream continuation of Yalimbah Creek extends into the Site but does not form part of the proposed area of disturbance as the riparian buffer of Yalimbah Creek has been largely excluded from the disturbance footprint of the Project. It was noted during the field surveys that moist open forest was widespread across the proposed area of disturbance and the potential for the species to occur

across the proposed area of disturbance (even away from Yalimbah Creek) was recognised. Consequently, targeted surveys for *Asperula asthenes* were conducted in spring across the entire proposed area of disturbance. During these surveys, one morphologically similar species, belonging to the same family as *Asperula asthenes* (Rubiaceae), was identified on site. However, this species was identified as *Galium leiocarpa* with identification of this species confirmed by the Royal Botanic Gardens following lodgement of a specimen collected from the proposed area of disturbance (**Appendix E**).

Targeted surveys for Stephens Banded Snake included active searches, pitfall trapping (over 11 trap nights) and spotlighting (over four nights). This survey effort is in accordance with the recommendation of DEC (2004), with the exception of the number of pitfall trap-nights (recommended 24 nights) as outlined within the BDAR. The number of pitfall traps was limited by the abundance of surface or shallow rocks which inhibited excavating more pitfall traps. This species was not detected during these targeted surveys.

Representative Comment(s)

Clarification is sought that targeted flora surveys would have detected Rhodamnia rubescens if present

Rhodamnia rubescens has been recently listed (1/02/2019) as critically endangered on Schedule 1 of the Biodiversity Conservation Act 2016 (BC Act). The species is associated with Plant Community Type (PCT) 1527 as described in the BDAR, on the New South Wales North Coast (which includes the project area). The species can be identified in the field year-round. Based on the survey periods shown in Table 8 and the survey effort shown in Figure 7 of the BDAR, it appears that the species would have been detected if present. The species does not appear in any species lists in the BDAR. Clarification is sought that surveys would have detected Rhodamnia rubescens if present on the subject land.

Recommendation 2 – OEH recommends clarification that Rhodamnia rubescens does not occur on the subject land.

Office of Environment and Heritage – Heritage Division Submission

Response

Due to the timing of the listing of *Rhodamnia rubescens* as 'Critically Endangered' under the BC Act, relative to the timing of surveys, this species was not identified as a candidate threatened species at the commencement of targeted threatened species surveys. However, as part of targeted surveys observations of species not previously recorded within vegetation integrity plots was recorded (listed as 'incidentals' in Table 22 of the BDAR). This distinctive species was not incidentally observed during surveys for other threatened species. The listing of this species under the BC Act was recognised prior to submission of the BDAR and suitable habitat for this species was revisited on 12 April 2019, with no individuals of the species detected.

Representative Comment(s)

Plant Community Type 1590 forms part of the Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions Endangered Ecological Community

The NSW Threatened Species Scientific Committee has recently made a final determination (31/05/2019) to list Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions (LHSGIB) as an Endangered Ecological Community (EEC) on Schedule 2 of the BC Act. PCT 1590 as described in the BDAR forms part of LHSGIB EEC; relevant sections of the BDAR should be updated to reflect this.

Recommendation 3 – OEH recommends PCT 1590 is identified as forming part of the Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions Endangered Ecological Community.

Office of Environment and Heritage – Heritage Division Submission

Response

The listing of the 'Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions' Endangered Ecological Community (EEC) on the 31 May 2019 replaces the previously listed 'Lower Hunter Spotted-Gum Ironbark Forest in the Sydney Basin Bioregion'. This updated listing of the ecological community includes a broader definition of the ecological community which includes areas of PCT1590 within the proposed area of disturbance. The BDAR has been updated to reflect the updated listing of the ecological community (see **Appendix E**).

Representative Comment(s)

The EIS does not mention old trees or describe rainforest areas in detail.

Ironstone Community Action Group Inc. Submission - 390466

Response

The BDAR does not specifically discuss age of trees, although the occurrence of hollow bearing trees (generally associated with larger and older trees) is discussed in Section 6.1.1 of the BDAR. This section of the BDAR notes that approximately 25 hollow-bearing trees are present within the proposed disturbance footprint. Additionally, Annexure 2 of the BDAR outlines the individual site attributes which are used to determine the vegetation integrity scores for each vegetation zone. This includes a count of the number of large trees (diameter at breast height greater than 50cm or 80cm depending on the vegetation formation) within the 20m x 50m plots surveyed across all vegetation zone. Large and old trees were common across the Site.

The occurrence and extent of rainforest (PCT1527) is discussed in detail within Section 3.3.5 of the BDAR including mapping of the extent on Figure 6 and a photograph of the rainforest Plant Community Type shown in Plate 3 within the BDAR.

4.3.2.4 Fauna

Representative Comment(s)

The Department requires more information about the effects of the proposal on biodiversity found on the site. It notes that Koalas have been identified on the site and requires a full description of measures that would be undertaken to ensure that the local Koala population is not put at risk by this proposal.

Department of Planning and Environment Correspondence

Response

The Project and proposed vegetation clearing would impact known habitat for the local Koala population. Impacts to the Koala have been assessed in accordance with the BAM and offsets calculated to achieve no net loss to Koala habitat (in accordance with the BAM). The following mitigation measures are proposed to minimise and mitigate impacts to the local Koala population.

- The overall footprint of the operation would be kept as small as possible during all stages of operation, with vegetation and soil removed prior to the progressive extension of operations.
- Ongoing maintenance of retained native vegetation and fauna habitat would be undertaken across the Site as detailed as part of a Biodiversity Management Plan (BMP) for the Site. This would include control of weeds and feral species.
- Pre-clearance protocols are to be established as part of vegetation removal to avoid direct Koala mortality during vegetation removal. This would include pre-clearance surveys for Koalas and other fauna prior to vegetation removal. Where fauna are observed within trees proposed for removal, tree clearing would be postponed until fauna has relocated outside the disturbance footprint. Soft-felling, under the supervision of an ecologist, employing the 'slow-drop' technique would also be undertaken for all hollow-bearing trees.
- The salvage of environmental resources within the approved disturbance area including tree hollows, vegetative and soil resources, for beneficial reuse in the enhancement of any biodiversity offset areas or site rehabilitation.
- Measures to protect vegetation and fauna habitat outside the approved disturbance area including Koala proof fencing along the southern boundary of the Site which would connect existing Koala proof fencing to the east and west of the Site.
- Retention of vegetation along the southern boundary of the Site so that Koala movement can still occur to the north and south of the disturbance footprint, although it is noted that the corridor width within the Site would be greatly reduced and a canopy gap of approximately 37 m would be created by the access road (**Figure 4.1**).
- Speed limit signs would be placed along internal haul roads to remind drivers of the presence of Koalas and reduce the chance of Koala vehicle strike.
- The presence of Koala habitat within the Site would be communicated to all workers on the Site as part of the induction process.

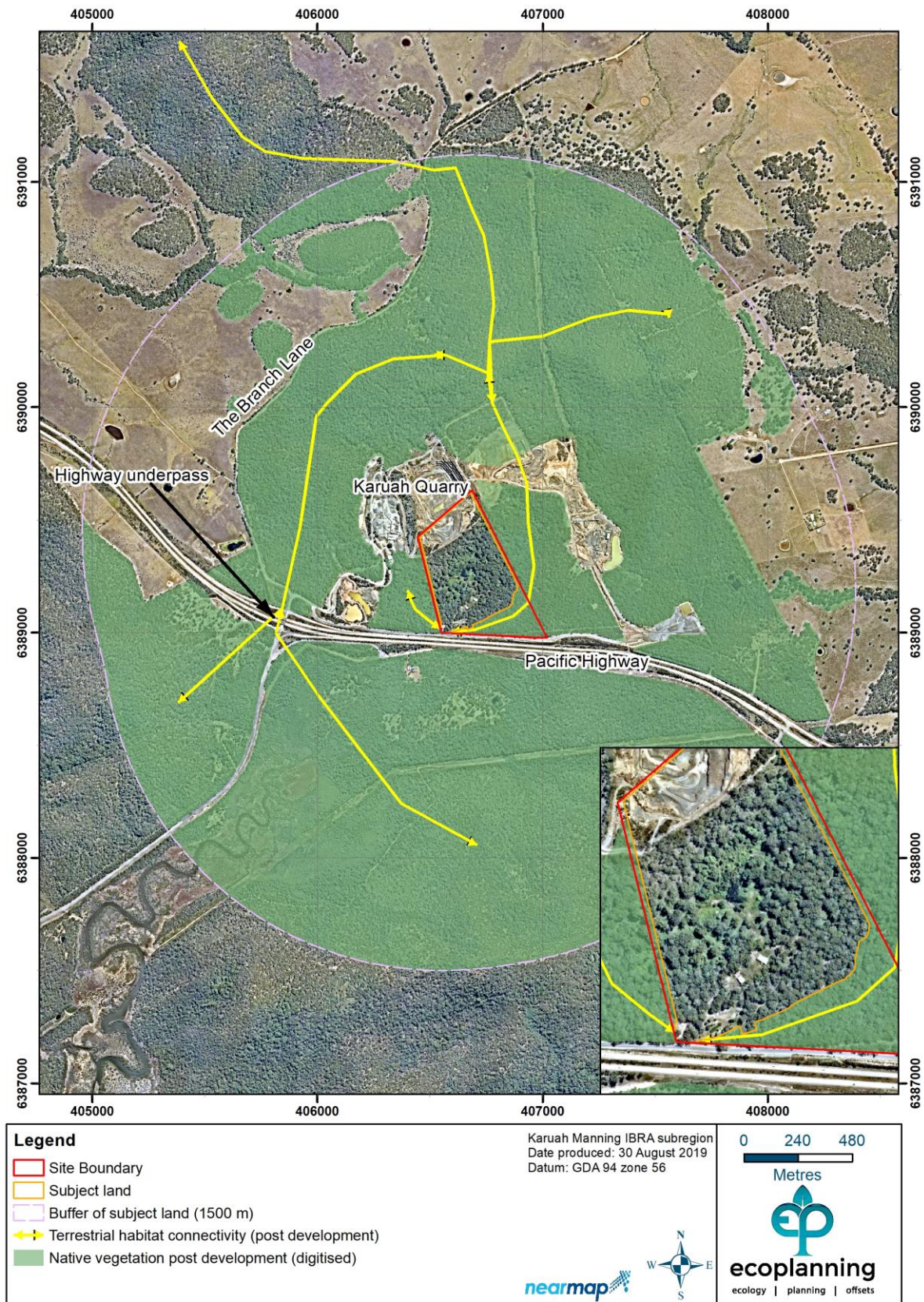


Figure 4.1 Habitat Connectivity Post Development

Representative Comment(s)

Pristine bushland will be removed from the almost 22 hectare property, destroying habitat for wildlife including threatened species such as koalas, quolls and phascogales.

D. Clarke Submission - 390086

Impacts to threatened, vulnerable, endangered wildlife.

A. Albury Submission - 390081

Response

Throughout the BDAR, it is identified that 11.59 ha of native vegetation would be impacted/removed as a result of the Project. The quality of this vegetation was determined in accordance with the NSW Government's Biodiversity Assessment Method ('BAM'; OEH 2017) and vegetation integrity scores ranged from 52.6/100 to 64.9/100.

The vegetation within the proposed area of disturbance is identified within Section 4 of the BDAR as known habitat for the Koala (*Phascolarctos cinereus*) and recognised as potential habitat for the Spotted-tailed Quoll (*Dasyurus maculatus*). Targeted surveys for the Brush-tailed Phascogale (*Phascogale tapoatafa*) did not identify this species as occurring within the proposed area of disturbance. Impacts to the Koala and Spotted-tailed Quoll as a result of the Project have been assessed in accordance with the BAM and offset requirements for the Project have been calculated.

Representative Comment(s)

Requests details re. clear felling strategy - i.e. amount of vegetation cleared at any one time.

Ironstone Community Action Group Inc. Submission - 390466

Clearance procedure inadequate - explain rationale with particular reference to nocturnal animals.

A. Albury Submission - 390081

Response

The exact timing of vegetation clearing would be dependent upon progress following the commencement of works. However, the overall footprint of the operation and vegetation clearing would be kept as small as possible during all stages of operation, with vegetation and soil removed at a suitable period prior to the progressive extension of operations. Progressive rehabilitation would be undertaken as soon as practicable following disturbance and completion of extraction operations in the subject area.

Pre-clearance protocols proposed as part of vegetation clearing are outlined within Section 6.3.1 of the BDAR. As discussed in the BDAR, pre-clearance techniques including soft-felling techniques aim to encourage arboreal fauna to relocate outside of the disturbance footprint prior to habitat clearing or alternatively provide an opportunity to move fauna during vegetation clearing works. Where fauna are observed within trees for removal as part of pre-clearance surveys, tree clearing would be postponed until fauna has relocated outside the disturbance footprint. Soft-felling including nudging trees 24 hours and then immediately prior to clearing aims to disturb any resident fauna and encourage them to move outside the disturbance footprint. The purpose of the 24 hr period between nudging trees and their removal aims to

allow nocturnal species to relocate during their natural active periods. The pre-clearance protocols are not species specific, although are targeted to arboreal species including mammals, birds and reptiles.

4.3.2.5 Aquatic Ecology

Representative Comment(s)

It has the potential to pollute the Port Stephens Great Lakes Marine Park. It threatens aquatic nurseries within the mangroves. Therefore it is not compliant with the Fisheries Management Act 2007. It is a threat to the iconic oyster industry by possible contamination of the Port Stephens Great Lakes Marine Park. It is not an environmentally sustainable development.

E. Armstrong Submission – 389916

Response

The Project would not involve any direct impacts to downstream mangroves, which are protected under the *NSW Fisheries Management Act 2004* and shown in Figure 4 of the BDAR (as a local wetland). The Project does have potential to indirectly impact these environments through potential negative impacts to water quality entering these estuarine environments. However, the Project has been designed in order to avoid impacts to downstream environments by avoiding impacts to the Yalimbah Creek riparian corridor and directing clean run-off around the disturbance footprint. Specifically, the Project has been designed to include two sediment basins, each with a pre-treatment pond, to collect sediment-laden runoff from the disturbed sections of the Quarry. Two clean water diversion (CWD) drains (CWD East and CWD West) would be constructed to direct runoff from undisturbed areas upslope of the extraction area. Bunding and/or contour drains would intercept runoff from the upslope undisturbed catchments, preventing it from entering the extraction area and directing this runoff to either of the clean water diversion drains which in turn would flow towards Yalimbah Creek.

During the construction and operational phases of the Project, the Quarry would operate in accordance with the environment protection licence issued under by the NSW Environment Protection Authority or the controls under the *NSW Protection of the Environment Operations Act 1997*.

4.3.2.6 Edge Effects and Cumulative Impacts

Representative Comment(s)

The Department is seeking further justification or review of the statement on page 4-73 of the EIS, and page 5-63 of the Biodiversity Development Assessment Report (BDAR), that “.....it is considered unlikely that the project would have inadvertent impacts which would reduce viability of any adjacent native vegetation or habitat due to edge effects, noise dust or light spill, or disturbance to breeding habitats.

The Department requires further details as to how the proposed quarry could be operated without generating edge effects (such as those resulting from blasting, noise, dust and weeds) on the adjacent biodiversity offset area.

Department of Planning and Environment Correspondence

The BDAR does not give a proper consideration for the likely indirect effects of the quarry proposal on adjoining natural areas and habitats of ecological significance. The quarry proposal, including the processing areas, immediately adjoin an existing conservation offset area, which was established under a previous development consent and which is managed for biodiversity protection purposes (refer map below):

The BDAR states "it is considered unlikely that the project would have inadvertent impacts which would reduce viability of any adjacent native vegetation or habitat due to edge effects, noise, dust or light spiff, or disturbance to breeding habitats" (pg. 4-73). There is no scientific evidence or justification for this statement, which summarily dismisses the edge effects of this type of development, and which would have negative influence on surrounding vegetation and habitat, including an existing conservation area. The BDAR is inadequate in respect of the description, type, assessment and management of the likely edge effects of this type of development on surrounding habitat.

MidCoast Council Submission

Response

The conclusion that the Project is unlikely to have indirect impacts which would reduce the viability of any adjacent native vegetation or habitat due to edge effects, noise, dust or light spill is based upon observations of the existing level of noise, dust and light which arise from existing Quarry operations adjacent to the Site. In particular, noise and dust impacts generated from existing quarry operations and the Pacific Motorway occur across the Site.

Clearing of vegetation away from the existing edge of patches of vegetation can cause edge effects including altered species composition and weed invasion. However, the extent of this impact is difficult to quantify, particularly as vegetation across the proposed area of disturbance already has variously modified species composition including infestation by exotic vegetation (*Lantana camara*). Further, the preparation and implementation of a Biodiversity Management Plan for the proposed area of disturbance, as discussed in Section 6.3.2 of the BDAR, including management of weeds would aim to avoid or reduce edge effects associated with the Project.

Representative Comment(s)

The BDAR does not appear to properly assess the implications of cumulative ecological impacts in this landscape associated with a sequence of cumulative approvals for quarrying development.

MidCoast Council Submission

It is a concern that cumulative quarrying proposals are being advanced in this local landscape in the absence of a strategic framework. These developments, cumulatively, have the potential to fragment habitats and contribute to local wildlife extinctions, biodiversity loss, environmental pollution and amenity loss. The biodiversity assessment for the proposed Karuah South Quarry does not consider or reflect on these cumulative impacts adequately.

MidCoast Council Submission

Response

Section 2 of the BDAR identifies the landscape context of the Site and all impacts to the proposed area of disturbance are assessed in accordance with the BAM. Through consideration of offset trading groups, the BAM does take into consideration the percentage of land cleared of each Plant Community Type within the IBRA subregion.

A strategic framework for extractive industries within the Karuah area is beyond the scope of this BDAR and any one single landowner. A strategic plan which identifies areas of natural vegetation for retention across the local area would be likely to produce overall benefits to biodiversity across the area, however such a plan would generally be considered a task for one or more arms of government rather than a single landholder.

4.3.2.7 Habitat Connectivity

Representative Comment(s)

Assessment and mitigation of fauna habitat connectivity west of the subject land is required.

The BDAR Section 2.1.4 and Figure 4 identifies terrestrial habitat connectivity across the subject land (noting recent clearing has impacted this connectivity). It is unclear if connectivity to native vegetation southeast on the subject land and west of the subject land could be retained post development, or if this native vegetation will become isolated. An assessment of post development habitat connectivity is required as per Clause 6.1 of the Biodiversity Conservation Regulation 2017, specifically to address the gap between native vegetation retained on the southeast of the subject land and west of the subject land, potential isolation of native vegetation west of the subject land, and if fauna structures (such as rope bridges or glider poles) are required to maintain habitat connectivity.

Recommendation 4 – OEH recommends assessment and mitigation of post-development fauna habitat connectivity is undertaken.

Office of Environment and Heritage – Heritage Division Submission

Response

An updated figure has been prepared to identify the post-development habitat connectivity within the proposed area of disturbance and surrounding area (**Figure 4 1**). This identifies that the vegetation retained in the south-east of the proposed area of disturbance would not be directly connected to vegetation to the west of the proposed area of disturbance, however these areas of vegetation would only be separated by the access route to the quarry with a canopy gap of approximately 37m.

As noted above, retention of vegetation along the southern boundary of the Site would still allow for potential Koala movement from the south-east of the proposed area of disturbance to vegetation west of the proposed area of disturbance, although it is noted that the corridor width within the Site would be greatly reduced and a canopy gap of approximately 37m would exist. No fauna structures are currently proposed across this canopy gap as it is less than the volplaning (gliding) distance for the Squirrel Glider and Yellow-bellied Glider. Additionally, given the preference for Koalas to move across the ground between canopy gaps, rather than across rope bridges or other fauna structures, no such structures are currently proposed. However, if the canopy gap and more importantly the gap between trunks of canopy trees exceeds 37m at the site entrance, such structures will be installed in consultation with DPIE.

Representative Comment(s)

The BDAR, in my opinion, is not based on complete and accurate field survey effort and understates the significance of the habitat to be removed for wildlife connectivity and its contribution to the area of habitat necessary for local populations of some threatened species needed to maintain their lifecycles.

The BDAR argues that the Pacific Highway and Blue Rock Close isolates the habitat of the project area to the south, but is not cognisant of the presence of a fauna underpass/ culvert under the highway west of, but in the vicinity of the subject land, which may permit some inter-connectivity of habitat for local wildlife. Secondly, I am not convinced that the habitat to be removed would not be critical to the survival of the local population of koalas and potentially other affected threatened species.

MidCoast Council Submission

Response

An updated map of habitat connectivity has been prepared which identifies the potential for some fauna to utilise the culverts and underpasses under the Pacific Motorway (**Figure 4.1**). The Project would not cause any further impacts on the ability of fauna to move across the Pacific Motorway, although it would reduce the width and connectivity of corridors in areas north of the Pacific Motorway, as discussed above. As noted above, retention of vegetation along the southern boundary of the Site would still allow for potential Koala movement from the south-east of the proposed area of disturbance to vegetation west of the proposed area of disturbance, although it is noted that the corridor width within the Site would be greatly reduced and a canopy gap of approximately 37m would exist. No fauna structures are currently proposed across this canopy gap as it is less than the volplaning (gliding) distance for the Squirrel Glider and Yellow-bellied Glider. Additionally, given the preference for Koalas to move across the ground between canopy gaps, rather than across rope bridges or other fauna structures, no such structures are currently proposed. However, if the canopy gap and more importantly the gap between trunks of canopy trees exceeds 37m at the site entrance, such structures will be installed in consultation with DPIE.

4.3.2.8 Biodiversity Offsetting

Representative Comment(s)

As the project would impact on Koala habitat, please provide a response to the submissions that have called for the provision of biodiversity offsets within the local area, say within 10 kilometres of the site, and the availability of any such offsets.

Department of Planning and Environment Correspondence

There is no clarification in the proposal that any required offsets established for the project would be sourced locally. This is an important issue for local communities and there appears much suitable lands.

MidCoast Council Submission

Entire property should be put into offset for perpetuity.

A. Johnson Submission - 390046

Response

The Applicant intends to meet the offset requirements for the Project in accordance with offset rules as outlined within Sections 6.2 and 6.3 of the NSW *Biodiversity Conservation Regulation 2017* (BC Reg). The Applicant is currently in negotiation with owners of multiple BioBanking Sites for the purchase of the required biodiversity credits for the Project (noting that credit equivalence will be required from the former NSW Office of Environment and Heritage [Now the Biodiversity Conservation Division (BCD) within the Department of Planning, Industry and Environment]). Whilst negotiations to date have included discussions with three BioBank properties, the exact location of these properties is not known, although two sites are located within the 'Karuah-Manning' IBRA subregion. The Applicant may also need to pay into the Biodiversity Conservation Fund (BCF), for any credits which are not available on the open market, or which are only available at a price greater than the price for payment into the BCF.

It is noted that if a restriction in the location in which credits can be purchased was enforced, above those included within Section 6.3 of the BC Reg, this would provide a competitive advantage to certain BioBank Landholders over others. Additionally, in the event that offsets requirements were to be met through payment into the BCF, the role of securing credits would fall to the NSW Biodiversity Conservation Trust.

Representative Comment(s)

The BDAR does not appear to me to fully satisfy the requirements of the biodiversity assessment method and the biodiversity offset scheme.

The credit calculations appear to be significantly inadequate to properly offset all impacts on all relevantly-affected plant community types and threatened species.

Many species credit species that are either known or are likely to occur in the area of the clearing and development, such as glossy black-cockatoo, brush-tailed phascogale, squirrel glider, etc, are not subject to offsetting in the current proposal. This is not appropriate.

MidCoast Council Submission

Response

The calculation of the offset requirements for the Project are in accordance with the BAM. The offset requirements have been calculated using the BAM Calculator and all associated data has been submitted online via the Biodiversity Assessor Accreditation System. Offset requirements have been calculated for those species credit threatened species which were recorded within the proposed area of disturbance. The Glossy Black-cockatoo, Brush-tailed Phascogale and Squirrel Glider were not detected during targeted surveys, although foraging habitat for the Glossy Black-cockatoo is likely to occur. Offsets have been determined based upon the results of the targeted surveys and in accordance with the BAM.

Representative Comment(s)

No amount of bio-credits, bio banking, offsetting will replace the wildlife that will be killed if this project proceeds. 400+ yr old trees with hollows cannot be offset.

A. Albury Submission - 390081

Offsets such as species and ecosystem credits cannot replace the loss of natural bushland habitat in the short and medium term, particularly for koalas, given the widespread deterioration of their habitat throughout the state.

D. Clarke Submission - 390086

Response

The calculation of offsets using biodiversity credits is a requirement of the BAM and the Secretary's Environmental Assessment Requirements (SEARs) issued for the Project. This represents current NSW Government policy and is a requirement of the NSW *Biodiversity Conservation Act 2016*.

4.3.2.9 EPBC Act Referral

Representative Comment(s)

Page 4-10 of section 4 of the Specialist Consultant Studies provides the conclusion that:

These assessments, which have been informed by a previous referral to the Commonwealth Department of the Environment and Energy (DoEE; EPBC Ref: 2012/6600), concluded that these entities would not be significantly impacted by the Project and another referral to the DoEE is not required.

The Department questions this position and seeks further information to justify it, because:

- the 2012 referral involved the proposed clearing of 8 hectares (ha) of native vegetation, while the current proposal proposes clearing 11.6 ha of native vegetation;*
- the 2012 referral stated that the site did not contain any listed Critically Endangered Ecological Community (CEEC), while the EIS has identified that 0.47ha of the site consists of a vegetation type that could be considered as "Lowland Rainforest of Subtropical Australia" (also referred to in the EIS as "PCT 1527 Bangalow Palm – Coachwood – Sassafras gully warm temperate rainforest of the Central Coast") which is listed as a CEEC;*
- there is potential for consideration by the Commonwealth of listings subsequent to 2012 under the Environment (sic) Protection and Biodiversity Conservation Act 1999 (EPBC Act); and*
- Koalas are listed as Vulnerable under the EPBC Act.*

Department of Planning and Environment Correspondence

In 2012, a smaller proposal (removal of 9-hectares of native vegetation) on the same land was assessed by Graham A Brown & Associates and by Conacher Environment Group, who concluded:

- The proposal required referral to the Commonwealth in relation to the Interim Koala Referral Advice for Proponents in relation to the koala and impacts on koala habitat, and*
- Potential and core koala habitat was identified on the site and "the subject site and surrounding areas are likely to support a resident population of koalas".*

I agree with the former assessment, a referral to the Commonwealth Environment Minister appears required for this proposal due to the fact that it removes koala habitat, isolates koala habitat, increases threats to koalas and causes stress to koala populations. The BDAR, in my opinion, understates the type, nature and significance of threats to koalas and other threatened species.

There is significant concern with respect to the findings of the field surveys based on the total available knowledge for threatened biodiversity in this area. The BDAR has not appropriately credited and reflected on this knowledge or used this knowledge to inform its findings. This is not appropriate.

There appears to be a scientific argument that there would be impacts from this proposal that would critically affect the survival of local populations of certain threatened species. The BDAR appears inadequate in this report.

MidCoast Council Submission

PCT 1527 comprises an Endangered Ecological Community under the BC Act. This community is also a Critically Endangered Ecological Community under the EPBC Act 1999.

(Name Withheld) Submission - 389936

Response

The Project has been recognised as having an impact on a local population of Koalas. A previous proposal on the Site also identified this impact and a referral was subsequently made to the Commonwealth Environment Minister on 26 October 2012. This referral was determined not to be a controlled action in a referral decision dated 25 November 2012.

An assessment against the referral guidelines for the Koala (DoEE 2014) was undertaken for the current Project taking into consideration an increase of 2.12ha of disturbance to Koala habitat in the current Project compared to the previous referral. This self-assessment, included as Annexure 1 of the BDAR, considered the results of the previous referral and concluded the Project was unlikely to have a significant impact on Koalas. The results of the updated self-assessment were discussed with the Commonwealth Department of Environment and Energy (DoEE; Dane Roberts, Director – Northern NSW Assessments). In correspondence dated 18 December 2018, the Department advised that the results of the self-assessment were reasonable, particularly in light of the previous consideration and the non-controlled action for the previous referral.

As a result of the identification of the change in area of native vegetation clearance, further advice was sought from DoEE on 30 August 2019 to confirm the results of the previous self-assessment due to a minor increase to the total area of disturbance. It was identified following the review of the submissions that the total area of clearing of native vegetation was in fact 11.6ha and not the 11.12ha referred to in the BDAR. Hence, the area considered in the 2012 referral (8ha) and the current proposal (11.6ha) would involve an increase of 3.6ha of disturbance. Additionally, matters relating to habitat connectivity were raised in response to concerns raised in submissions. In correspondence dated 20 September 2019, DoEE (Dane Roberts, Director – Northern NSW Assessments) confirmed that the results of the self-assessment remained reasonable due to the relatively small increase to the total area of disturbance.

Assessment of impacts of the Project against the significant impact criteria was also undertaken for the Grey-headed Flying-Fox, Rufous Fantail and Lowland Rainforest. It was concluded that the Project was unlikely to have a significant impact on any these entities. For the Lowland Rainforest ecological community, it was concluded that the Project would result in the loss of the small area (0.47 ha) of the ecological community within the Site, but given the small area of the ecological community which would be impacted by the Project and the requirements to offset these impacts in accordance with the BAM, it is unlikely that the ecological community will be significantly impacted. Impacts the Grey-headed Flying-fox would not include any camps for this species and impacts to the Rufous Fantail would affect an ecologically significant portion of the species (defined as 4,800 individuals). Consequently, the impacts to these species were identified as being not significant.

4.3.3 Air Quality

Representative Comment(s)

The nearest residence to the quarry's proposed area of ground disturbance appears to be less than 300 metres to the south, in Mill Hill Close. The RTS must provide details on how drinking water supplies (i.e. captured rainfall from roofs) would be protected from dust fallout generated by quarry operations.

Department of Planning and Environment Correspondence

Concerns regarding dirty furniture, tank water contamination.

A. Albury Submission - 390081

Residents will require the following compensation - Capped tanks, water diverters, sound proofing, air conditioners with a supply of filters, sink filters for tank waters, drinking water filters, supply costs for delivery of potable water.

Ironstone Community Action Group Inc. Submission - 390466

Response

The dispersion modelling assessment undertaken to support the EIS indicates that the rate of dust deposition attributable to the operation of the Karuah South Quarry would be a maximum of 0.3g/m²/month at all surrounding sensitive receptor locations (compared to a criterion of 2.0g/m²/month). These maximum rates of dust deposition are anticipated to occur during Stage 2B of operations and represent 15% of the relevant criterion.

The predicted rates of dust deposition at nearby receptors would be minor due to the range of particulate emission control measures which are proposed to be employed at the Quarry. A significant contributing factor to production is the prevailing wind direction. **Figure 4.2** presents the wind rose from the AQIA (Figure 6) superimposed on the land ownership figure. This combined figure effectively displays the predominant winds in the vicinity of the Karuah South Quarry would blow the bulk of the dust generated within the Quarry away from the residences south of the Pacific Highway.

The rate of dust deposition experienced at surrounding receptor locations resulting from the Karuah South Quarry is likely to be minor. The contribution of the Karuah South Quarry to the total dust rate of dust deposition experienced at surrounding receptors is also likely to be minor.

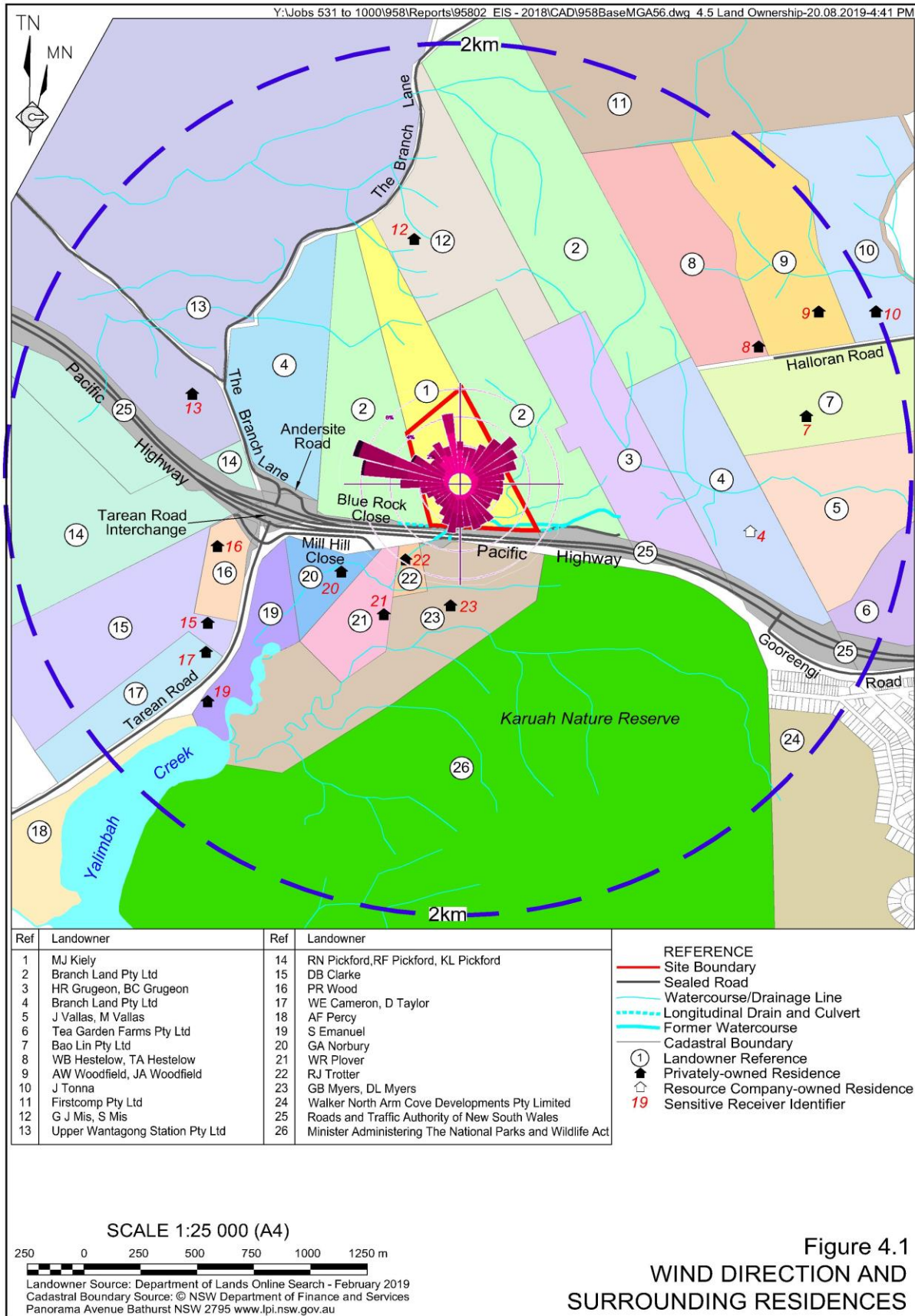


Figure 4.2 Wind Direction and Surrounding Residences

The Applicant would be prepared to enter into discussions with the adjoining quarry operators and to contribute to the cost of the installation of first flush rainwater harvesting systems at the most potentially affected residential locations where such systems are not currently installed. No other controls would be required at the surrounding residences as suggested.

Representative Comment(s)

Please address, in terms of both feasibility and quantification of likely beneficial effects, the potential for the crushing plant to be enclosed to reduce dust emissions.

Department of Planning and Environment Correspondence

Response

The mobile processing plant is proposed to be enclosed on three sides using an enclosure similar to that displayed in **Plate 3.1**. This enclosure would cover the key items of processing equipment, i.e. the crushers and screens would be designed to be moved throughout the Project life in conjunction with the mobile crushing plant. Given the mobility of the processing plant, the orientation of the enclosure would vary throughout the Project life. It is noted that the orientation of the enclosure would have minimal impacts on the effectiveness of the enclosure in mitigating dust dispersion.

As such, a justifiable level of particulate emission control attributable to the enclosures is likely to be at least 70%, however, in order to provide a defensible air quality impact assessment, a control of 70% has been adopted. Based on this level of control, the site-wide emissions reductions which may result due to the implementation of this control measure are presented in **Table 4.4**.

Table 4.4
Emission Reductions due to Enclosure of Mobile Processing Plant

Stage	Total site PM ₁₀ Emissions without Enclosure of Processing Plant	Total site PM ₁₀ Emissions with Enclosure of Processing Plant	% change
1C Annual	7,847.8 kg·annum ⁻¹	7,677.9 kg·annum ⁻¹	-2.2%
2B Annual	15,569.3 kg·annum ⁻¹	14,974.7 kg·annum ⁻¹	-3.8%
1C Max 24-hour	52.1 kg·day ⁻¹	50.2 kg·day ⁻¹	-3.6%
2B Max 24 hour	67.8 kg·day ⁻¹	64.8 kg·day ⁻¹	-4.4%

Adoption of this additional control measure would result in the predicted maximum 24-hour PM₁₀ concentrations as presented in **Table 4.5** for Stage 1C of operations and **Table 4.6** for Stage 2B of operations. Results associated with the non-enclosure of processing operations are taken from Table 39 of the AQIA (for Stage 1C) and Table 49 of the AQIA (for Stage 2B).

The additional modelling has demonstrated that the installation of an enclosure above and around the processing plant would result in often noticeable impact reductions at certain receptor locations when compared to a no-enclosure scenario. The variations in the impact control differ at each receptor and also differ from the calculated emission controls. This is due to the variable action of wind and topography on the dispersion of particulate matter.

Table 4.5
Maximum predicted 24 hour PM₁₀ concentrations – Stage 1C

Receptor	PM ₁₀ concentrations without enclosure of processing plant	PM ₁₀ concentrations with enclosure of processing plant	% change
7	3.6	3.6	0.0
8	3.4	3.2	-5.9
10	2.2	2.2	0.0
12	6.8	6.7	-1.5
13b	7.0	6.6	-5.7
15	7.2	7.0	-2.8
16	10.1	9.7	-4.0
17	6.8	6.5	-4.4
19	3.3	3.2	-3.0
20	20.2	18.9	-6.4
21	9.5	9.3	-2.1
22	23.1	21.7	-6.1
23	17.5	16.6	-5.1

Table 4.6
Maximum predicted 24 hour PM₁₀ concentrations – Stage 2B

Receptor	PM ₁₀ concentrations without enclosure of processing plant	PM ₁₀ concentrations with enclosure of processing plant	% change
7	5.5	5.4	-1.8
8	4.5	4.4	-2.2
10	3.3	3.2	-3.0
12	9.4	9.1	-3.2
13b	8.4	8.1	-3.6
15	7.7	7.0	-9.1
16	8.6	7.5	-12.8
17	6.5	6.0	-7.7
19	3.4	3.2	-5.9
20	15.9	13.9	-12.6
21	12.7	8.4	-33.9
22	21.6	16.1	-25.5
23	16.2	15.5	-4.3

Representative Comment(s)

The AQIA is required to be revised to include the following.

- *Revised dispersion modelling to include production scenarios for the Karuah Quarry and Karuah East Quarry that reflect their maximum operating capacities (current approach does not reflect worst case scenario).*
- *Additional information to support the use of the equivalence background dataset.*

- *PM₁₀ dispersion modelling of pollution control strategies to achieve compliance with the impact assessment criterion. (AQIA indicates exceedance at receptor 16 and marginal compliance at receptors 20 and 23).*

Environment Protection Authority Submission

Response

Reflection of maximum production scenarios at Karuah and Karuah East Quarries

Since the submission of responses to the EIS from the community and government agencies, information has been provided to the Applicant by Hunter Quarries' legal representatives which confirms that extraction activities and rehabilitation within the Karuah Quarry will be completed on or before 6 May 2021. On that basis, it is likely that activities undertaken during Stage 1C and Stage 2B operations at Karuah South Quarry would not be coincidental with any operations at Karuah Quarry. It is possible, subject to the period involved in the determination of the development application and the grant of other approvals (see EIS Section 3.3.3), that some site establishment and construction activities may be undertaken as the activities within the Karuah Quarry are being scaled down.

In response to the NSW EPA comment regarding the appropriate reflection of maximum approved production rates at surrounding operations, dispersion modelling has been updated to reflect the maximum approved production rate at Karuah East Quarry of 1.5Mtpa and reflecting no production at the Karuah Quarry.

The scenarios outlined in **Table 4.7** have been adopted and can be compared to Table 15 of the AQIA.

Table 4.7
Summary of Modelling Scenarios

Operational Stage at Karuah South Quarry	Karuah Quarry	Karuah East Quarry	Karuah Red Quarry
Site Establishment and Construction	Not operational	Stage 3 1.5Mtpa	Not operational
Stage 1C 300 000 tpa Max: 3,000 t·day ⁻¹	Not operational	Stage 3 1.5Mtpa	Not operational
Stage 2B 600 000 tpa Max: 3,000 t·day ⁻¹	No extraction Processing of Karuah Red 100 000 tpa	Stage 3 1.5Mtpa	Extraction 100 000tpa

All dispersion modelling results presented and discussed below reflect the scenarios presented in **Table 4.7** unless specifically stated otherwise.

Equivalence background dataset

NSW EPA has requested additional information to support the use of an 'equivalence' background dataset (adjusted monitoring data from Wallsend to represent conditions at the Site without any quarrying activity). NSW EPA considered that the approach adopted in the AQIA was inconsistent with the Approved Methods and results in a less conservative assessment of the total impact of the Project. The following presents the requested additional information and detailed discussion to support the use of the 'equivalence' dataset relied upon for the air quality assessment.

The SEARs provided for the Project (SSD 17_8795) in November 2017 by NSW Department of Planning and Environment specifically required that the air quality assessment provide a cumulative assessment of predicted impacts. The contribution of all identified existing and recently approved developments was required to be accounted for in the cumulative assessment.

It is considered that three options exist for the assessment of cumulative impacts for this Project. The advantages and disadvantages of each option, and a full justification for the approach taken is provided below.

1. Use of a site-specific dataset to characterise background, plus an increment from the Project.
2. Use of a non-site-specific dataset to characterise background, plus an increment from the Project.
3. Use of a representative dataset to which impacts from surrounding projects are added through modelling.

Option 1 – Use of a site-specific dataset to characterise background, plus an increment from the Project

As outlined in the AQIA, TSP and PM₁₀ concentrations are measured by Hunter Quarries at an Air Quality Monitoring Station (AQMS) to the south of the Karuah Quarry (near Residence 22) on a 1-in-6 day cycle. These measurements have been discussed in detail within Annexure 3 of the AQIA.

Advantages:

- These data provide a characterisation of the air quality environment in the area surrounding the Karuah South Quarry Site (with a proviso provided below regarding the associated extraction rates which are characterised by these measurements).

Disadvantages:

- The measurements have not been taken during periods when maximum extraction rates were performed at any of the existing sources (i.e. Karuah East Quarry at 1.5Mtpa and Karuah Quarry at 500 000tpa [notwithstanding that Karuah Quarry will not now be operational concurrently with the Karuah South Quarry Project]).
- The data are not continuous and are therefore not suitable for use in an AQIA that is required to comply with the requirements of the Approved Methods.

This option has not been taken forward for further assessment.

Option 2 – Use of a non-site-specific dataset to characterise background, plus an increment from the Project

Following review of the AQIA, NSW EPA has requested that this option be explored further. A level of detail is presented here to allow that request to be addressed in full.

A background dataset to which incremental impacts from the Project could be added to provide a prediction of the potential future air quality environment in the area would need to be robust. A range of uncertainties would need to be considered to allow that dataset to be adopted to the satisfaction of NSW EPA. For example, the background dataset adopted would be required to:

- include the impacts of similar activities (extraction, processing and transport) at rates and a geographical distribution similar to those of existing and approved operations in the area surrounding the Site;
- be comparable to a location which might be representative of sensitive receptors surrounding the Site; and
- be representative of the topographical and meteorological environment surrounding the Site.

A detailed review of available air quality monitoring data has been performed which has sought to address the requirements highlighted above.

Firstly, the review focussed on areas with major extractive activities incorporating drill and blast, load and haul operations at a rate similar to 1.5Mtpa (which is the approved extraction rate at Karuah East Quarry (i.e. without the Project)).

Secondly, the review examined locations of air quality monitoring stations which were within approximately 2 km of the activities under consideration. This distance appropriately covers the most likely impacted receptors surrounding the Project.

Based on those requirements, the NSW OEH AQMS at Singleton NW in the Hunter Valley, located approximately 1.5km to the east of the Rix's Creek Mine was identified as potentially meeting those criteria. In the period 1 January 2017 to 31 December 2017, 2 013 486 t of ROM coal was extracted from Rix's Creek South (approximately 1.5km to the west of the Singleton NW AQMS)². Other mining operations are located at distances greater than 4km from Rix's Creek South.

Continuous PM₁₀ data measured at the Singleton NW AQMS during 2017 has been critically reviewed. A frequency distribution of the PM₁₀ measured at the Singleton NW AQMS in 2017 and 2012 (the year subject to detailed modelling in the AQIA for comparison), Wallsend AQMS in 2012 (the AQMS from which data were obtained and adjusted to support the AQIA), and Beresfield AQMS in 2012 (for comparison) is presented in **Figure 4.3**.

The data clearly indicate that the Singleton NW AQMS is located in a significantly impacted particulate matter environment which would be expected given the predominant mining nature of the area. The data from Beresfield indicates a less impacted particulate matter environment, with data from Wallsend being less impacted still.

A frequency distribution of PM₁₀ measurements at all Upper Hunter AQMS and at Wallsend AQMS (for comparison) during 2012 is presented in **Figure 4.4**. This indicates that all sites in the Upper Hunter (with the significant exception of Jerrys Plains AQMS) show a similar PM₁₀ frequency distribution, with a smaller frequency of lower PM₁₀ concentrations and a greater frequency of higher PM₁₀ concentrations as would be expected given the mining activities undertaken in the area at a range of production rates.

² https://www.bloomcoll.com.au/uploads/2017_RCM_Annual_Review_Report.pdf

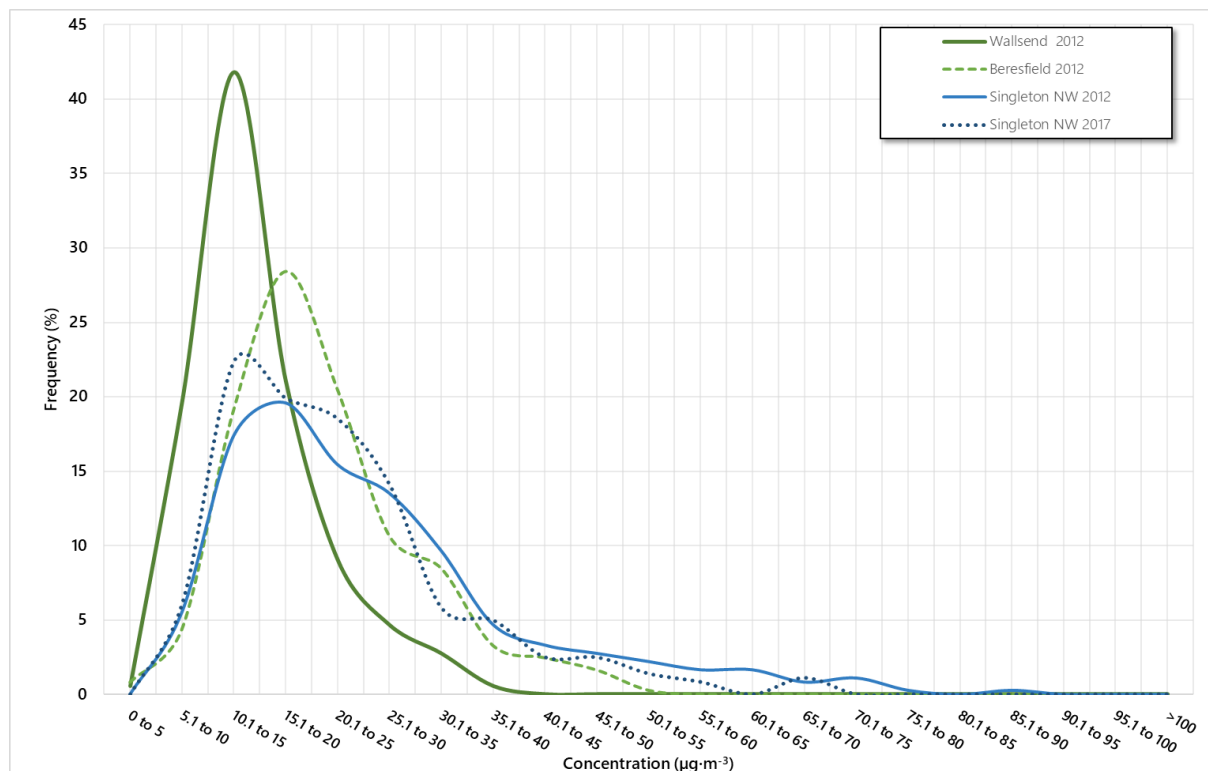


Figure 4.3
PM₁₀ Frequency Distribution - Wallsend, Beresfield, Singleton and Singleton NW

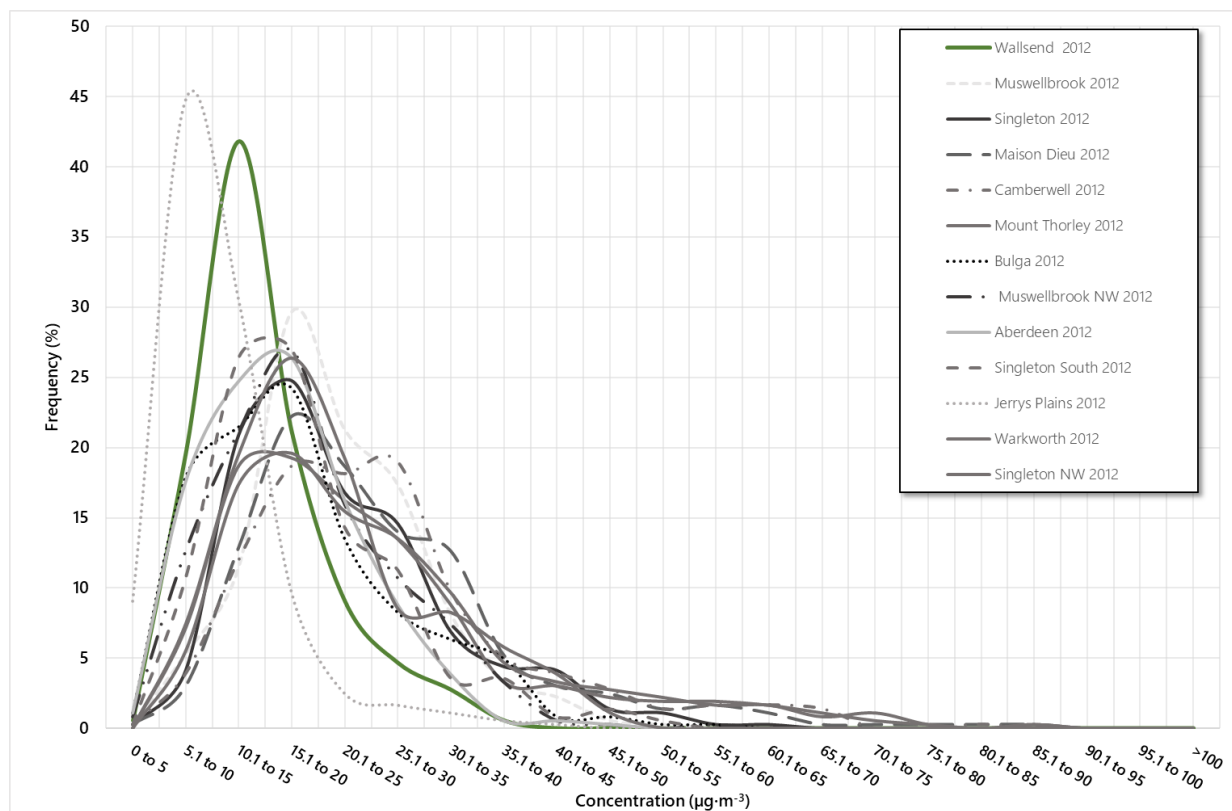


Figure 4.4
PM₁₀ Frequency Distribution – Upper Hunter

As may be inferred from the plotted distribution frequencies, the distribution of data measured at Jerrys Plains is a significant outlier from the general distribution measured at other Upper Hunter sites. This indicates that this site is comparatively less impacted by PM₁₀ than other AQMS in the region. In addition, the distribution of PM₁₀ indicates that the Jerry Plains AQMS may be even less impacted than the Wallsend AQMS, data from which was adopted for further analysis in the AQIA.

In this instance, and on the basis of the data reviewed, it is our opinion that the use of an existing background dataset to provide an approximation of impacts from currently (or anticipated) operational activities in a different airshed is not justified. Although it may provide a conservative approximation of background conditions, it is also highly likely to provide an unrealistic approximation.

Although not in accordance with the Approved Methods, the Approved Methods does show shortfalls in its approach to the evaluation of short-term cumulative impacts (RAMBOLL Environ, 2015). RAMBOLL Environ prepared a report for NSW EPA in 2015 which reviewed the adoption of cumulative air impact assessment methodologies for NSW. As outlined within that report, a number of project approvals have been supported by NSW EPA on the basis of cumulative assessment and approaches to the treatment of background air quality which are not in strict accordance with the Approved Methods.

Option 3 – Use of a representative dataset to which impacts from surrounding projects are added through modelling

This is the option which was selected for use within the AQIA. This option was selected as impacts associated with nearby operations (i.e. Karuah East Quarry [and Karuah Red Quarry once operational]) could be specifically modelled, with the site layouts and locations of emission sources reflective of actual conditions, including meteorology and topography. To those impacts were added a contribution from the Project and a background dataset was added.

Importantly, the background dataset added in this approach seeks to represent the likely particulate environment without the impact of current and proposed extractive industry in the area. Option 1 and Option 2 discussed previously required that the background dataset does include the impacts of those operations which has been shown to be problematic for a number of reasons.

Given that production at Karuah Quarry is now confirmed to cease prior to 6 May 2021, this approach allows for those incremental contributions to be removed from further assessment, an approach which would not be possible using air quality monitoring data alone.

The approach adopted in the AQIA examined the relationship between air quality monitoring data measured by Hunter Quarries (see Option 1) near to the Site, and that measured by NSW OEH at a location in Wallsend. That relationship was then applied across all data measured at Wallsend to provide an adjusted air quality monitoring dataset that was continuous and therefore able to be used in the AQIA.

The adjusted dataset, also termed the ‘equivalence dataset’ by NSW EPA, seeks to provide background data without the impact of quarrying operations. However, due to the data used to form the equivalence relationship, some level of quarrying activity is included in the relationship. Monitoring performed by Hunter Quarries was associated with extraction at the Karuah Quarry and also construction activities at Karuah East until 14 November 2017, and

extraction operations from 16 November 2017. No data is publicly available through recent AEMRs to provide data on extraction rates, although the AEMR for 2017 indicated that in the second month of operations, an extraction rate of 16 884 t was experienced in December 2017.

Data is now available from the Hunter Quarries monitoring site until March 2019 (from April 2016) and the equivalence relationship can be updated. Over the period since December 2017, it would be anticipated that extraction operations at Karuah East would have increased.

Therefore, far from providing a ‘less conservative assessment of the total impact of the proposal’ as NSW EPA has suggested in its submission, the use of the equivalence dataset includes an element of double counting which results in a more conservative assessment.

Figure 4.5 presents the frequency distribution of PM₁₀ measurement at Jerrys Plains AQMS and Wallsend AQMS in 2012, and the ‘equivalence dataset’ using the updated equivalence relationship between April 2016 and March 2019. These data clearly indicate that the equivalence dataset approximates a less impacted environment than that measured at Wallsend AQMS. It also indicates that the equivalence dataset represents a marginally less impacted particulate environment than that experienced at Jerrys Plains, in the Upper Hunter.

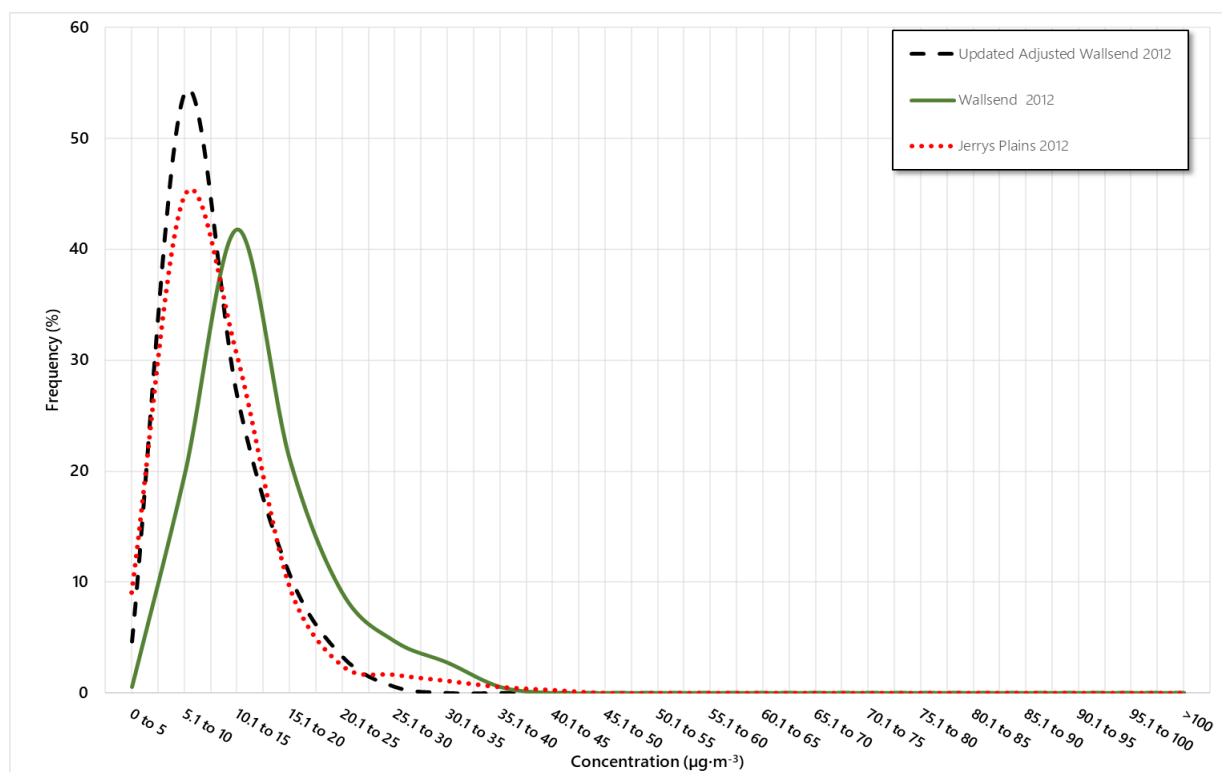


Figure 4.5
PM₁₀ Frequency Distribution – Wallsend, Jerrys Plains and Equivalence Dataset

In seeking to approximate an environment which is not impacted by particulate matter from extractive industries in the area of the Site, it is respectfully suggested that the approach taken, and the data provided to support that approximation justifies the use of the equivalence dataset.

Assessment of control strategies to achieve compliance with the impact assessment criterion

One minor exceedance of the maximum 24-hour PM₁₀ criterion was predicted within the AQIA. A summary of that exceedance, predicted during Stage 1C operations, is presented in **Table 4.8** which is a direct extraction from Table 38 of the AQIA. This exceedance was predicted to occur on 8 April 2012. Note that the incremental contributions from the Karuah Quarry were significant, and these can now be justifiably removed on the basis that the operations are to be ceased by 6 May 2021 at the latest.

Table 4.8
Previously Predicted Maximum 24-hour Average Cumulative PM₁₀ Concentrations – Stage 1C

Receptor	Maximum 24-hour PM ₁₀ Concentration (µg·m ⁻³)				
	Cumulative Impact	KSQ	KEQ	KQ	BG
16	50.8	4.7	5.6	15.6	24.9

Note: KSQ = Karuah South Quarry, KEQ = Karuah East Quarry, KQ = Karuah Quarry, BG = background

These modelling data have since been updated based on:

- the requirement of NSW EPA to consider maximum extraction rates at surrounding operations (i.e. Karuah East Quarry at 1.5Mtpa);
- the cessation of activities at Karuah Quarry;
- the inclusion of additional particulate controls on the processing plant; and
- the adoption of an updated 'equivalence background' dataset.

Updated modelling indicates that no exceedances of any air quality criteria are predicted at any receptor location, during any stage of construction or operation modelled. The updated modelling predictions of maximum 24-hour PM₁₀ concentration associated with Stage 1C are presented in **Table 4.9**.

Table 4.9
Updated Predicted Maximum 24-hour Average Cumulative PM₁₀ Concentrations – Stage 1C

Receptor	Maximum 24-hour PM ₁₀ Concentration (µg·m ⁻³)				
	Cumulative Impact	KSQ	KEQ	KQ	BG
23	44.6	16.6	8.6	0.0	19.4
22	40.5	17.3	11.4	0.0	11.8
16	33.1	4.6	9.1	0.0	19.4

Note: KSQ = Karuah South Quarry, KEQ = Karuah East Quarry, KQ = Karuah Quarry, BG = background

Results are presented for receptor 16 (the location of the previously predicted exceedance (see **Table 4.8**)), for the receptor at which the maximum cumulative 24-hour PM₁₀ concentration is now predicted (receptor 23), and for the receptor at which the maximum incremental 24-hour PM₁₀ concentration is now predicted (receptor 22).

Results associated with Stage 1C are presented as these indicate the highest predicted incremental impacts at all receptors and also the greatest cumulative impacts of any stage modelled. When compared with results in **Table 4.8** and in the EIS, the results show:

- the increased incremental contributions from Karuah East Quarry when modelling at 1.5Mtpa production rate;
- the removal of incremental contributions from Karuah Quarry due to the cessation of production by 6 May 2021 at the latest; and
- a minor reduction in incremental contribution from the Project (KSQ) due to additional controls on the processing plant.

Given that the 'equivalence dataset' has been based on air quality monitoring data which includes a level (unknown) of production at Karuah Quarry and Karuah East Quarry, an element of double counting is included within the background data and the results can be viewed as being conservative.

The results of the updated assessment presented above indicate that the Karuah South Quarry can be operated without resulting in any exceedances of the relevant air quality criteria. The exceedance previously predicted in the AQIA submitted to support the Project would not be predicted to eventuate following the cessation of activities at Karuah Quarry. This conclusion applies equally to the data presented in the original AQIA and that presented in this response to submissions, even taking into account the increased production rate at Karuah East Quarry during the site establishment and construction phase and Stage 1C of the Project.

Section 8 of the AQIA provides a detailed description of a proposed air quality monitoring program (AQMP) which would be operated following the grant of development consent for the Karuah South Quarry. The AQMP includes real-time monitoring (using methods specified in the relevant NSW guidance documents), with monitored concentrations compared to trigger levels at which actions would be implemented at the Site to either apply additional controls or modify/cease site activities until such time as concentrations measured are below defined acceptable limits.

Representative Comment(s)

Requirements for additional air quality assessment should be imposed should there be any alterations to the timings / assumptions assessed in the AQIA (re. cumulative impacts).

MidCoast Council Submission

Response

The Quarry (if approved) would be subject to a range of conditions relating to operational management, including monitoring requirements. In the unlikely event that any changes to the operational conditions are required by the Applicant (including alterations to the timings and assumptions), a modification application would need to be submitted to DPIE in relation to the subject changes.

Representative Comment(s)

Recommended that should air quality monitoring indicate that resource company-owned residences experience emissions above air quality standards that they are not permitted to be used for residential purposes.

MidCoast Council Submission

Response

Council's position is acknowledged, however, there would be no residential premises within the Site throughout the life of the Project.

Representative Comment(s)

The AQIA has factored in a 90% control rate for wheel generated dust relying on water suppressant. The 90% control rate should be justified.

MidCoast Council Submission

Response

Table 56 and Table 2-16 of the AQIA indicate that the particulate control afforded by haul road watering may be between 72% and 90%. The control efficiency has been calculated using a US EPA equation which takes into account site specific factors such as evaporation rates, traffic flow, time between water application, water application intensity and water availability during each modelled scenario. Full details of the method used to calculate these emission control efficiencies is provided in Annexure 2 of the AQIA.

The control efficiencies associated with haul road watering vary between each of the scenarios modelled and also vary by season (due to differences in evaporation rates). Table 2-12 of the AQIA provides the calculated emission control efficiencies for all scenarios and seasons.

During each scenario, the lowest of the control efficiencies calculated for each season have been adopted across the whole year. For example, during site establishment and construction, the control efficiency calculated in winter was 95.7%, although the efficiency associated with the summer months (90%) was applied across all seasons. In Stage 1C, the control efficiency calculated in winter was 86.2%, although the efficiency associated with the summer months (67.8%) was applied across all seasons. This approach is conservative.

Representative Comment(s)

The area suffers from dust pollution associated with the existing two Hunter crushing plants. No independent dust monitoring is in place and pollution is seriously affecting local residents, causing reports of illness and nose bleeds. The dust evaluation should take into consideration all operations in the area. As extraction continues a large void will emerge as a cutting through the existing hill causing changes in the wind conditions around the site and potentially exacerbating the dust spread from the site. The Applicant should be made to seal the Branch Lane up to at least the end of the property.

H. Fitzpatrick Submission – 390076

Response

The AQIA considered in detail the operations at the Karuah Hard Rock Quarry, the Karuah East Quarry and the proposed Karuah Red Quarry in addition to considering potential impacts associated with the proposed Karuah South Quarry.

This Response to Submissions has also considered that production and rehabilitation activities at the Karuah Quarry is anticipated to cease on or before 6 May 2021.

The meteorological data used in each of the modelled scenarios for the Karuah South Project (spanning site construction and establishment through to later extraction stages) has been modified through the consideration of changes in the topography of the extraction area.

The quarry access road and Blue Rock Close to the Pacific Highway would be sealed. No quarry traffic would use Branch Lane north of Andesite Road.

Representative Comment(s)

The crushing plant will be uncovered, releasing fine particles (including silica) into the air. This is shared with surrounding air space and residents via tank water. People in Karuah already complain of frequent nose bleeds and irritation from silica particles. The crushing plant should be enclosed in a building and dealt with like other harmful substances. I assume the workers need respiratory protection; so do other air breathing creatures, human or otherwise.

S. Munro Submission - 390006

Response

At the outset, it needs to be stated that there is no epidemiological or other data linking the nominated health claims from people in Karuah with the current approved quarrying operations undertaken by Hunter Quarries Pty Ltd.

The mobile processing plant is now proposed to be partially enclosed to reduce dust emissions and correspondingly, emissions of particulate matter (including silica) would be reduced from the levels assumed in the AQIA. The AQIA includes detailed assessment of best practice dust control and concludes that a wide range of dust control measures would be adopted during all stages of the Project construction, site establishment and operation.

Predicted concentrations of silica at all surrounding residential properties are less than $0.1\mu\text{g}/\text{m}^3$ (less than 4% of the relevant criterion) as a result of the Project. The predicted incremental change when compared to the criterion is therefore not significant. As discussed in the AQIA, respirable crystalline silica is an occupational and safety issue rather than an environmental issue.

Representative Comment(s)

Potential for deposition of Quarry dust and silica dust into the Grahamstown Dam

Ironstone Community Action Group Inc. Submission - 390466

Response

The AQIA has assessed the potential impacts of the Project and existing and approved operations on human health through inhalation (breathing) risk at a number of residential receptor locations within an approximately 2km radius of the Site. At all of those locations, the maximum dust deposition rate predicted is 0.3g/m²/month. At locations furthest from the Site, dust deposition rates are predicted to be less than 0.1g/m²/month.

The Grahamstown dam is located approximately 17 km to the southwest of the Site. At this distance, the contribution of the Project to dust deposition will be negligible.

Representative Comment(s)

Not conducting real-time monitoring of dust and noise is a mistake. Swab tests of people's properties should be completed.

Ironstone Community Action Group Inc. Submission - 390466

Response

Section 8 of the AQIA provides a detailed description of a proposed air quality monitoring program (AQMP) which would be operated prior to the commencement of earthmoving operations within the Site. The AQMP includes real-time monitoring (using methods specified in the relevant NSW guidance documents), with monitored concentrations compared to trigger levels at which actions would be implemented at the Site in conjunction with a review of wind direction data to either apply additional controls or modify/cease site activities until such time as concentrations measured are below defined acceptable limits.

It is assumed that the comment regarding swab tests relates to amenity impacts associated with dust deposition. A predictive dispersion modelling assessment has been performed to support the EIS which indicates that the rate of dust deposition anticipated to result from the operation of the Karuah South Quarry is a maximum of 0.3g/m²/month at all surrounding sensitive receptor locations (compared to a criterion of 2.0g/m²/month). These maximum rates of dust deposition are anticipated to occur during Stage 2B of operations and represent 15% of the relevant criterion.

The rate of dust deposition at nearby receptors is predicted to be minor due to the range of particulate emission control measures which are proposed to be adopted at the Quarry. The correlation between wind speed and direction and the locations of surrounding residences is provided in Section 4.3.3.

No swab testing of individual properties is proposed and a program of air quality monitoring surrounding the Quarry would be performed to demonstrate compliance with relevant criteria.

4.3.4 Operational and Traffic Noise

4.3.4.1 Noise Impacts and Modelling

Representative Comment(s)

Noise and Vibration Impact Assessment - requires the following additional information.

- a) *Explanation of why acoustic monitoring was not undertaken at R22 given that it is potentially the most impacted residence.*
- b) *Explanation of why property R2 was used in the traffic noise assessment in Section 3.6 of the NVIA (rather than property R22).*
- c) *Confirmation that the 4m high acoustic barrier/fence is incorporated into the modelling of Scenario 1 and Scenario 3.*

Environment Protection Authority Submission

Response

- a) The landowner at R22 was not contactable and the property was inaccessible when the placement of the noise logger was planned. As a consequence, the logger was placed just 100m further west along the common fence line at a comparable distance of the residence R22 from the Pacific Highway, which is representative of R22.
- b) Section 3.6 presents the RNP criteria and does not mention receivers. There is a typographical error in Section 4.5: R2 should be R22. Traffic noise impact assessment in Section 5.5.3 considers R16 at 185m from the Highway as this is the closest residence to the southbound interchange but it is agreed that R22 at 108m from the Highway should also have been assessed.

The calculated worst case noise level from quarry-related heavy vehicles at R22 is 45.5 dB(A), which is almost 10 dB below the RNP criterion of 55 dB(A) and 13 dB below the existing daytime traffic noise level of 58 dB(A) recorded at R21 (NM4).

- c) It is confirmed that the operational noise modelling incorporated the 4m acoustic barrier indicated in Figures 2 and 6 in Scenarios 1 and 3.

Representative Comment(s)

Noise report states that morning shoulder periods generally have higher background level than the daytime background level. This is not reflected in the noise data charts in annexure 1 - especially between 5:00am and 5:30am. It is recommended that further justification for the use of 'daytime' period amenity noise level be completed for the 'shoulder period' between 5:00am and 7:00am.

MidCoast Council Submission

Response

The statement made in Section 3.3 was a generalisation, and it is agreed that the data do not show background noise levels between 5:00am and 5:30am as being higher than the background noise levels later in the day. No loss of validity has occurred, however, as the only

assessable noise during this morning shoulder period would be the loading of trucks and the movement of product despatch trucks within the Site boundary. This source was also included in the operational noise scenarios in which all other sources have sound power levels typically more than 15 dB greater than the product despatch trucks. Separating out these trucks as the only sources operating before 7:00am gives a noise level < 30dB(A) at the most impacted receiver, which is well below the noise trigger level of 49 dB(A) that would have resulted from adopting the night-time background noise level.

Representative Comment(s)

5:00am operation commencement would disturb locals, and 24 hour maintenance times would set a precedent for local operations. Does this mean that trucks will be loaded prior to 5:00am for despatch at 5:00am?

A. Albury Submission - 390081

Response

Noise emissions have not been assessed to occur prior to 5:00am, meaning trucks would not be loaded before this time. Further, the Quarry Operator would instruct all product truck drivers not to approach the Site prior to 5:00am. In reality, it is likely the first trucks would leave the Site by about 5:15am.

Representative Comment(s)

ICAG reject comments that traffic noise on the Pacific Highway is the same as and equal to that of quarry/mining noise. It is obvious that the quarry is much louder in their operation. This noise exceeds people's tolerance.

Ironstone Community Action Group Inc. Submission - 390466

Response

The cumulative noise from all existing and proposed quarries (Table 14 of the Noise Impact Assessment) at the most impacted receivers R20, R22 and R23 was 49 dB(A) against a criterion of 55 dB(A). This considers the predicted worst-case noise impacts from each quarry regardless of operational scenario or meteorological condition, so is an unrealistically high estimate of worst case impacts. The daytime traffic noise level measured adjacent to R22 was 58 dB(A) Leq(day). Pacific Highway noise significantly exceeds the maximum predicted cumulative quarry noise at these receivers. Receivers more distant from the highway will receive less highway noise, but these receivers are also further from the quarries and compliance with quarry noise criteria has been demonstrated at all receivers.

It is noted that although the predicted noise level of a 15 minute period would comply with the criterion, there would be short periods in each 15 minute period when traffic levels on the highway are lower than normal which in turn allows the noise from the Site to be detected.

4.3.4.2 Noise Mitigation and Monitoring

Representative Comment(s)

The proposal includes the commencement of trucking operations from 5.00 am Monday to Saturday. Please provide details of why it is necessary to commence at this time and how the amenity of nearby residents would be either protected or else impacted.

Please address, in terms of both feasibility and quantification of likely beneficial effects, the potential for the crushing plant to be enclosed to reduce noise emissions.

Department of Planning and Environment Correspondence

Crushers should be placed in a soundproof building (regardless of whether they are mobile) to reduce noise and dust.

A. Albury Submission - 390081

The proposal includes an uncovered crushing plant. There have been noise pollution issues with the existing Hunter Quarry. The EIS should take the combined effect of all operations in the area into account.

H. Fitzpatrick Submission - 390076

Response

Noise from product loading and on-site truck movements prior to 7:00am would be <30 dB(A) at the most impacted receivers to the south. Background traffic noise at Residence 21 (NM4) was in the range 47-53 dB(A), L90 during this time period and LAeq levels were approximately 5 dB higher. The level of impact would be minimal.

Partial enclosure of the processing plant also represents noise control at the source which is usually the optimal solution. However, it remains the key requirement of the EPA that the critical parameter with respect to noise is the noise experienced at a residence or sensitive receiver. It will be the responsibility of the Quarry Operator to ensure the equipment is located in an area, with sufficient shielding and source controls to achieve the nominated noise level, as stated in the environment protection licence for the Quarry.

The proposal to construct the 4m high fence represents noise control along the propagation path, which is often the appropriate approach if engineering control at the source is technically or economically unfeasible. The barrier insertion loss in the order of 10 dB is comparable with the noise reduction achievable by cladding the processing plant.

The DPIE is fully aware of the benefits to the building and construction industry through the early delivery of construction materials of each operational day to concrete and asphalt batching plants and construction project sites. The benefits relate to reduced traffic congestion during the peak morning period which in turn reduces travel times and hence provides cost savings for the building of homes, commercial buildings and infrastructure. Given the Quarry Operator is likely to focus on the delivery of products to the Sydney metropolitan area, the retention of a 5:00am start, in the manner proposed is considered appropriate.

Section 5.3 of the acoustic assessment considers the impact of all quarry operations in the area.

4.3.5 Traffic and Transport

Representative Comment(s)

Dust across the highway is a hazard.

A. Albury Submission - 390146

Response

Predicted dust levels will not be of a concentration that would cause a visual hazard for motorists travelling on the Pacific Highway. The Project would involve a range of dust suppression measures to limit dust generation.

Representative Comment(s)

Truck movements presented are misleading. There could be hundreds or thousands per week per day

A. Albury Submission - 390146

Response

The development consent for the Karuah South Quarry would include conditional requirements nominating the maximum hourly and daily number of laden trucks with verification from weighbridge records. Emotive claims relating to truck movements are not correct.

Representative Comment(s)

The impact of truck movements is understated in the proposal (provides calculations indicating approx. 225 truck movements per day). Impacts on traffic in the area will be unacceptable. The potential for accidents will increase dramatically.

(Name Withheld) Submission - 389961

Response

The Applicant acknowledges that the Project would result in the generation of traffic which would increase overall traffic levels on local and State road networks in the area surrounding the Site. As such, The Transport Planning Partnership Pty Ltd (TTPP) was commissioned to undertake a detailed traffic and transport assessment to inform the preparation of the EIS. The results of this assessment found that maximum product truck movements during a high-volume campaign would be 246 per day, i.e. 123 loads. At maximum production, employee and visitor light vehicles were estimated to amount to approximately 60 light vehicle movements per day, i.e. 30 return trips. This would represent approximately 1% of total traffic and 9% of heavy vehicle traffic on the Pacific Highway in the vicinity of the Site.

Traffic modelling, undertaken by TTPP (2018) at key intersections within the vicinity of the Site, indicates that intersections would continue to operate satisfactorily regardless of the additional traffic generated by the Project. During peak production at the Karuah South Quarry, the highest delay (16 seconds) would occur at the Pacific Highway Interchange by the drivers of vehicles turning right out of the Pacific Highway westbound off-ramp during the AM peak hour (seven vehicles per hour) as well as the PM peak hour (five vehicles per hour). This impact has been assessed as minimal by TTPP.

The Applicant further acknowledges the concern in the community regarding road user safety. The traffic and transport assessment (TTPP, 2018) considered road safety in terms of the intersection capacity and sight distance, confirming that the existing design of the road network is suitable and safe for the proposed traffic levels.

Representative Comment(s)

Danger to road users from product falling from trucks.

Ironstone Community Action Group Inc. Submission - 390466

Response

The Applicant acknowledges that product falling from trucks could potentially pose a hazard to other road users. As such, a Driver's Code of Conduct would be implemented by the Quarry Operator to ensure that other motorists are minimally impacted by Project-related traffic. The Driver's Code of Conduct would incorporate a mechanism for all drivers to brush down their vehicles prior to departing to remove debris and would stipulate that all loads that leave the Quarry should be covered to avoid spills. Drivers that do not abide by these rules would face disciplinary action.

4.3.6 Fly Rock Management

Representative Comment(s)

...has complained 3 times (verbally) regarding blast vibration from Karuah Quarry. Proposed quarry is 2-3 times closer. Therefore, expects major increase in ground vibration. Requests annual property inspections.

R. Trotter Submission - 390141

Response

All blasting undertaken within the Karuah South Quarry would be designed to satisfy all blast criteria with respect to ground vibration and airblast overpressure. The initial blasts would be undertaken in the northeastern side of Stage A1, approximately 650m from Mt Trotter's home (Residence 22), a distance that would enable confirmation (or adjustment) of the blast design to ensure that all future blasts closer to Mr Trotter's residence would similarly satisfy the blast criteria.

It is noted that it is quite likely that Mr Trotter would hear most blasts within Stage 1 and possibly Stage 2 within the Site. Whilst some blasts may be felt, the predicted blast levels, which are comfort based, would be well below those capable of causing structural damage.

The Quarry Operator would be pleased to arrange a building inspection of Mr Trotter's home and any other privately-owned dwellings and/or important structures prior to the first blast on the Site to provide a baseline for any claim for structural damage caused by blast initiated at the Karuah South Quarry.

Representative Comment(s)

Stopping of traffic on the Pacific Highway during blasting. All site is within 500m of the highway. This was a condition on Pacific Highway reconstruction.

R. Trotter Submission - 390141

Response

As discussed above, the initial blast in Stage 1A would occur approximately 650m from Mr Trotter's residence, a distance greater than the 500m at which all blast parameters would be monitored to ensure that the design of all subsequent blasts are optimised to avoid any adverse impacts upon traffic travelling on the Pacific Highway or Mr Trotter's residence.

The Applicant commissioned Prism Mining to undertake a blasting assessment for fly-rock control to provide an assurance to Mr Trotter, DPIE and RMS that fly-rock could be appropriately controlled and that there would be no need to close the Pacific Highway at any time during any blast. A copy of the report by Prism Mining is reproduced as **Appendix F**.

The report presents methods to estimate potential fly-rock range and determine suitable blast clearance distances for the proposed Karuah South Quarry in order to manage the risks associated with fly-rock from blasting. Preliminary blast parameters, clearance distances and associated factors of safety are provided using published guidelines, with further operational adjustments to be made once blasting commences, based on site experience.

While fly-rock risk can be largely controlled within the Quarry Site, using blast designs nominated in the EIS, the report outlines that modified designs will be required for some blasts, to contain fly-rock within reduced available clearance distances. As a precaution, access restrictions would be adopted when initiating some blasts, i.e. through the temporary closure of Blue Rock Close to the south for a period up to approximately 15 minutes and on defined areas within the adjacent land holdings to the east and west. The Quarry Operator would liaise with management of the Karuah East Quarry well in advance and on the day of each blast to enable the temporary closure of Blue Rock Close to be managed to minimise any inconvenience.

The report by Prism Mining also states that in addition to appropriate blast designs, to suit local topography and ground conditions, a high level of operational control will be required for blasting, and south-facing 'end-walls' will need to be appropriately buffered for both fly-rock and airblast overpressure control.

The liaison between the operators of the Karuah South Quarry and Karuah East Quarry would be a regular event in that operators of both quarries would advise each other of their respective plans for blasting of their quarries and the need to accommodate operational/transportation short-term stoppages to achieve safety of all quarry personnel within both Quarries.

4.3.7 Visibility and Lighting

Representative Comment(s)

Existing quarries are an eyesore. Visual impacts of tree removal including skyline changes. Existing quarry approval requires that the existing mountain skyline be retained. Impact on impression of the area due to visibility.

H. Fitzpatrick Submission - 390076



Response

The Karuah South Quarry has been designed to minimise the exposure of operational extraction faces and to avoid breaking the skyline when viewed from the Pacific Highway. The proposal to progressively revegetate the upper benches of the extraction area throughout the quarry life (see EIS Section 2.12) would minimise the visual impacts from the Pacific Highway.

Representative Comment(s)

The Quarry will be a significant visual impediment on the beautiful natural environment. It is likely to be visible from the water travelling up on the Karuah river, and coming into town from the highway. The image of Port Stephens as a beautiful, healthy and natural environment will be diminished by a rock quarry occupying an area that is currently a beautiful vegetated hill.

(Name Withheld) Submission - 389936

Response

The claim that the Karuah South Quarry would be visible from the Karuah River is not supported as a result of the preparation of cross-sections between the river and the proposed extraction area – see typical cross-sections in **Figure 4.6**.

4.3.8 Groundwater

4.3.8.1 Groundwater Impacts and Assessment

Representative Comment(s)

The existence of springs and groundwater sources for creeks on the property should be considered.

Ironstone Community Action Group Inc. Submission - 390466

Response

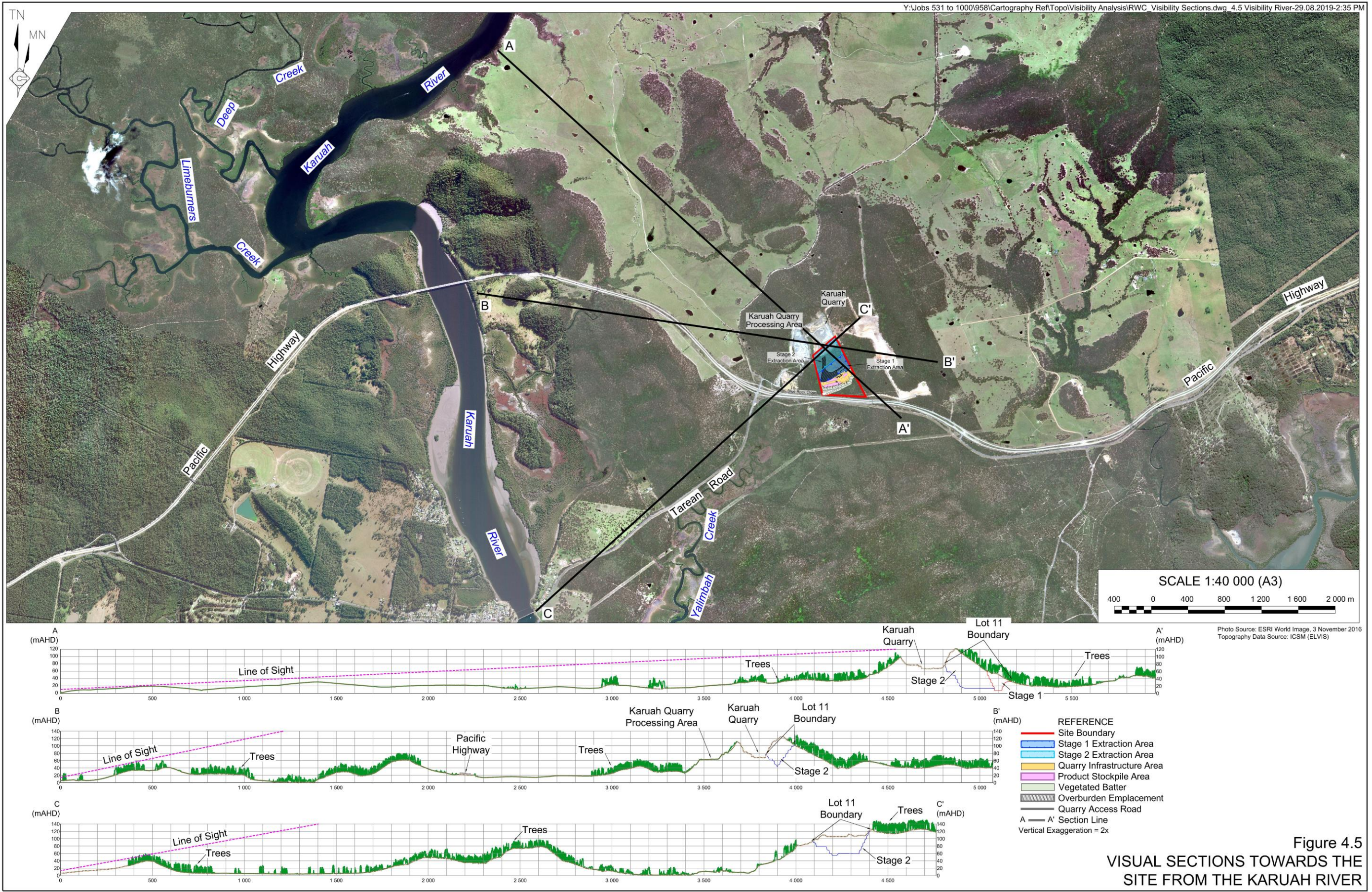
The Applicant commissioned Larry Cook and Associates to conduct a Groundwater Impact Assessment for the Project (refer SCSC Volume 2 Part 5 Cook, 2019). As noted in Cook (2019) and Section 5.7.5.5 and Section 5.5.3.2 of the EIS, no groundwater dependent ecosystems or groundwater sensitive ecosystems were identified during detailed surveys of the Site. In addition, as identified in the Surface Water Assessment (RWC, 2019b), watercourses on the Site are ephemeral (i.e. only discharge for a short duration after rainfall) and the weight of evidence clearly indicates an absence of springs and negates the possibility of groundwater discharging to surface water (baseflow) at the Site.

4.3.8.2 Groundwater Mitigation and Monitoring

Representative Comment(s)

Ongoing monitoring and reporting of groundwater levels in monitoring bores, and groundwater inflows to the quarry for the life of the operations including closure.

Department of Industry – Lands and Water



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Response

As noted in Cook (2019) and Section 5.7.6 of the EIS, the Applicant would implement a groundwater monitoring program from the existing piezometer network on the Site.

This monitoring would include continuous logging of water levels and bi-annual sampling for laboratory analyses.

4.3.9 Water Supply

Representative Comment(s)

Alarming that potable water will be imported for use as dust suppressant. Water should be prioritised for people before the Quarry.

Ironstone Community Action Group Inc. Submission - 390466

Response

As noted in Section 5.6.4.4 and Table 5.16 of the EIS, the site water balance identifies that the proposed sediment basins/dams will be sufficient to supply the Quarry in all but the driest of years. Should the Applicant be required to import water to the Site, this would be part of a commercial arrangement that would financially compensate the supplier at the appropriate rates determined by market demand.

Representative Comment(s)

Dust suppression using wet earth fog cannons or high volume sprinklers. Where is the water going to come from?

S. Filson Submission - 389951

Response

As noted in Section 5.6.4.4 and Table 5.16 of the EIS, the site water balance identifies that the proposed sediment basins/dams will be sufficient to supply the Quarry's water requirements (including the annual requirement for dust suppression on the processing plant) in all but the driest of years.

4.3.10 Aboriginal Heritage

Representative Comment(s)

Survey coverage was not adequate and excluded areas where Aboriginal sites were more likely to occur along creek banks and areas that would have had higher potential for accessible natural resources. OEH recommends that additional survey be undertaken in the southern portion of the Project area. Additional consultation with the registered Aboriginal parties should be undertaken to provide them with the opportunity to participate in the survey.

Recommendation 6 – OEH recommends that archaeological survey be undertaken in the southern portion of the Project area with opportunity provided to the registered Aboriginal groups to participate in the survey.

Office of Environment and Heritage – Heritage Division Submission

Response

On 24 July 2019, Biosis staff and Aboriginal RAPs undertook an additional survey in the southern portion of the Site. Biosis contacted the Karuah Local Aboriginal Land Council via email and phone calls to arrange the survey. The results of the survey have been included in an updated ACHA and archaeological report (AR). It is noted that no comments from RAPs were received following the survey.

Representative Comment(s)

Revised Aboriginal Cultural Heritage Assessment Report and Revised Archaeological Report Required

A revised Aboriginal cultural heritage assessment (ACHA) and a revised Archaeological report are required to include the results of the additional survey. Additional consultation with the registered Aboriginal parties regarding Aboriginal cultural values in the southern portion of the Project area is also required and should be documented.

Recommendation 7 – OEH recommends that the results of the additional survey of the southern portion of the Project area and additional consultation with the registered Aboriginal groups relating to Aboriginal cultural values of this area should be documented in a revised Aboriginal cultural heritage assessment and a revised Archaeological report in accordance with the SEARs.

Office of Environment and Heritage – Heritage Division Submission

Response

Both the ACHA and AR have been updated with the results of the additional survey (as detailed above) and further consultation with the RAPs has also been undertaken. Documentation of this consultation is provided in **Annexure 7a** of the revised ACHA. Extracts of relevant text from the updated ACHA and AR are attached as **Appendix G**.

Representative Comment(s)

The EIS is a white man's interpretation. Dozens of trees on the site are hundreds of years old. The ecosystem around them sustains a variety of habitats which would have been recognised and revered by our First Nation people.

S. Filson Submission - 389951

Response

The on-site consultation undertaken by Biosis with the RAPs sought information regarding the both tangible and intangible aspects of the Site's Aboriginal cultural and social significance. RAPs advised they had no knowledge of any culturally or socially significant sites, objects or places within the Site. During consultations, RAPs further advised they had surveyed the Site on four separate occasions. To their knowledge, the area has no known places, sites or associations of cultural or social significance. This has been documented in the ACHA and AR.

Representative Comment(s)

Social values - 400+ yr old trees were seed trees for historic logging industries, they reflect the socio-economic and natural history of the area.

Ironstone Community Action Group Inc. Submission - 390466

Response

Biosis advises that at no time during consultation or site visits did RAPs provide any comment upon or information regarding the social values of trees associated with historic logging industries in the Site from an Aboriginal cultural perspective.

Representative Comment(s)

Michael Kiely has a glass case full of artefacts he has collected from the site.

Ironstone Community Action Group Inc. Submission - 390466

Response

RW Corkery & Co Pty Limited has contacted Michael Kiely who categorically denies this assertion. He has never collected any artefacts on the property.

4.3.11 Rehabilitation

Representative Comment(s)

How can rehabilitation commence prior to the completion of extraction activities?

Ironstone Community Action Group Inc. Submission - 390466

Response

The Karuah South Quarry would be operated with an emphasis placed upon progressive rehabilitation. The initial rehabilitation activities would be undertaken throughout the site establishment and construction stage, particularly for the rehabilitation of the batter slopes of the Quarry infrastructure area as Stages 1A, B and C are constructed.

The Quarry Operator would adopt best practice by progressively rehabilitating the upper extraction benches in the manner described in the EIS (Figure 2.15) to minimise the visual impacts of the extraction operation from the Pacific Highway.

Representative Comment(s)

Rehabilitation - request specifics re. future land use. Rubbish tip?

Ironstone Community Action Group Inc. Submission - 390466

Response

Section 2.12 of the EIS clearly presents details of the final landform (Figure 2.14) and the subsequent land use(s) benefiting from the site close to the Pacific Highway interchange, i.e. for the storage of boats / caravans, plant nurseries or transport depots.

4.3.12 Economic

Representative Comment(s)

Concerns re. discharge impacting oyster harvest, stock health, saleability.

NSW Farmers - Port Stephens Branch Submission – 390001

Response

As discussed in Section 4.3.1, the Applicant recognises the concerns of Port Stephens oyster farmers and based on the nature of the proposed operations (i.e. extraction, crushing, stockpiling and loading) recognises the principal risks to downstream water quality from the Site as being the discharge of sediment-laden runoff. The Applicant proposes to manage the risk of sediment-laden runoff via the measures described in the Preamble to Section 4.3.1 to ensure that the catchments generating runoff entering the sediment basins/dams would be vegetated to reduce sediment loads in any runoff. As such, there would be no impacts on oyster harvest, stock health and saleability.

Representative Comment(s)

EIS displays too much variance re. employment numbers.

A. Albury Submission - 390081

Response

Table 2.6 of the EIS presents the indicative employment numbers for the Project. It is anticipated that between 14 and 20 persons would be employed fulltime during full-scale operations. This variance in employment numbers reflects the ramping up of extraction and production operations throughout the life of the Project i.e. indicative extraction rates for Stage 1 of the proposed operation would be approximately 200 000t in Year 1, 250 000t in Year 2 and possibly up to 300 000t in Years 3 to 5. Throughout Stage 2, extraction rates would progressively increase from 300 000tpa to a maximum rate of 600 000tpa.

Representative Comment(s)

How was the \$15 million CIV determined?

Ironstone Community Action Group Inc. Submission - 390466

Response

The capital investment value for the Project (\$12.11 million) was determined by an independent quantity surveyor with details of the calculation of the value provided to DPE at the time of the development application lodgement.

4.3.13 Social

Representative Comment(s)

Properties in Limeburners Creek, the Branch lane should also be included in the 'principal amenity impact area'. The area should be a full 360 degrees circle. Areas including North Arm Cove, Limeburners Creek, Tahlee Carrington, Tea Gardens, and Hawks Nest have been left out.

Ironstone Community Action Group Inc. Submission - 390466

Response

The Principal Amenity Impact Area was defined in recognition of the fact that landowners and residents within this area would be the most likely to experience the greatest amenity impacts from the Project. Amenity impacts relate to tangible experiences of dust, noise, blast noise, or vibration, changes to outlook (visibility) or water-related impacts. It is noted that this boundary is not firm and may be adjusted over time depending on real or perceived impacts to community members following the commencement of operations.

5. EVALUATION OF MERITS

5.1 INTRODUCTION

In order to conclude the *Submissions Report*, the merits of the Project are evaluated and justified through consideration of its potential impacts on the surrounding environment and potential benefits to the local and wider community. Section 7 of the EIS presents a comprehensive evaluation and justification of the Project through the lens of Ecologically Sustainable Development.

In considering the merits of the Project, it is important to note that the proposed extractive operation would essentially replace an existing extractive operation (Karuah Quarry) located on the northern section of Lot 11 DP 1024564. As detailed in Section 3.3.3, extraction and rehabilitation activities within the Karuah Quarry are expected to be completed on or before 6 May 2021 and it is unlikely that any substantive concurrent operations would occur at the Karuah South Quarry. This would minimise any potential cumulative impacts generated by the two quarries whilst ensuring the responsible extraction of an important regional hard rock resource.

5.2 BIOPHYSICAL CONSIDERATIONS

It is acknowledged that some members of the community have raised concerns regarding the potential biophysical impacts of the Project. In response to the matters raised in submissions, the Applicant commissioned supplementary assessments for the following key areas.

- Surface Water
- Ecology
- Air Quality
- Noise
- Fly-rock Management
- Aboriginal Heritage

Surface Water

RWC was commissioned to provide detailed responses to the submissions received during the public exhibition period and to further explain the design intent of the water management strategy at the Quarry, in particular, in regard to the potential discharge of sediment-laden water from the Site.

The surface water assessment focused upon the design elements of the Quarry to ensure that any potential discharge from the sediment basins/dams would be of similar quality to that of runoff presently leaving the Site and the Project would not cause any significant adverse impact on surface water resources adjacent to or downstream from the Site.

Ecology

Ecoplanning Pty Ltd was commissioned to address matters raised in submissions relating to the Biodiversity Development Assessment Report (BDAR) prepared for the Project including clarification regarding the methodology used during the preparation of the BDAR, potential impacts of the Project on habitat connectivity, cumulative impacts on biodiversity and further justification regarding the decision not to refer the current Project to the Commonwealth Department of Environment and Energy (DoEE) under the EPBC Act.

It has been concluded that the ecological impacts of the Project have been mitigated to the greatest extent practicable with all residual impacts offset in accordance with the BAM to achieve a 'no net loss standard' to biodiversity values.

Air Quality

Supplementary predictive modelling of dust dispersion was undertaken by Northstar Pty Ltd to incorporate additional mitigation and management measures and to provide additional information requested in the submissions. In particular, the updated modelling reflects the proposed installation of an enclosure above and around the key items of processing equipment of the mobile processing plant (on three sides) and the cessation of extraction and rehabilitation operations at the Karuah Quarry on or by 6 May 2021.

The results of the supplementary air quality assessment presented in Section 4.3.1 indicate that the Project can operate without resulting in any exceedances of the relevant air quality criteria at the surrounding residences. It is noted that the single exceedance previously predicted in the AQIA submitted with the EIS for the Project is no longer predicted to occur.

Noise

Spectrum Acoustics Pty Ltd was commissioned to provide further analysis and respond to submissions relating to operational and traffic noise impacts. Noise impacts on the surrounding environment were found to be mitigated to the greatest extent practicable and to comply with all relevant criteria.

Fly-rock Management

A blasting assessment for fly-rock control was undertaken by Prism Mining Pty Ltd to provide assurance that fly-rock would be appropriately controlled and that there would be no need to close the Pacific Highway at any time during any blast. The report presents methods to estimate potential fly-rock range and determine suitable blast clearance distances for the Project, in order to manage the risks associated with fly-rock from blasting.

While fly-rock risk can be largely controlled within the Site, using blast designs nominated in the EIS, the report outlines that modified designs will be required for some blasts, to contain fly-rock within reduced available clearance distances. As a precaution, access restrictions would be adopted when initiating some blasts, i.e. through the temporary closure of Blue Rock Close to the south for a period up to approximately 15 minutes and on defined areas within the adjacent land holdings to the east and west. Such restrictions are standard within the Quarrying Industry.

Aboriginal Heritage

In its submission, the Office of Environment and Heritage (OEH) requested further archaeological survey work within the southern section of the Site. In response to this request, the Applicant commissioned Biosis Pty Ltd to undertake an additional field survey which was undertaken on 24 July 2019 in conjunction with representatives of the Karuah LALC

No sites of Aboriginal heritage significance were located during either this or any previous surveys undertaken for the Project.

5.3 ECONOMIC CONSIDERATIONS

The Project provides for the extraction, processing and despatch of a range of aggregates, and pavement products required for ongoing developments within the Hunter and Greater Sydney Regions. The extraction of this resource would assist to maintain downward pressure on costs associated with construction material supply for construction and infrastructure projects. The Project would further assist in generating local employment and contribute to local, regional, State and National economies through flow-on effects.

Acknowledging any minor costs associated with residual environmental and/or social impacts, it is concluded that the net economic benefits of the Project would outweigh the costs as the Project would:

- replace an existing extractive operation located on Lot 11 DP 1024564, thus ensuring the supply of aggregates, pavement products and manufactured sand in the Hunter and Greater Sydney Regions is maintained;
- provide ongoing employment opportunities throughout the MidCoast and Port Stephens LGAs;
- contribute to the continued economic growth at local, regional, State and National levels through flow-on effects; and
- avoid, minimise and/or mitigate environmental and social impacts to the greatest extent practicable which in turn relates to the economic costs of the Project.

5.4 SOCIAL CONSIDERATIONS

The potential amenity impacts of the Project have been the subject of comprehensive technical review that predicts that all operations (including the Project) would operate within acceptable criteria established in NSW guidelines and legislation. Residual social impacts are predicted to occur as a result of changes to local amenity which may influence the existing way of life for some stakeholders.

The EIS proposes a range of standard social mitigation measures as well as additional measures that require the Operator to address social performance criteria. These include a commitment to annual community meetings for the first two years of operations, at which feedback would be collected from the local community that will be presented in the Annual Review. This process would create a loop of feedback connecting the community, the Operator and the regulators.

Assuming that the mitigation commitments for the Project are successful in alleviating community concerns, the Project would operate with only minor additional social impacts and with acceptable cumulative social impacts. Where community concerns may remain, mechanisms would be established to incorporate this feedback into adaptive management of the operation.

5.5 CONCLUSION

The Project has been designed to address the issues raised by the community and all levels of government throughout the preparation and exhibition of the EIS. The Project provides for the extraction of the identified hard rock resource and general operation of the Quarry in an environmentally responsible manner. The Project incorporates a range of design and operational mitigation measures to ensure all relevant statutory goals and criteria, environmental objectives and reasonable community expectations are satisfied. Importantly, the environmental aspects of the Project have been assessed cumulatively with those of the adjoining quarries with the collective impacts assessed to be acceptable.

This document, and the EIS prepared in support of the Project, have identified that the Project should proceed because it would:

- contribute towards satisfying the demand for hard rock products required for the construction industry, particularly within the Greater Sydney metropolitan and Hunter regions;
- have a minimal and manageable impact on the biophysical environment;
- satisfy sustainable development principles; and
- result in a net benefit for the local community, the Local government agencies of MidCoast and Port Stephens and the State of NSW.

6. REFERENCES

- Department of Environment and Conservation (DEC) (NSW) (2004a).** “*Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities*”. NSW DEC, Hurstville.
- Department of Environment and Climate Change (DECC) (NSW) (2008).** “*Managing Urban Stormwater: Soils and Construction Volume 2E Mines and quarries*”. June 2008.
- Department of Industry and Environment (DPE) (2019).** “*Community Consultative Committee Guideline, January 2019*”.
- Landcom (2004).** “*Managing Urban Stormwater: Soils and Construction*” March 2004.
- Larry Cook Consulting Pty Ltd (2019).** “*Groundwater Impact Assessment*”. Prepared for Wedgerock Pty Ltd presented as Part 5 of the Specialist Consultant Studies Compendium, 2019.
- Natural Resources Access Regulator (NRAR), (2018)** “*Guidelines for controlled activities on waterfront land: Riparian Corridors*”.
- NSW Department of Primary Industry (DPI) (2016)** “*Oyster Industry Sustainable Aquaculture Strategy*”.
- Office of Environment and Heritage (2015)** “*Manly Hydraulics Laboratory, 2015 “NSW Hunter and Central Coast Flood Summary April – May 2015”*”.
- Office of Environment and Heritage (OEH) (2016).** “*NSW Guide to Surveying Threatened Plants*”.
- Office of Environment and Heritage (OEH) (2017).** “*Biodiversity Assessment Method*”.
- Office of Environment and Heritage (OEH) (2018).** NSW BioNet. Online database available at: <http://www.bionet.nsw.gov.au/>, accessed 18 October 2018.
- R.W. Corkery & Co. Pty Limited (2019a).** “*Environmental Impact Statement*”. Prepared on behalf of Wedgerock Pty Ltd, 2019.
- R.W. Corkery & Co. Pty Limited (2019b).** “*Surface Water Impact Assessment*”. Prepared on behalf of Wedgerock Pty Ltd presented as Part 5 of the Specialist Consultant Studies Compendium, 2019.
- R.W. Corkery & Co. Pty Limited (2019c).** “*Social Impact Assessment*”. Prepared on behalf of Wedgerock Pty Ltd presented as Part 8 of the Specialist Consultant Studies Compendium, 2019.
- Watson. P., Lord.. D., Kulmar, M., McLeckie. D and James, J.(2007).** “*Analysis of a Storm - June 2007*” DECCW.
- Yannopoulos S, Basbas S and Giannopoulou I (2012).** “*Water Bodies Pollution due to Highways Stormwater Runoff: Measures and Legislative Framework*” Global NEST Journal, Greece.