



# Warkworth Continuation 2014

Response to Planning Assessment Commission review report

Prepared for Warkworth Mining Limited

March 2015



**COAL  
&  
ALLIED**

Managed by Rio Tinto Coal Australia



**EMM**  
EMGA Mitchell McLennan

## CHAPTERS

Chapter 1	Context
Chapter 2	The proposal
Chapter 3	Project determination process
Chapter 4	Response to recommendations
Chapter 5	Other matters
Chapter 6	Conclusion

## APPENDICES

Appendix A	Updated economic study
Appendix B	Warkworth Mine calm weather calculations
Appendix C	MTW noise management plan
Appendix D	MTW blast management plan
Appendix E	Rio Tinto letter dated 10 February 2015
Appendix F	Final void options

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## Response to Planning Assessment Commission Review Report

Final

Report J14013RP1 | Prepared for Warkworth Mining Limited | 20 March 2015

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Prepared by **Duncan Peake**

Approved by **Luke Stewart**

Position Associate Director

Position Director

Signature



Signature



Date 20 March 2015

Date 20 March 2015

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### Document Control

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## Table of contents



## Table of Contents

<b>Chapter 1</b>	Context
<b>Chapter 2</b>	The proposal
<b>Chapter 3</b>	Project determination process
<b>Chapter 4</b>	Response to recommendations
<b>Chapter 5</b>	Other matters
<b>Chapter 6</b>	Conclusion

# Table of Contents

---

<b>Chapter 1</b>	<b>Context</b>	<b>1</b>
<b>Chapter 2</b>	<b>The proposal</b>	<b>3</b>
2.1	Objectives	3
2.2	Components	3
<b>Chapter 3</b>	<b>Project determination process</b>	<b>7</b>
3.1	Environmental assessment	7
3.2	Response to submissions	7
3.3	Secretary’s environmental assessment report	7
3.4	Commission review	8
3.5	Purpose of this report	9
<b>Chapter 4</b>	<b>Response to recommendations</b>	<b>11</b>
4.1	Economic	11
4.1.1	Recommendation 1	11
4.1.2	Recommendation 2	11
4.1.3	Recommendation 3	12
4.2	Noise	17
4.2.1	Recommendation 4	17
4.2.2	Recommendation 5	17
4.2.3	Recommendation 6	18
4.2.4	Recommendation 7	18
4.2.5	Recommendation 8	18
4.2.6	Recommendation 9	19
4.2.7	Recommendation 10	19
4.2.8	Recommendation 11	19
4.2.9	Recommendation 12	20
4.2.10	Recommendation 13	20
4.3	Air quality	21
4.3.1	Recommendation 14	21
4.3.2	Recommendation 15	22
4.4	Biodiversity	22
4.4.1	Recommendation 16	22
4.4.2	Recommendation 17	23
4.4.3	Recommendation 18	23
4.4.4	Recommendation 19	28
4.5	Final void	28
4.5.1	Recommendation 20	28

## Table of Contents *(Cont'd)*

---

4.5.2	Recommendation 21	33
4.6	Rehabilitation	33
4.6.1	Recommendation 22	33

---

<b>Chapter 5</b>	<b>Other matters</b>	<b>35</b>
5.1	Commission review report Section 5.3.5 – noise cumulative assessment	35
5.2	Commission review report Section 5.3.12 – independent mediator	35
5.3	Commission review report Section 5.5.3 – air quality mitigation for mine-owned properties	36
5.4	Commission review report Section 5.10.1	37

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<b>Chapter 6</b>	<b>Conclusion</b>	<b>39</b>
------------------	-------------------	-----------

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## Appendices

A	Updated economic study
B	Warkworth Mine calm weather calculations
C	MTW noise management plan
D	MTW blast management plan
E	Rio Tinto letter dated 10 February 2015
F	Final void options

## Tables

4.1	DCP contribution rates	15
4.2	List of key documentation from the studies and research programme commissioned by WML	24
4.3	Final void reduction investigations	30
4.4	Investigations for partially filling in gap between two main emplacement areas	31

## Figures

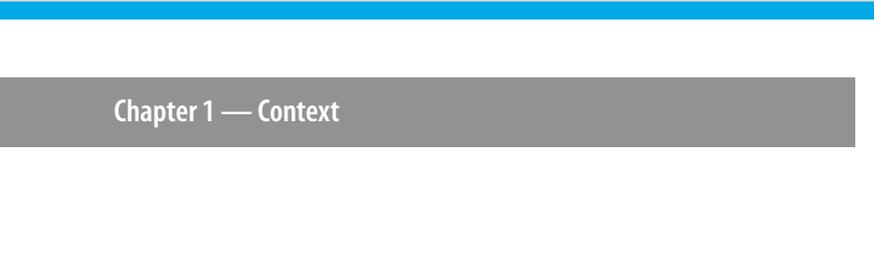
2.1	The proposal	5
4.1	Options for partial fill in haul road (truck and shovel vs dozer)	32



## Chapter 1

### Context





Chapter 1 — Context

# 1 Context

Development consent for Warkworth Continuation 2014 (the proposal) is required to enable the long-term viability of operations at Warkworth Mine.

Mining in West Pit at Warkworth Mine is forecast to reach consent limits in 2015 which would significantly reduce the length of mining (strike length). The choice of mining method, which is dictated in part by the available strike length, is critical to ensuring the ongoing viability of the operation through changing economic environments, given the high strip ratio and, consequently, relatively high costs of extraction. Any approval that provides a lesser strike length than would be afforded under the proposal is expected to cause the mine to become unviable.

For Warkworth Mine (and the adjacent Mount Thorley Operations - MTO), draglines are the most efficient mining method used to offset a proportion of the overall higher cost of mining. Draglines move waste material for approximately one third the cost of load and haul mining systems.

The reduced strike length that would result from the current spatial consent limit being reached would mean that a dragline could no longer be used to economically remove overburden material in West Pit. The inability to use a dragline to remove overburden material in West Pit would require alternative methods that are more costly and slower. This means the cost of production would increase while revenue decreases from a reduced rate of coal produced, affecting the viability of the mine.

The purpose of the proposal is therefore to extend the spatial limit approved under the current development consent to enable mining in West Pit along the required strike length and, subsequently, enable the two main pits, North and West Pit, to advance down dip to the west.

The resource can be extracted efficiently and effectively by the applicant, Warkworth Mining Limited (WML), because of the hundreds of millions of dollars invested in the mine since it commenced operations in 1981 and, that as an existing mine, it has established access to product transport and distribution infrastructure such as road, rail and port. Extraction of the resource would enable the mine to continue to be a major employer in the Singleton Local Government Area (LGA).

The continued operation of Mount Thorley Warkworth (MTW), which is comprised of Warkworth Mine and MTO, has significant social and economic benefits in the form of continuing employment for a workforce of approximately 1,300 persons on average, net economic benefits in net present value (NPV) terms of some \$1.5billion including royalties of some \$617million.

The economic significance of the resource attributable to Warkworth Mine only includes:

- the continuation of approximately 1,187 jobs on average in the long-term;
- the payment of \$567million in royalties in NPV terms to the state; and
- indirectly, the making of approximately \$75million in additional income in NPV terms and additional annual employment of 57 full-time people in the Singleton LGA.

It is recognised that the proposal has some residual social and environmental impacts, some of which would be experienced locally, it is consistent with legislation and government policies and would be managed in accordance with industry best practice.



## Chapter 2

### The proposal





Chapter 2 — The proposal

## 2 The proposal

### 2.1 Objectives

The proposal seeks a continuation of all aspects of Warkworth Mine as it presently operates and extends or alters them as described in Section 2.2 below.

The objectives of the proposal are to:

- ensure the long-term economic viability of the mine;
- maintain the current workforce at MTW of 1,300 jobs on average;
- minimise impacts on near neighbours to the greatest extent possible using all reasonable and feasible industry best practice measures while maintaining an economically viable mine plan;
- maximise return on the substantial capital invested in the mine since it commenced in 1981 using existing infrastructure such as road, rail and port;
- ensure consistency with all government policies; and
- continue to provide economic benefits to local, regional, state and national economies.

### 2.2 Components

To enable the objectives to be met, the key components of the proposal comprise:

- an extension of the approved mining disturbance footprint by approximately 698ha to the west of current operations (ie the proposed 2014 disturbance area);
- the ability to transfer overburden to MTO to complete MTO's final landform;
- the closure of Wallaby Scrub Road;
- an option to develop an underpass beneath Putty Road for the third bridge crossing yet to be constructed (while retaining the current approval for an overpass);
- minor changes to the design of the Northern out-of-pit (NOOP) dam; and
- the continued use of secondary access gates to the mine site and offset areas for activities such as drilling, offset management, and equipment shutdown pad access amongst other things.

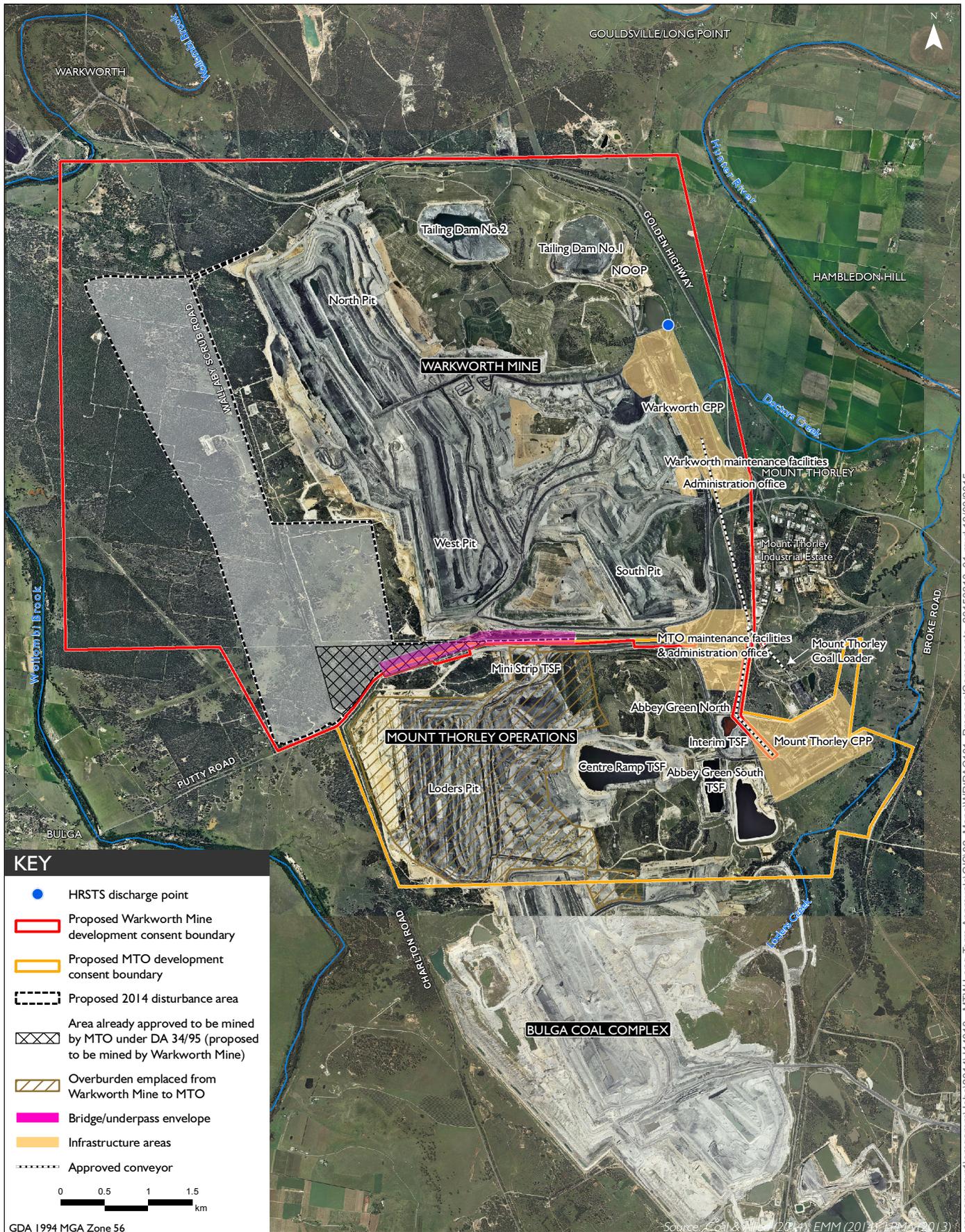
The proposal would also enable the provision of a fully contemporised development consent for the Warkworth Mine.

Under the development consent granted in 2003, Warkworth Mine has approval to operate until 19 May 2021. The proposal, as shown in Figure 2.1, seeks a 21 year development consent period from the date of any approval.

Approximately 63ha of land approved to be mined by MTO in accordance with its development consent (DA 34/95) is within the Warkworth Mine's proposal footprint. Given it is already approved to be cleared, and would otherwise be mined by MTO, this area is not included within the disturbance boundary for offsetting purposes.

Extracting this coal under Warkworth Mine's operations avoids the need to relocate Putty Road. The area is included within the development consent boundary as amended under the proposal and was considered in the proposal's noise, air quality and visual assessments.

The majority of the area within the proposed development consent boundary is owned WML and Miller Pohang Coal Company Pty Limited.



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## Chapter 3

### Project determination process





Chapter 3 — Project determination process

## 3 Project determination process

### 3.1 Environmental assessment

The EIS for the proposal was prepared by EMGA Mitchell McLennan Pty Limited (EMM), with input from various external specialists. It was prepared in accordance with the requirements of the Department of Planning and Environment (DP&E) and other Government agencies, as given in the Secretary's requirements issued on 22 May 2014.

The EIS was publicly exhibited between 25 June and 6 August 2014. In response, WML received 1,974 submissions, including seven from public authorities, 52 from special interest groups and 1,915 submissions from the general public. Of importance, there were no government agency or council objections to the proposal, subject to conditions.

Of the 1,967 submissions received for WML from individuals and special interest groups, 1,670 submissions were in support of the proposal. This represents approximately 85 per cent of all submissions received. The vast majority of the submissions were from the Hunter region with the majority of submissions in support of the proposal originating from the Singleton, Maitland and Cessnock LGAs. Approximately 86 per cent of those originating from the Singleton LGA were in support of the proposal.

### 3.2 Response to submissions

All submissions received during public exhibition of the EIS were reviewed and matters raised were summarised and responded to in the RTS. Submissions regarding the *Mount Thorley Operations 2014 Environmental Impact Statement* (MTO EIS) were reviewed and responded to in a separate RTS.

### 3.3 Secretary's environmental assessment report

On 6 November 2014 the Minister requested the Planning Assessment Commission (Commission) review the Warkworth Continuation 2014 Project pursuant to section 23D of the EP&A Act and clauses 268R and 268V of the EP&A Regulation. On 14 November 2014, the DP&E provided the Secretary's environmental assessment report to the Commission as part of the Commission's review process.

As stated in the Commission's review report, the Secretary's environmental assessment report considered the proposal, its strategic and statutory context, public and agency submissions and the applicant's EIS and RTS reports and concluded:

- the extraction of a coal resource of the size and quality proposed would result in a range of very significant economic benefits to the Singleton local government area, the Hunter region and to the state of NSW, which must be given sufficient weight in assessing the development's overall merits;
- the combined benefits of the two mines include a net economic benefit of approximately \$1,488 million, \$617 million in royalties for the NSW Government, and continued employment for the 1,300 people that currently work at the MTW complex;
- noise, air quality, blasting and visual impacts would increase as the mining complex progresses towards Bulga village. Conversely, the amenity impacts on local residents to the east of the mine would reduce to some extent compared to the current situation;

- given the location of the resource and the local topography, the Department considered that there are limited options for appreciably reducing visual impacts. Nonetheless, it is recommended that affected residents be entitled to visual screening at their residences, which would reduce visual impacts to some extent; and
- subject to the provision of an additional land-based offset to compensate for the impact on Warkworth Sands Woodland (WSW), OEH has certified that the proposed offsets are adequate. The Department has recommended that all the offset areas be protected and managed under bio banking agreements under the NSW *Threatened Species Conservation Act 1995* (TSC Act).

The Secretary's report also stated:

Overall, the Department is satisfied that the applicant has designed the project in a manner that achieves a reasonable balance between maximising the recovery of the coal resource and minimising the potential impacts on surrounding land users and the environment. The Secretary's assessment report includes draft recommended conditions of approval relating to the management of air quality/dust, noise and blasting, water, contamination, biodiversity conservation, heritage conservation, transport, visual impact and rehabilitation.

### 3.4 Commission review

As outlined on 6 November 2014, the Minister for Planning requested the Commission undertake a review of the proposal. The request stated that the Commission was to:

1. Carry out a review of the Warkworth Continuation 2014 Project; and
  - (a) consider the EIS for project, the issues raised in submissions, the formal response to submissions, the Department of Planning and Environment's preliminary assessment report of the project, and any other relevant information provided on the project during the course of the review;
  - (b) assess the merits of the project as a whole, particular attention to the potential amenity, health and social impacts on the village of Bulga and surrounds;
  - (c) apply all relevant NSW Government policies in those considerations and to that assessment; and
  - (d) provide recommendations on any reasonable and feasible measures that could be implemented to avoid, reduce and/or offset the potential impacts of the project.
2. Conduct public hearings on the project no later than 12 December 2014.
3. Complete the review by 20 February 2015, unless the Secretary agrees otherwise.

The public hearing was held over two days (18 and 19 December 2014) in Singleton.

Approximately 60 verbal submissions were made to the Commission at the hearings. In addition, the Commission received a number of written and photographic submissions.

In undertaking the review, the Commission conducted a site visit to MTW and met with a range of stakeholders, including government agencies, Singleton Council and WML. Subsequent to this, the Commission requested further information from DP&E. In turn and where applicable, DP&E requested further information from the applicant. This information was provided in the applicant's letter dated 10 December 2014. This letter forms Appendix 4 of the Commission's review report. The Commission required an extension of two weeks' to complete the review report.

On 4 March 2015, the Commission completed its review report of the proposal in accordance with the Minister's request. The report concludes, in part, that subject to the detailed recommendations outlined in the report, the proposal is consistent with government policy and legislation and is capable of being approved.

### 3.5 Purpose of this report

This report provides WML's response to each of the Commission's recommendations outlined in the Warkworth Continuation Review Report prepared by the Commission. Detailed responses, where required, are provided in Chapter 4. In addition to addressing the Commission's recommendations, this report provides responses and comments to statements made within the Commission's review report more generally, where warranted. These are provided in Chapter 5.

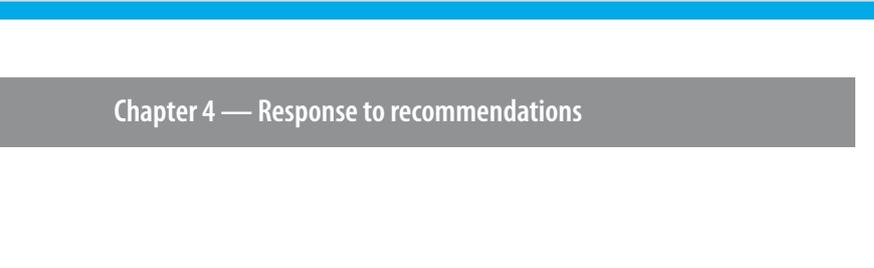
This report will be considered by DP&E when preparing the Secretary's environmental assessment report which will be provided to the Commission for determination.



## Chapter 4

### Response to recommendations





Chapter 4 — Response to recommendations

## 4 Response to recommendations

### 4.1 Economic

#### 4.1.1 Recommendation 1

*The Applicant's economic assessment, including the CBA, should be updated to reflect the current economic climate.*

The EIS expert economist BAEconomics has addressed this recommendation by assessing the economic benefits of the project to NSW and the region in the current economic climate. A copy of this assessment is enclosed as Appendix A and the key conclusions are summarised below.

The sensitivity analysis presented in BAEconomics (2014) encompasses the current economic climate being experienced in the Australian and international thermal coal market. The low case in the sensitivity analysis represents an Australian dollar thermal coal price of \$79/tonne, resulting in an incremental production-related benefit to NSW of \$1.2billion in NPV terms. Current consensus thermal coal prices and exchange rates equate to a coal price in Australian dollar terms of \$81/tonne, which is above the low case (\$79/tonne) in the original assessment.

To further test the resilience of the key components of the production related benefits of the proposals, BAEconomics recalculated the net present value for the central case using the most recent consensus forecasts for both thermal coal prices and the exchange rate. Using the most recent short and medium term forecasts, together with the long run price and exchange rate assumptions, the net present value of the production related benefits is marginally smaller (reduced by approximately \$10million). However, when rounded this still results in a benefit of \$1.5billion to NSW as in the original.

It is also worth noting that each component of net public benefit has a different level of sensitivity to changes in coal prices and exchange rates. There are some components that do not materially change when coal prices and exchange rates change, such as compensation of employees and contractors, rates and payroll taxes and any other payments that are directly related to staff payments. Similarly, the estimated regional and local impacts of the proposals are insensitive to changes in short term coal prices and exchange rates, so no updates have been made to the Regional Economic Impact Assessment.

These outcomes are consistent with the Secretary's environmental assessment report which states:

*The Department has tested the sensitivity of these estimates [important social and economic benefits outlined in the EIS] to changes in key variables, such as the price of coal, and concluded that even if these variables change significantly over time, the benefits of the project would remain positive.*

The above demonstrates that the proposal will result in significant economic benefits to the State and the region throughout the commodity cycle.

#### 4.1.2 Recommendation 2

*As part of the determination of the project, DAE should review the additional information provided by the applicant and any updated economic assessment/CBA provided by the applicant and provide updated advice to the Department as required.*

The applicant notes the Commission's recommendation including that this is a matter for DP&E and Deloitte Access Economics.

### 4.1.3 Recommendation 3

*The following options should be considered for the future of Bulga village:*

*(a) Compensating property owners who wish to sell. This compensation would be paid by the Applicant and the compensation amount would be the difference between movements in the average regional/sub-regional property price and that of the local property sale prices based on an independent valuation process. A dispute resolution process would also need to be agreed.*

*(b) Relocating the village at the expense of the state government and Applicant. The government would be required to deliver all new infrastructure, while the Applicant would be required to pay for the construction of new houses. Any relocation decision and associated planning would need to involve the residents of Bulga.*

*(c) Requiring the Applicant to develop a Village Enhancement Strategy in consultation with the local community and Council and to fund an implement a program of works or similar via a VPA with the Minister and Council.*

The assessments of the proposal found that the amenity criteria for noise and air quality in Bulga village as outlined in the Mining SEPP are satisfied for all properties in Bulga village. Compliance with the Mining SEPP's criteria is accepted as demonstrating that the impacts, from a noise and dust perspective, are acceptable at Bulga village. Given this it is appropriate to apply long standing Government policy of only providing acquisition and mitigation rights, as per the NSW Government's Voluntary Land Acquisition and Mitigation Policy.

With respect to the assessment against Project Specific Noise Level within Bulga village and surrounds:

- One property located approximately three kilometres north of the Bulga village centre was found to exceed the Project Specific Noise Level by more than 5 db(A), entitling the owner to acquisition upon request in accordance with the NSW Government's Voluntary Land Acquisition and Mitigation Policy.
- Of the 15 properties entitled to mitigation measures upon request in accordance with the NSW Government's Voluntary Land Acquisition and Mitigation Policy, five are located in Bulga village with the remaining properties located in Warkworth and Gouldsville areas to the north and north-east.

Coal & Allied is committed to the continued co-existence with the local community, and ensuring Bulga village is sustainable in the future.

Despite the assessment outcome summarised above, careful consideration has been given to each of the options recommended by the Commission and a response is provided to each below.

## i Property owner compensation

The assessments by the applicant and responsible Government Department found that there is no reason to suggest the property values would decline as a consequence of the proposal.

Section 6.7.2 of the RTS reported that based on publicly available data there is no evidence that either the previous application for the Warkworth Extension 2010 or the current proposal have had a negative influence on property prices in Bulga village. There are a number of factors which determine the value of properties, including supply and demand, interest rates, the state of the economy, demographics and the property's location.

Analysis undertaken for the Bulga Optimisation Project in 2013 identified that capital growth for the houses in Bulga was at least 97 per cent above other similar NSW regional areas analysed for the 2012 and 2013 period (Umwelt 2013)<sup>1</sup>. As shown in Section 6.7.2 of the RTS, further analysis indicates that there has not been a marked decrease in the median sales prices nor the average number of sales from January 2008 and August 2014 and certainly that the median price has increased during this period. This analysis suggests that property values may in fact be inflated by the presence of mining in the region rather than depressed when compared with other non-mining regions.

Section 4.11.4 of the RTS outlined WML's initiative to reinstate acquisition rights of those properties entitled to acquisition upon request under the disapproved Warkworth Extension 2012 Planning Approval. This is part of Coal & Allied's property acquisition programme and is not related to the impact assessed for this proposal which found only one property to the north of the village would be entitled to acquisition upon request under Government policy.

Coal & Allied's programme for reinstating the Warkworth Extension 2012 Planning Approval acquisitions rights for Bulga village (not related to the impact assessment for this proposal) is based on a compensation package that exceeds market value, consisting of:

- written request from property owner entitled to acquisition under Warkworth Extension 2012 Planning Approval;
- market value of property at time of request;
- reasonable costs associated with relocation within Muswellbrook, Singleton or Cessnock local government areas;
- reasonable legal advice and expert advice; and
- reasonable compensation for disturbance caused by the acquisition process.

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<sup>1</sup> Comparative analysis was undertaken with 40 communities of a similar size that were not impacted by mining.

Further compensation is therefore not considered warranted. The DP&E's response to the Commission dated 17 December 2014, which is supported by the applicant (refer to Appendix 5 of the Commission review report) noted that:

...the assessment of the projects indicates that the vast majority of properties in Bulga would comply with applicable amenity criteria for both dust and noise. These criteria are set by the NSW Government for assessing whether the impacts of a proposed development are acceptable. Consequently, apart from those with acquisition rights, the Department considers there is no justification for paying compensation to Bulga residents or relocating the village.

...there is no legal basis for guaranteeing property values where a proponent is seeking to develop the site in accordance with a permissible land use. The Department also notes that the Warkworth mine has been operating since 1981, and Rio Tinto has held a valid mining tenement over the area subject to the current application since that time. It would therefore be reasonable to assume that the presence of open cut mining in the vicinity is a long standing factor in the valuation of properties in Bulga village and surrounds.

## ii Relocating the village

WML does not support any option for relocation of the village and does not believe that it is justified based on the results of extensive environmental studies and Government policy. As noted previously, the applicant is committed to ensuring that Bulga village has a sustainable future.

The proposal is very different to a dam which would require relocation of residences within the 1 in 100 year footprint of inundation. As discussed above, the proposal satisfies the noise and dust amenity criteria for all residents in Bulga village as outlined in the Mining SEPP. Accordingly, the amenity of Bulga village would be acceptable under the proposal. Residents who will have a change in impacts due to the proposal are provided acquisition and mitigation rights in accordance with Government policy. Only one property located three kilometres north of Bulga village centre would be entitled to acquisition upon request based on the NSW Government's Voluntary Land Acquisition and Mitigation Policy and five properties entitled to mitigation measures under the same policy. Therefore in this instance, the technical and Government assessments indicate that the two land uses, mining and the village, can co-exist and that the amenity at Bulga village would be acceptable.

The applicant is not aware of relocation of the village being raised as an option for consideration by residents of Bulga village through consultation for this proposal or in regular operational engagement with the community.

The DP&E is also not supportive of an option to relocate the village, as noted in the Department's response to the Commission dated 17 December 2014 (refer Appendix 5 of the Commission review report):

The Department's assessment of the Warkworth and Mt Thorley Continuation Projects indicates that no privately-owned residences within Bulga village would experience noise and/or dust impacts above the applicable acquisition criteria (although one affected property may be said to be located on the northern outskirts of Bulga). An additional 15 residences would be subject to moderate noise and/or dust impacts. The Department has recommended conditions that would require Rio Tinto to address these impacts in accordance with the NSW Government's Voluntary Land Acquisition and Mitigation Policy.

In summary, the assessment of the projects indicates that the vast majority of properties in Bulga would comply with applicable amenity criteria for both dust and noise. These criteria are set by the NSW Government for assessing whether the impacts of a proposed development are acceptable.

Consequently, apart from those with acquisition rights, the Department considers there is no justification for paying compensation to Bulga residents or relocating the village.

Relocation of Bulga village is not an option supported by the applicant, the community or Government.

### iii Village enhancement strategy

The applicant supports the option to develop a Village Enhancement Strategy recommended by the Commission.

The recommendation is consistent with the commitment in Table 22.1 of the EIS (EMM, June 2014) which commits to:

- development of a Social Impact Management Plan;
- negotiation of a VPA with Singleton Council with a proportion of the funds dedicated to maintaining and/or improving facilities and services in Bulga; and
- establishment of a Bulga and Near Neighbour Amenity Resource.

Singleton Council in its submission requested the inclusion of a suitable consent condition for a VPA should the application be recommended for approval. In Section 4.11.4 of the RTS, the applicant confirmed that it is committed to working with Council on developing a mutually agreeable VPA and would support a condition to this effect.

Singleton Council and the applicant are in active discussions in relation to the terms of the VPA and compensation for Wallaby Scrub Road which is a Council asset.

EMM has undertaken a review of the development contribution requirements for the proposal against the Singleton Development Contributions Plan 2008 (DCP). The purpose of the DCP is to set out the administrative framework for levying development contributions under Section 94 of the EP&A Act. The DCP includes contribution rates for new coal mining development applications towards rural roads and Council's Development Contributions Plan as summary in Table 4.1 below.

**Table 4.1 DCP contribution rates**

Facility Type	Method	Based Contribution Rate (June 2008)	Revised Contribution Rate (2013/2014)	Revised Contribution Rate (2014/2015)
Rural Roads	Determined on basis of Council assessment of traffic and roads standard assessment prepared by applicant.			
Community Enhancement Programme	Contributions to the CEP based on total capital expenditure and annual outputs of the development.			
Preparing and Administering Plans	Per lot or dwelling equivalent	\$129	\$151	\$155

### *Rural Roads*

The DCP requires Council to seek contribution to maintaining a rural road's standard when faced with a potential reduction of standard from increased heavy vehicle usage.

The DCP states that for mining projects Council applies conditions of consent requiring contributions to maintaining a rural road's standard due to heavy vehicle usage. Council's methodology for calculating contributions for accelerated road maintenance due to heavy vehicle haulage states that this contribution is separate to any upgrading work which may be necessary due to the increased development traffic.

Council's methodology states that for mining projects, the contributions are generally reduced to a per tonne payment, however, this may not be applicable for other types of heavy vehicle haulage.

It is important to note that the proposal does not seek to haul material (ie gravel or coal) via the road network. Currently, MTW generates approximately 40 daily deliveries by heavy vehicles, which would not change under the proposal. The daily deliveries predominantly use State Highways (ie Golden Highway and New England Highway) rather than more localised destinations using locally maintained roads. On this basis, contributions from rural roads under the DCP due to the proposal are not required.

Compensation for Wallaby Scrub Road, which is a Council asset, sits outside the planning assessment. Singleton Council in its submission on the disapproved Warkworth Extension 2012 Planning Approval dated 22 June 2010 (page 70) noted that the community of Singleton has paid to maintain and construct Wallaby Scrub Road. The submission noted that the average maintenance costs over the preceding 10 years were approximately \$158,340 with a resealing expenditure of \$199,044. The construction costs were estimate at \$1,131,000. The total expenditure made by the community on Wallaby Scrub Road was reported as \$1,488,384.

### *Community enhancement programme*

To help mitigate negative impacts of coal mining, Council proposes to implement its CEP (Singleton Council website link: <http://portal.singleton.nsw.gov.au/eplanning/pages/plan/Book.aspx?vid=10887>), which identifies community infrastructure that will be partially funded by future contributions from coal mining developments.

Whilst the DCP Contributions Rates Schedule specifies that the contribution towards the CEP will be based on the total capital expenditure and outputs of the development, no specific rate or formula to calculate the contributions is provided. Rather, in the Strategy Plans section of the DCP, it is specified that the proposed contributions will be agreed between the applicant and Council and detailed in a VPA, in accordance with section 93F of the EP&A Act.

To provide an estimate of the likely contributions from the proposal towards community infrastructure the details of the most recent VPA in Singleton LGA was reviewed. This VPA relates to Glencore's Bulga Optimisation Project (SSD-4960) which outlines the terms of the Applicant's offer in Appendix 4 of the development consent. A review of Appendix 4 indicates that the total contributions towards community projects and initiatives was found to be \$1,970,000, with \$1,720,000 payable at the commencement of operations and the remainder paid annually over the life of the project.

Based on the capital investment value (CIV) of the Bulga Optimisation Project (\$450million) the rate of contribution towards community enhancement program equates to approximately 0.44 per cent of the CIV.

Section 94A provides another methodology for deriving the fixed development consent levies towards public amenities and services under the EP&A Act. It refers to Section 25K of the EP&A Regulations which provides for contributions up to 1 per cent of the cost of the development for proposals with a value exceeding \$200,000.

The applicant has discussed a contribution of up to 1 per cent of the CIV over the life of the proposal towards community enhancement with Singleton Council. Discussions are ongoing to ensure a significant portion of these funds are directed to Bulga village.

The CIV for Warkworth Continuation 2014 and Mount Thorley Operations 2014 combined is \$719million.

## 4.2 Noise

### 4.2.1 Recommendation 4

*The acceptability of setting noise limits above the PSNL should be considered by the NSW government, ideally via a review of the INP.*

The Industrial Noise Policy (EPA, 2000) is the current Government policy in relation to noise assessments in New South Wales (NSW). The Industrial Noise Policy (INP) provides a process for setting noise limits above the Project Specific Noise Levels at receptor locations where modelling predicts the Project Specific Noise Levels cannot be met after the application of reasonable and feasible mitigation measures.

The responsible Government Department, the Environmental Protection Authority (EPA) advised in its submission and confirmed that the proposal included reasonable and feasible mitigation measures as follows:

The EPA's view of the proposed noise mitigation measures is that they reasonably represent current best practices at similar mines. The EPA considers it unlikely that there are further feasible and reasonable measures that would provide significant additional noise mitigation.

It would therefore not be reasonable or feasible to set a lower level at these locations without significant impact on the economic viability of the proposal.

The Mining SEPP provides for non-discretionary standard to protect noise amenity, which is satisfied for all residences in Bulga village. Compliance with the Mining SEPP's cumulative noise limit is accepted as demonstrating that the amenity at Bulga village is acceptable, from all mines in the locality.

The applicant understands that the NSW government is currently reviewing the INP and looks forward to participating in any industry reviews.

### 4.2.2 Recommendation 5

*The question of how often calm conditions occur in the area should be independently verified by the Department before the application is determined.*

The applicant would support an independent verification of the calm condition data by the DP&E.

The data underpinning the applicant's statement that calm conditions occur less than 2 per cent is based on advice from the EIS noise expert and derived from the expert's noise model. The EIS noise expert has advised that its reproduction would result in thousands of pages of data due to the comprehensiveness of the dataset. Notwithstanding this, the noise assessment was peer viewed by Wilkinson Murray and found to be acceptable. Further the DP&E's independent consultant has also reviewed the noise assessment. A letter from the EIS noise expert is enclosed as Appendix B that provides a summary of the data and cross references with the wind data used in the EIS air quality and greenhouse gas study.

#### 4.2.3 Recommendation 6

*To ensure the benefits of the attenuation program will be fully realised, regular monitoring and audit of the performance of the attenuated fleet and equipment should be carried out.*

The applicant supports this recommendation.

The existing MTW Noise Management Plan attached as Appendix C provides for this process and requires regular monitoring of the performance of the fleet. It provides for testing one third of the attenuated fleet on an annual basis with 100 per cent on a three year rolling basis. The intent of the programme is to identify any potential degradation in performance to allow for prompt rectification of defects to ensure the attenuation components remain effective.

Schedule 5, Condition 9 of the draft development consent provides for an independent environmental audit within one year of commencement and every three years thereafter.

#### 4.2.4 Recommendation 7

*A public information briefing session should be held to clarify the operation of the Trigger Action Response Plan.*

The applicant supports this recommendation.

The existing MTW Noise Management Plan (refer Appendix C) outlines the operation of the Trigger Action Response Plan. The operation of the plan is a matter that has been communicated to the MTW Community Consultative Committee. The applicant has advised that it would be prepared to participate or hold a public information session and would recommend attendance by the relevant Government Departments with accountabilities for noise management and Singleton Council.

#### 4.2.5 Recommendation 8

*Draft recommended conditions 8 and 9 in schedule 2 and draft recommended conditions 4 and 5 in Schedule 3 should be amended to ensure that when the new consent commences, the new noise criteria should apply and the noise criteria in Condition 18 of DA-300-9-2002-I be attached as an appendix to the new consent of the subject application is approved.*

The applicant would support the inclusion of Condition 18 of DA-300-9-2002-I in the new consent to clarify that the mine will operate under these existing noise limits until the fleet is fully attenuated (end of 2016).

The limits to apply from 1 January 2017 outlined in Table 3 of draft development consent are the levels set above Project Specific Noise Levels following completion of the fleet attenuation and adoption of reasonable and feasible mitigation measures accepted by the EPA (refer Section 4.2.1).

To operate under the attenuated limit in Table 3 from commencement of the consent and prior to completion of the fleet attenuation (end of 2016) would require additional operational control in the interim period that would significantly impact on Warkworth Mine through lost production of in excess of \$40m. It is not possible to attenuate the fleet prior to commencement as outlined in the applicant's response to DP&E dated 10 February 2014 (Appendix 4 of the Commission review report).

#### 4.2.6 Recommendation 9

*The Applicant should update its Statement of Commitments to provide acquisition and mitigation rights to those properties which were granted such rights under the now repealed approval. The terms of these rights should be similar to those that would be granted under the approval conditions should the application be approved.*

Coal & Allied's commitment to reinstate acquisition rights under the disapproved Warkworth Extension 2012 Project Approval is outside the scope of the current proposal. Only one property located approximately three kilometres north of the centre of Bulga village is entitled to acquisition upon request under the NSW Government's Voluntary Land Acquisition and Mitigation Policy with five entitled to mitigation measures. The Mining SEPP provides for non-discretionary standards to protect noise and air quality amenity, which is satisfied for all residences in Bulga village.

WML has undertaken a review of its current initiative to reinstate acquisition rights for those properties entitled to acquisition upon request under the disapproved Warkworth Extension 2012 Planning Approval as described in Section 4.1.3(i).

In light of the Commission's recommendation, WML would be prepared to extend this programme to also reinstate mitigation rights under the disapproved Warkworth Extension 2012 Planning Approval. Again, this commitment sits outside the current development application as it is not required by the impact assessments for the proposal.

There is no Government policy or procedure that requires the applicant to amend its Statement of Commitments to provide acquisition or mitigation rights under a repealed approval.

#### 4.2.7 Recommendation 10

*The recommended public information briefing session referred to in Recommendation 4 should include a briefing on the application of the LFN modification factor and the purposes of different types of monitoring as well as the operation of the Trigger Action Response Plan.*

The existing MTW Noise Management Plan outlines a process for noise monitoring in accordance with the INP. The operation of the plan is a matter that has been communicated to the MTW Community Consultative Committee.

Similar to the response to Recommendation 4, the applicant has advised that it would be prepared to participate or hold a public information session and would recommend attendance by the relevant Government Departments with accountabilities for noise management and Singleton Council.

#### 4.2.8 Recommendation 11

*The concerns raised in the SKM report that insufficient data was collected to enable it to assess the accuracy of ongoing routine noise monitoring carried out by the Applicant should be addressed before determination of the current application.*

The existing MTW Noise Management Plan outlines the process for compliance monitoring in accordance with industry standards.

MTW, on behalf of the DP&E, engaged SKM to conduct an independent monitoring programme to assess the impact of mine noise from MTW in the summer of 2011. As part of the programme, a monitoring and assessment regime was established at eight locations to represent the Bulga area in consultation with the Bulga community.

As noted in the Commission review report:

The SKM report found the operations generally complied with the noise conditions noting that some locations may be impacted by LFN at night. The report also identified that insufficient data was collected to enable it to assess the accuracy of ongoing routine noise monitoring carried out by the Applicant.

The reference to 'insufficient' data in the SKM report relates to the scope of the SKM assessment in that the data collected was for a period of eight weeks, a period considered insufficient to assess the accuracy of ongoing routine noise monitoring. It should, however, be read in the context of further statements in the SKM report, in particular:

In general the results may be interpreted as showing that the Routine Monitoring Program does not underestimate noise levels from the Warkworth or Mt Thorley mining operations.

#### 4.2.9 Recommendation 12

*The conditions in any approval should require the application of an appropriate noise modification factor for LFN during compliance testing if LFN is prevalent before comparison with the PSNL in the approval. However, if a new INP is adopted before the determination of this application, the new INP methodology and criteria should apply.*

The INP (EPA, 2000) is the current Government policy in relation to noise in NSW and provides a process for considering Low Frequency Noise (LFN).

The applicant is committed to managing operations in accordance with legislation and Government policy. The applicant currently measures LFN during compliance assessments and applies the appropriate noise modification factor for comparison against PSNL. These results are made publically available in monthly and annual reports submitted to Government.

The applicant understands that the NSW Government is currently reviewing the INP and looks forward to participating in any industry reviews.

#### 4.2.10 Recommendation 13

*Up-to-date information should be provided on both the Rio Tinto website and hotline with respect to blasting schedule.*

The existing MTW Blast Management Plan attached as Appendix D details processes for providing up-to-date information regarding the proposed blasting schedule as follows:

- notify neighbouring mining operations;
- advertisement in the Singleton Argus when a public road is to be closed, as well as identifying proposed blasting times on road signage established in the vicinity of MTW;

- providing up-to-date information to the blasting hotline 1800 888 733.

The applicant has advised that it would be prepared to modify the MTW Blast Management Plan to provide a daily schedule on the company's website for the next day's activities. However, it should be noted that, despite predictive modelling initiatives, should adverse meteorological conditions be experienced on the day of the blast, the blast schedule may change and hence the blast hotline will be more accurate than the alternate notification processes.

In relation to the feedback/complaint management in response to environmental matters, a commitment has been made to make publically available daily environmental data. This will include a summary of the complaints received and the operational response to noise or dust alerts.

## 4.3 Air quality

### 4.3.1 Recommendation 14

*Clarification should be provided in relation to Location 264 as to whether this property should be granted acquisition rights as part of any future approval of the subject application having regard to air quality impacts.*

Location 264 is the Warkworth Anglican Church. According to the Anglican Parish of Warkworth web site (<http://www.anglican-warkworth.org/>), services are held every Wednesday and Sunday with additional services for special occasions such as Easter. That is, the premises are infrequently used with short exposure periods when occupied.

The NSW Government's Voluntary Land Acquisition and Mitigation Policy provides guidance of when acquisition rights apply, as follows:

"A consent authority should only apply voluntary acquisition rights where, even with the implementation of best practice management, the development is predicted to contribute to exceedances of the acquisition criteria in Table 3:

- At any residence on privately owned land; or
- At any workplace on privately owned land where the consequences of those exceedances in the opinion of the consent authority are unreasonably deleterious to worker health or the carrying out of business at that workplace, including consideration of the following factors:
  - the nature of the workplace;
  - the potential for exposure of workers to elevated levels of particulate matter; – the likely period of exposure; and
  - the health and safety measures already employed in that workplace.
- On more than 25% of any privately owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls".

The applicant understands that Location 264 does not fall within the above criteria because the property is used only twice a week for short period, on average.

### 4.3.2 Recommendation 15

*Prior to any approval conditions 17-19 should be amended to require compliance with established criteria.*

The applicant supports the Commission's recommendation.

## 4.4 Biodiversity

### 4.4.1 Recommendation 16

*Further detail should be provided which includes a clear and transparent strategy to achieve ecosystem and species credit requirements as required by the NSW Biodiversity Offset Policy for Major Projects.*

The Biodiversity Offset Strategy (BOS) for the proposal, as outlined within the EIS and RTS, was prepared in accordance *NSW Biodiversity Offset Policy for Major Projects* and certified by the Office of Environment and Heritage (OEH) under clause 14(3) of the Mining SEPP.

The DP&E has prepared draft development consent Conditions 28, 29, 30 and 31 in Schedule 3 to reflect one of the first certifications under the new legislation and policies in NSW. The applicant would support a review of the conditions to provide greater clarity of the process to retire credits. The applicant understands the intent of the conditions is to act as follows:

1. Quantify the impact credits (ecosystem and species credits);
2. Specify direct land-based offsets;
3. Specify area of mine rehabilitation offsets and associated credits;
4. Provide a mechanism to secure a legally binding mechanism over the land-based offsets, and through this process, retire offset credits against impact credits (item 1). A period of three years is required for this process;
5. Provide a mechanism to secure a legally binding mechanism over the mine rehabilitation offsets, and through this process, retire offset credits against impact credits (item 1). A period of 10 years after mining is required to enable rehabilitation to be established and credits generated by it subsequently retired.

Condition 30, Table 12 of the draft development consent provided a summary of the land based offsets. The Goulburn River and Bowditch Biodiversity Areas were late additions to the BOS and credits were not available at the time. Condition 30, Table 12 should be updated to include an additional land-based offset (now known as the North Rothbury Biodiversity Area) as required as part of the OEH certification and outlined in a letter from the applicant to DP&E dated 16 December 2014 (refer to Appendix 4 of the Commission review report).

Further detailed offset credit calculations (BioBanking Assessment Methodology; BBAM) have now been completed for all of the direct land-based offsets. In summary, the credits calculated using BCAM required to be offset are 31,700 ecosystem credits and 37,290 species credits, respectively. The credits calculated using BBAM for the biodiversity areas are 32,869 ecosystem credits and 178,483 species credits, respectively. This demonstrates that the applicant has sufficient credits to achieve the ecosystem and species credit requirements in accordance with the provisions of the *NSW Biodiversity Offsets Policy for Major Projects*.

As part of the biobanking agreement mechanism and provisions under the NSW *Threatened Species Conservation Act 1995*, these BBAM assessments will be verified by OEHL as part of securing a legally binding mechanism over the properties. WML considers this to represent a clear and transparent strategy for assessing impacts and offsetting consistent with the aforementioned government policies.

#### 4.4.2 Recommendation 17

*Further justification should be provided to indicate why the Project should not be required to secure offsets [sic] before development commencement as required by the NSW biodiversity Offset Policy for Major Projects. Alternatively conditions of consent should be amended to comply with the Policy and require that offsets be secured prior to commencement of development.*

As discussed in Section 4.4.1, all direct land-based offsets for the proposal have now been acquired by the applicant prior to commencement of the development. Condition 28 of the draft development consent provides a period of up to three years to retire offsets credits to enable sufficient time for a legally binding mechanism over these properties in accordance with Government policy.

The applicant proposes to use the offset mechanism provided by the *Upper Hunter Strategic Assessment – Interim Policy*. The retirement of impact credits will be finalised in consultation with OEHL once the UHSA has been finalised and the process for credit retirement under that scheme is established. The applicant currently owns all the biodiversity areas proposed to be used for offsets and has completed BBAM of all these biobanking areas.

Once finalised, applications to permanently secure the biodiversity areas using biobanking will occur under the transitional implementation arrangements described in the *NSW Biodiversity Offsets Policy for Major Projects* (refer to Principle 5, page 12) and the final version of the UHSA.

#### 4.4.3 Recommendation 18

*Prior to any development approval further additional information be provided to:*

*a. Substantiate the viability of the proposed Warkworth Sands Woodlands EEC regeneration.*

Detailed consideration of the viability of the proposed WSW EEC regeneration was provided in the EIS and RTS and was accepted by the OEHL in certifying the BOS. The DP&E has assessed (Appendix 5 to the Commission review report) that WSW has a high likelihood of being able to be successfully re-established based, in-part, on its discussions with OEHL and other stakeholders.

Since 2004, a large number of studies and a significant research programme (2004 to 2013) investigating the restoration of WSW has been completed. This work was commissioned by WML in response to the requirements set out in the existing development consent (refer to Conditions 2 to 4 in Schedule 4). Table 4.2 provides a list of key documentation to increase the knowledge of WSW and inform the method to restore the community. Specifically, the research programme undertaken by the University of New England (UNE) focused on determining the best approaches to restore WSW, which focused on gaining a better understanding the regeneration processes such as pollination factors, genetic variability and active re-establishment by direct seeding and tube stock planting.

**Table 4.2 List of key documentation from the studies and research programme commissioned by WML**

<b>Documentation</b>	<b>Author</b>	<b>Year</b>	<b>Purpose</b>
Investigation of Warkworth Sands Woodland and Associated Soils in the Extension Area, NDAs, HMAs and on Adjacent Land	Flora Search	2004	Preliminary mapping of WSW flora and soils. Mapping of other vegetation communities. Assessment of WSW habitat values Mapping of potential areas for WSW re-establishment. Mapping of WSW soils that could be used for WSW rehabilitation.
Warkworth Fauna and Flora Baseline Survey and CAN Biodiversity and Rehabilitation Monitoring, Hunter Valley Operations and Mount Thorley Warkworth Operations	Andrews, Neil	2006	Report on the baseline flora and fauna survey of the Green Offsets.
The Vegetation of the Warkworth Sands and Associated Vegetation Communities	C. L. Gross, University of New England	2007	Vegetation survey to determine the extent of WSW across 1600 hectares and to identify within these areas sites that would be suitable for enhancing and re-establishing WSW and non-WSW communities.
Warkworth Sands soil survey Soil sampling and analysis within the Green Offsets and at Archerfield	Peter Lockwood, School of Environmental and Rural Science University of New England	2007	Soil survey to map and characterise the sandy soils associated with the Warkworth Sand Woodlands Vegetation Community.
Warkworth Mine Green Offsets Scoping Report BLUEPRINT for the “Restoration Research for the Warkworth Sands Woodlands”	C. L. Gross, University of New England	2007	Scoping Report that describes the research methodology and project schedule recommended for the Long Term Research and Monitoring Programme of the Warkworth Mine Green Offsets.
“Restoration Research for the Warkworth Sands Woodlands” – Progress Report	C. L. Gross, University of New England	2008 to 2013	Annual progress report on findings and progress of the research programme.
The discovery of microsatellite markers for <i>Hardenbergia violacea</i> (Fabaceae), using next-generation sequencing	Fatemi, M., Haddadchi, A & C.L. Gross, University of New England	2012	Conservation Genetics Resources, 4: 1063-106
Provenance testing for climate change: non-local seed of <i>Hardenbergia violacea</i> 1 (Fabaceae) are suited for future climatic scenarios but not the current field conditions	C.L. Gross, M. Fatemi & I.H. Simpson, University of New England	2013	Publication pending
The cost-effective microsatellite markers for <i>Banksia integrifolia</i> (Proteaceae)	Fatemi M, Houliston GJ, Haddadchi A and Gross CL, University of New England	2013	Applications in Plant Sciences, 1(2):1200130. <a href="http://dx.doi.org/10.3732/apps.1200130">http://dx.doi.org/10.3732/apps.1200130</a>

**Table 4.2 List of key documentation from the studies and research programme commissioned by WML**

Documentation	Author	Year	Purpose
Provenance testing for climate change: non-local seed of <i>Hardenbergia violacea</i> (Fabaceae) are suited for future climatic scenarios but not the current field conditions. Submitted to PLoS One	Gross, C.L. & M. Fatemi, University of New England	2013	In review phase
Arrested recovery in a sandy woodland correlates with a lack of heavy and large seeds in seed bank	C.L. Gross and L. Vary, University of New England	2014	Publication pending
Warkworth Sand Woodland - Species Fact Sheets	University of New England	2014	Publication pending

One of the projects completed by UNE involved the monitoring of three different ‘states’ of WSW for a period of three years, with monitoring plots measured every six months from September 2007 to September 2010. The plots were within the Northern Biodiversity Area, where grazing activities were removed prior to commencement of the project. The three different ‘states’ of WSW measured were ‘intact’, ‘degraded’ and ‘cleared areas’, to represent different ecological condition of WSW.

The intact WSW represented areas with the native vegetation structure and composition of WSW and intact regenerative capacity. The degraded states of WSW were characterised as being significantly altered by land use with regenerative capacity intact and cleared areas as highly modified with limited capacity regenerative capacity and native vegetation structure and composition. This research project indicated that cleared areas stagnated, however over time the degraded plots become more similar to the intact WSW plots due to increasing similarity in native species composition.

The key finding from the project was that areas of WSW had the capacity to naturally regenerate, under a passive restoration regime (exclusion of grazing and control of weeds). Cleared or highly modified areas such as grassland had a limited capacity to naturally regenerate and would benefit from active restoration including the planting of tube stock. The species trial completed by UNE tested the survival and growth of WSW species when planted as tube stock, and the best techniques to plant tube stock. The seed bank project completed by UNE showed that direct seeding was potentially less effective than tube stock planting, particularly, in cleared areas as the large seeds were not present. The absence of large seed was considered to be possibly due to ants removing the seed as it was shown that ants were more abundant on cleared sites. Key findings from these projects support the use of tube stock planting in ‘active’ restoration of cleared areas and ‘passive’ restoration in areas where the regenerative capacity was intact.

In its letter dated 21 November 2013, the DP&E confirmed that WML had met its obligations under Conditions 2 and 3 of Schedule 4 of the development consent (DA 300-9-2002-i), thereby enabling it to clear the areas of WSW approved for clearing under its existing development consent. As part of this process, WML’s committed to protect 78ha of WSW that would be established on land to the west of the mine, for which a deed of agreement between WML and the Director-General was signed.

Subsequent to the DP&E’s confirmation, the 2014 WSW re-establishment programme was established. The programme commenced in 2013 with the collection of local seed and propagation of tube stock, with site preparation undertaken prior to tube stock planting commencing in September 2014. The site preparation included the translocation of sand, mulch and topsoil salvaged ahead of pre-stripping activities, the application of composted mulch and control of weeds.

The programme has recorded a good initial result with a 70 per cent survival rate for the 8,235 tube stock planted to restore 78ha of grassland on the Warkworth sand sheet. This is particularly positive given the difficult conditions for the growing season with record high temperatures and lower than average rainfall.

The re-establishment technique implemented is a shelter belt approach, where strips of vegetation are planted to create wind breaks to alter the sites microclimate. It is widely acknowledged and supported by extensive research that wind breaks create natural protection to create a microclimate that promotes and encourages plant growth and natural recruitment. The assessment of the re-establishment sites prior to planting indicated a high level of natural recruitment present, due to the cessation of cattle grazing (which supported findings of previous studies referenced above). A shelter belt approach also limits the disturbance from active restoration of these existing natural regeneration processes by not disturbing the entire site, and encourages these natural processes.

The information gathered by the UNE research programme informed the preparation of the WSW Restoration Manual (Niche 2014) and the Local Offset Management Plan (Rio Tinto Coal Australia 2014) which were provided in Appendix A and B of the RTS, respectively. These documents provide instructions on the application of key research findings at an operational scale for the relevant biodiversity areas as part of the OEH certified BOS.

A recent paper by Maron *et al*, 2012, investigated restoration success in the situation where biodiversity offsets relied upon the restoration of an ecological community to offset the lost biodiversity values. This paper proposed that ‘the main factors limiting the ability of ecological restoration to achieve a successful offset are captured by the broad categories of poor measurability, uncertainty and time lags’ (Marion *et al*, 2012). The paper identified risk management measures required to respond to these three categories. In response to poor measurability, ‘objectives should be clear in terms of which biodiversity values, an offset should target, and metrics an monitoring programmes designed accordingly’ (Bekessy *et al* 2010).

The Local Offset Management Plan (Rio Tinto Coal Australia 2014) is aligned with these identified risk management measures. It outlines a monitoring programme targeting the biodiversity values, measuring the performance in attaining the conservation objectives, and is designed to monitor the changes in the biodiversity value condition at different scales. The Local Offset Management Plan (Rio Tinto Coal Australia 2014) embeds a comprehensive and consistent monitoring programme and key performance indicators to be observed over 15 years. The monitoring programme comprises three components to capture environmental change at different scales:

- landscape monitoring: to assess vegetation changes and habitat connectivity at the landscape scale in the long-term (monitored over a 7 to 10 year period, as appropriate);
- ecological monitoring: Vegetation and bird assemblage to quantify changes in vegetation structure, key fauna habitat features and bird assemblages in the medium-term (monitored biennially); and
- restoration monitoring: Rapid Condition Assessments to identify threats and inform management activities consistent with the adaptive management approach in the short term (monitored annually) and survival assessments to assess the performance of planting activities.

The concepts of adaptive management and State and Transition modelling are well known and widely accepted as an appropriate response to addressing uncertainty in resource management. Some examples cited include:

A commitment to active adaptive management (McKenney and Kiesecker, 2010; Gardner, 2010) can help to resolve uncertainties in achieving restoration offset goals” (Maron *et al*).

State and Transition modelling is widely advocated as an approach to dealing with uncertainty in natural resource management as it provides an explicit framework for motivating, designing and interpreting the results of monitoring (Rumpff et al 2010).

Both the WSW Restoration Manual (Niche 2014) and the Local Offset Management Plan (Rio Tinto Coal Australia 2014) embed the State and Transition model approach in the restoration of WSW. It should be noted that the use of a State and Transition model was adopted in the current National Recovery Plan (Commonwealth Government 2011) for the Critically Endangered Box Gum Grassy Woodlands to guide the long- term restoration of the community.

In summary, a high level of confidence in the viability of regeneration of WSW is provided through key findings from the research completed by UNE and a decade of investigations undertaken since 2004 and the implementation of WSW Restoration Manual (Niche 2014) and the Local Offset Management Plan (Rio Tinto Coal Australia 2014) which have been developed using well-known and widely accepted methodology to address key risks. It should be noted that in accordance with Conditions 2 to 4 in Schedule 4 of the existing development, the measures described above (eg improve knowledge on the existing WSW community) were to be completed to the satisfaction of the Director-General prior to clearing WSW under the existing development consent. The measures outlined in Conditions 2 to 4 in Schedule 4 of the existing development consent were deemed satisfactorily completed by the Director-General prior to the first disturbance of WSW areas, which occurred in 2014.

The WSW Restoration Manual (Niche 2014) is currently being reviewed and updated with information collected from the 2014 WSW re-establishment programme.

*b. Quantify the indicative cost of undertaking this work 15 years post commencement should the Applicant's regeneration program be unsuccessful as assessed against OEH's agreed performance criteria. The bond proposed in Condition 33(b) (Schedule 3) should be amended to reflect the estimated cost of the proposed regeneration works to ensure that these works are able to be undertaken.*

Condition 33(b) in Schedule 3 of the draft development consent provides for an upfront 'implementation bond' of \$1million based on the method used in Section 2.4 of the RTS. This method for the calculation of this bond was based on the same rationale as calculation for the contribution to the SOS programme, which is the OEH's draft Upper Hunter Offset Fund calculator. The \$1million is equivalent to retiring the entire proposed impact credit of WSW (ie it was calculated for the total area to be cleared rather than the costs for regeneration activities).

The intent is that if the 15 year targets are not met, the proposed implementation bond would be triggered; however, the applicant would still be required to deliver the WSW re-establishment programme (and associated costs). This bond provides WML with the incentive continually commit resources to delivering WSW in a timely manner.

The applicant has quantified its indicative costs to regenerate WSW over the 15 year period post commencement and estimates these costs to be approximately \$4.8million. The action to regenerate WSW areas will be detailed in the Local Offset Management Plan (Rio Tinto Coal Australia 2014), which includes the Northern and Southern biodiversity areas. A conservation bond will be lodged as an appropriate security deposit specifically for these works.

The applicant proposes that the process for the requirement of a conservation bond also be included in the conditions of consent. The bond would be in the form of a bank guarantee. It should be noted that the requirement for a conservation bond formed a condition for the disapproved Warkworth Extension 2012 Planning Approval. Draft wording for DP&E's and the Commission's consideration is provided below:

By the end of [XXXXXX], the Proponent shall lodge a conservation bond with the Department to ensure that the biodiversity offset strategy is implemented in accordance with the performance and completion criteria of the Local Offset Management Plan.

The sum of the bond shall be determined by calculating the full cost of implementing the offset strategy (other than land acquisition costs).

If the offset strategy is completed generally in accordance with the completion criteria in the Local Offset Management Plan to the satisfaction of the Secretary, the Secretary will release the bond.

If the offset strategy is not completed generally in accordance with the completion criteria in the Local Offset Management Plan, the Secretary will call in all or part of the conservation bond, and arrange for the satisfactory completion of the relevant works.

#### 4.4.4 Recommendation 19

*Conditions 34 (Schedule 3) should be amended to require the bond required by conditions 33(b) to be used by OEH for the regeneration of Warkworth Sands Woodland EEC in the local area should be forfeited.*

The applicant supports this recommendation by the Commission.

## 4.5 Final void

### 4.5.1 Recommendation 20

*The Applicant should be required to undertake further investigations to minimise the size and depth of the final void prior to determination of the application. These additional investigations should also consider opportunities to partially fill the gap between the two main overburden emplacements, reduce the slopes of the final highwall and / or incorporate additional micro-relief as recommended by the Department.*

The applicant notes this recommendation and is of the view that opportunities to further reduce the size and depth of the final void are limited in consideration of the efforts already made to minimise the final void, as detailed in the investigations presented in the EIS, RTS and subsequent information provided to DP&E (Appendix 4 of the Commission review report).

It should be noted that there are no current policies in NSW to guide an acceptable size and depth of a final void for a coal mine. The final voids for the proposal are in accordance with past practices as evidenced by approvals for similar developments.

The further investigations requested in recommendation 20 are addressed in following sub-sections.

## i Reduction in size and depth of final void

The development of the mine design presented in the EIS and RTS resulted in the reduction of the currently approved void size of 491ha for the MTW complex to an area of 445ha (measured at the long term water level). The reduction was achieved by filling in Loders Pit void at MTO with overburden material extracted from Warkworth Mine.

Notwithstanding the five options investigated in the applicant's letter to DP&E dated 10 February 2015 (Appendix 5 of the Commission review report), subsequent to the Commission's review report an additional option to reduce the size and depth of the final void was investigated. A copy of the letter is reproduced in Appendix E.

This option, referred to as Option 6, consists of raising the floor of the pit by one seam in both North Pit and West Pit for the last seven dragline strips, between years 2029 and 2035. For this scenario, the depth of the final void measured from the long term water level of RL -10m AHD could be reduced by 65m with a reduction in the surface area of 9 ha. However, it would require the sterilisation of 30 Mt of coal at a strip ratio of 4.4 to one and require a further 50 million bank cubic metres of fill at a cost of \$127million using the same assumptions as the previous investigations (refer to letter from Rio Tinto Coal Australia to DP&E dated 10 December 2014 in Appendix 4 of the Commission review report). There would be no change in the surface area of depth of void when measured at the natural ground surface level of RL 80 m AHD. From an aesthetics and void water quality perspective, there would be no change compared to the base case with a negligible increase in useable land above the long term water level, but below the natural ground surface level.

Figure 1 of the applicant's letter to DP&E dated 10 February 2015 (refer Appendix E) illustrates the various reference levels for measuring the surface area.

The additional direct cost associated with filling and sterilisation of 30 Mt of economic coal for Option 1, with negligible change in aesthetics, void water quality and useable land, is not considered reasonable or feasible.

For completeness, a summary of the options investigated, including the above (option 6), is provided in Table 4.3 below. These options are described further and shown graphically in Appendix F.

The applicant will use its best endeavours to minimise the depth and area of the final void where reasonable and feasible as part of the Mine Closure Strategy and in accordance with Government policy developed to guide this process.

**Table 4.3 Final void reduction investigations**

Option	Description	Surface level (m AHD)	Pre-fill void area at surface level (ha)	Void area after filling (ha)	Change in area (ha)	Fill required (Mbcm)	Estimated fill cost (\$M)*	Fill cost/ change in area	Comments
Base case	Current proposal	-10	454	445	9	50	\$127	\$14.1M/ha	Utilises Warkworth overburden to fill Mount Thorley void. Void acts as groundwater sink.
1	Fill to natural surface	80	950	0	950	824 (+50)	\$2,085 (+\$127)	\$2.2M/ha	Requires considerable volumes of material with no convenience source from an operating mine. Potential for void to be a groundwater source rather than a sink.
2	Fill to 350 year water level	-10	445	0	445	335 (+50)	\$848 (+\$127)	\$1.9M/ha	Requires considerable volumes of material with no convenience source from an operating mine. Potential for void to be a groundwater source rather than a sink.
3	Fill to 1,000 year water level	20	576	0	576	476 (+50)	\$1,204 (+\$127)	\$2.1m/ha	Requires considerable volumes of material with no convenience source from an operating mine. Potential for void to be a groundwater source rather than a sink.
4	Reduce highwall and endwall	-10	445	487	-42	170 (+50)	\$430 (+\$127)	N/A (increase)	Using material from the highwall and endwalls would increase the surface area of the void. Void acts as groundwater sink.
5	Reshaping North and West Pit Final Landform	-10	445	391	54	106 (+50)	\$143 (+\$127)	\$2.6M/ha	Require removal of 150 ha rehabilitation. Void acts as groundwater sink.
6	Raise North Pit and West Pit floor by one seam in last seven dragline strips	-10	445	434	9	50	\$1427(+\$127)	\$14.1M/ha	Reduce void depth by 65m. Sterilises 30 million tonnes coal.

Notes: \* Estimated fill cost based on DRE costs calculator of \$2.53/bcm for carting material. Actual costs likely to be significantly higher to shape and rehabilitate.

## ii Filling gap in overburden emplacements

Further analysis has been undertaken as to the viability of filling of the gap between the two overburden emplacements (ie the haul road from the main pit). The analysis considered raising the final surface level to provide a more consistent landform between these two emplacement areas. As shown Figure 2.16 of the EIS, this area is currently proposed to be rehabilitated as trees over grass.

The analysis focussed on the most efficient and cost-effective method of moving overburden from the two emplacements upon completion of mining as it is not possible for this to occur during mining given it is an active haul road. Two options were considered; Option 1 (truck and shovel) and Option 2 (dozer). Figure 4.1 shows the post-mining surface of the haul road for both these options. Key findings of the analysis are provided in Table 4.4.

**Table 4.4 Investigations for partially filling in gap between two main emplacement areas**

Item	Option 1 (truck and shovel)	Option 2 (dozer)
Total material needed to be moved	26 million bank cubic metres	19.5 million bank cubic metres
Total cost of fill using industry benchmark of \$2.53/bank cubic metre <sup>2</sup>	\$66 million	\$49 million
Final void size <sup>1</sup>	Reduces the final void size to 434ha	Reduces the final void size to 438ha
Landform drainage	Smaller drainage profile	Slightly larger drainage profile
Slope	All surfaces to 10 degrees or shallower	All surfaces to 10 degrees or shallower
Rehabilitation implications for MTW	Short-term 'dehab' totalling 143.75ha	Short-term 'dehab' totalling 131.7ha

Notes: 1. Final void size at minus 10 RL.

2. Using Division of Resources and Energy Rehabilitation Cost Calculation Tool.

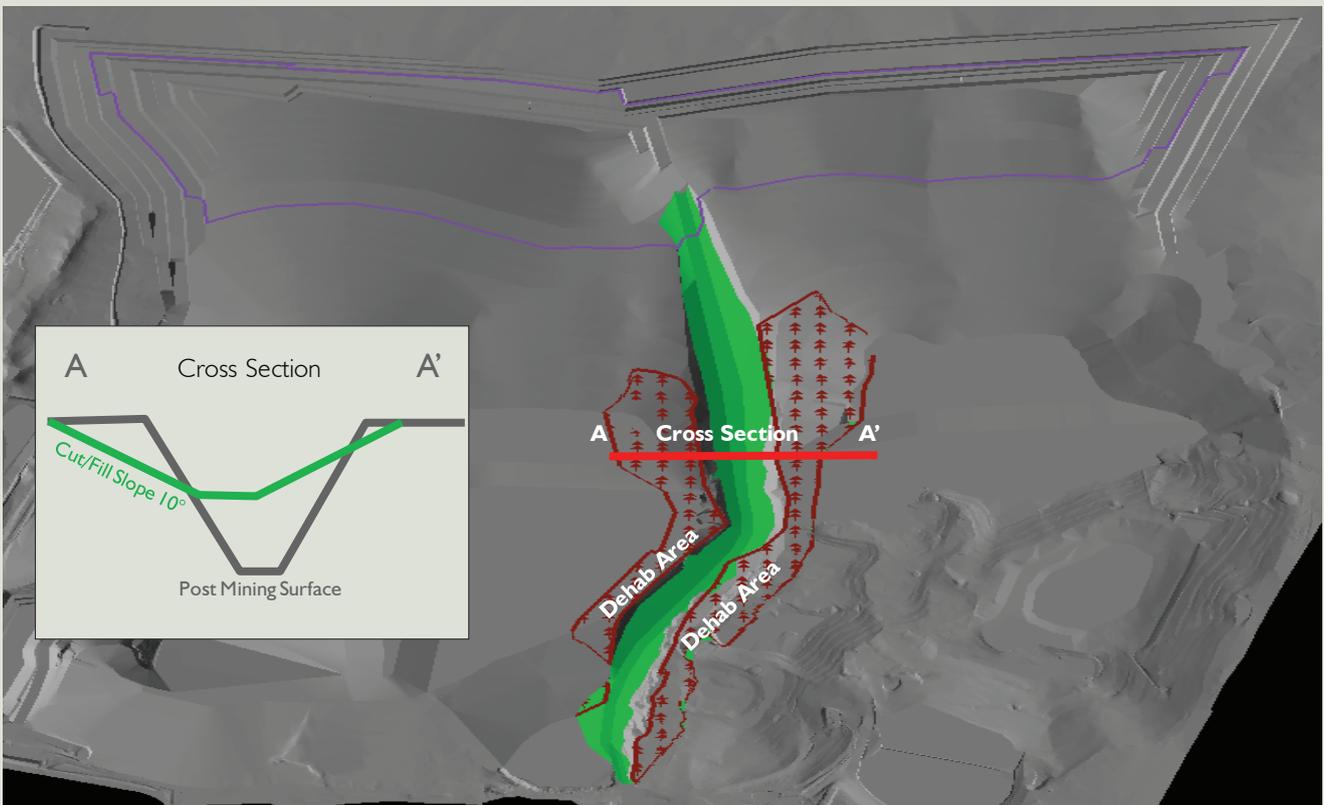
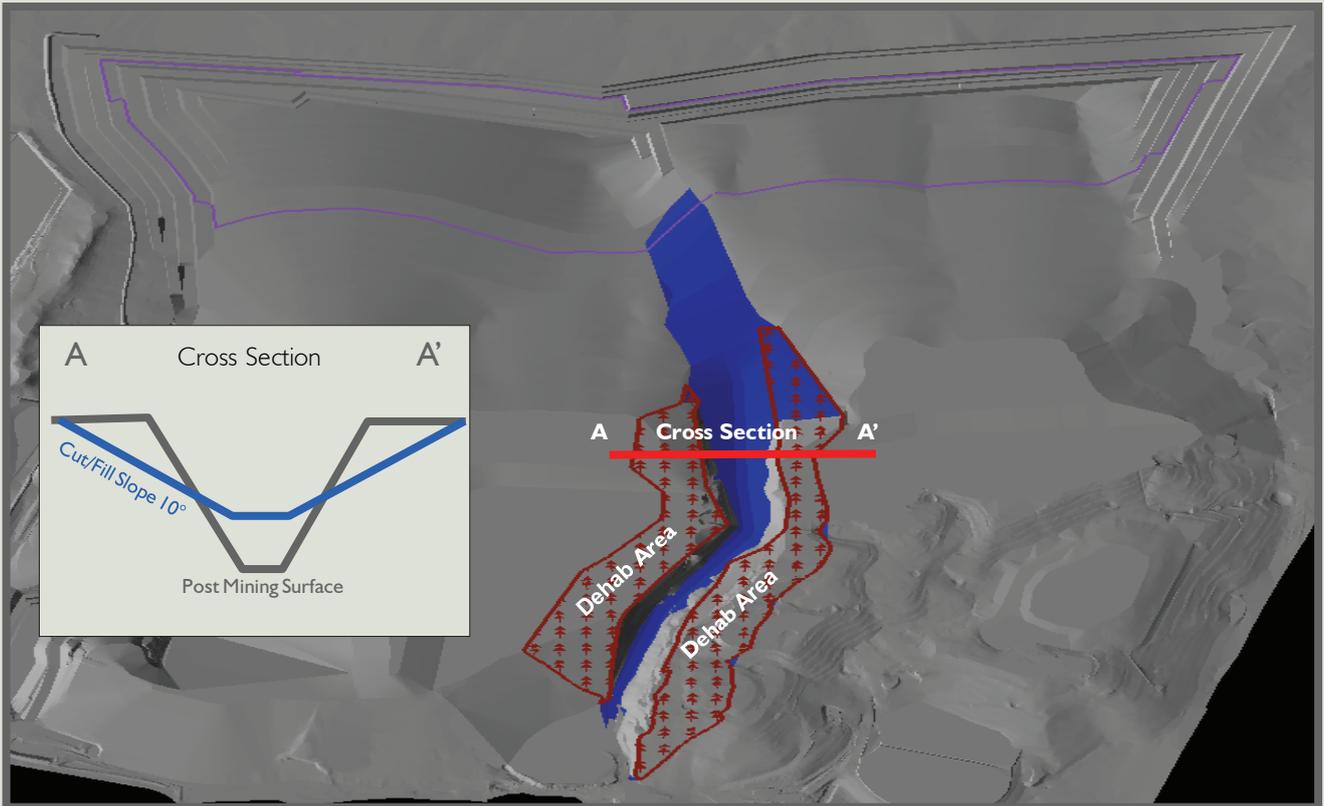
In consideration of these options, WML proposes to implement Option 2 to partially fill the gap between the two main overburden emplacements given there is significantly less material to move (and resulting in further disturbance) to establish a more consistent landform.

## iii Reduction in slopes of final highwall

A reduction of final highwall slopes was investigated as option 4 in Table 4.3, Section 4.5.1(i) above. This option shows that the reduction in highwall and endwall slopes actually increases the size of the final void (487ha vs 445ha) if accessing the same volume of coal. Therefore, this option was discounted.

## iv Incorporation of additional micro-relief

The EIS and RTS provided for an undulating landform to provide micro-relief. Draft consent Condition 56 in Schedule 3 requires WML to provide a final landform in keeping with the natural terrain features of the area.



#### 4.5.2 Recommendation 21

*A study should be undertaken by government as a matter of priority to review the cumulative impact of voids in the Hunter Valley including the impact of these voids in the short, medium and long term on the water table and on the future of agriculture and associated industries in the Hunter Valley. The findings of the study should be used to establish a policy position on voids for future mining projects / mine expansion projects.*

The applicant notes this recommendation and would welcome the opportunity to participate during the preparation of a study by the NSW Government as an industry stakeholder.

### 4.6 Rehabilitation

#### 4.6.1 Recommendation 22

*Recommended Condition 58 (Schedule 3) should be amended to include timeframes for achieving specified rehabilitation benchmarks with penalties to be enforced if these benchmarks are not met.*

The applicant understands that the current Government process for rehabilitation timing, standards and enforcement is via the MOP under the *Mining Act 1992*.

The performance of the operation against existing approved rehabilitation benchmarks are publically available each year through the Annual Review that is provided to Government and posted on the company's website. This document compares the extent of rehabilitation undertaken during the reporting year with that stated in the approved MOP.

The applicant understands that penalties and enforcement action for not undertaking progressive rehabilitation are available to the regulators through the various Acts. The operations must meet the commitments and standards in its approved EIS and management plans. The DP&E, in addition to the Department of Trade and Investment (Division of Resources and Energy) may enact its enforcement and compliance policies should it be deemed that the operations have not met their stated commitments.



## Chapter 5

### Other matters





Chapter 5 — Other matters

## 5 Other matters

The comments below respond to specific statements contained in the Commission's review report and are included to supplement the responses to the 22 recommendations. In each section, the specific statement contained in the Commission review report is provided, followed by a response to that comment.

### 5.1 Commission review report Section 5.3.5 – noise cumulative assessment

Section 5.3.5 of the Commission review report suggests that the EPA's submission to the Department dated 13 August 2014 raised an issue that the assessment of cumulative noise in the EIS noise and vibration study seems to include the noise of the subject mine which appears to be inconsistent with the INP methodology.

The cumulative assessment is an assessment undertaken inclusive of all industrial sites operating at the same time and compared to the amenity criteria in accordance with the INP. This is different to an assessment for a mine's own contribution which is compared against the Project Specific Noise Levels in accordance with the INP.

The amenity criteria used for the cumulative assessment is derived from Table 2.1 of the INP as outlined in Section 9.1.2 and Section 11 of the EIS noise and vibration study. The cumulative assessment is a prediction of all mine's operating (including the proposal) at the same time at selected future snapshots and compared to the amenity criteria. The assessment found that the amenity criteria are met for all residents in Bulga village.

### 5.2 Commission review report Section 5.3.12 – independent mediator

Section 5.3.12 of the Commission's review report states that it considers it is of critical importance that the applicant attempt to improve its relationship with the community so as to rebuild confidence and trust. The report further states that engaging an independent mediator may assist in this rebuilding process.

The applicant acknowledges that there are relationships with parts of the community where trust needs to be re-established as a consequence of this proposal. The applicant values direct relationships with its stakeholders and near neighbours rather than employing an outside facilitator.

The applicant's community engagement is founded on the value placed on direct relationships and uses a number of engagement tools on an ongoing basis, including:

- Shopfronts in Singleton and Muswellbrook and a freecall line (1800 727 745) to provide the community with the opportunity to provide feedback, both positive and negative, relating to Coal & Allied's operations in the Hunter Valley;
- Coal & Allied's website ([www.riotintocoalaustralia.com.au](http://www.riotintocoalaustralia.com.au)) which contains information on mine operations and management, environmental monitoring results, project applications, community engagement and contact details;
- Quarterly newsletters distributed to all residences within the Singleton LGA which provide information on Coal & Allied's mining operations in the LGA, including upcoming projects; and

- MTW's Community Consultative Committee (CCC) which meets regularly to discuss mining operations and performance, and comprises representatives of the community, Singleton Council and Coal & Allied.

Section 21.5 of the EIS outlined social management and monitoring initiatives as part of existing operations. Notably this includes enhancing two-way flow of information and feedback between the MTW operation and the community through appropriate programmes such as a 'Community Scorecard' to increase transparency of our operations.

The concept behind a Community Scorecard is the development of an interactive tool that enables the community to rate the company's performance and provides the company with a way to respond to the community's concerns around corporate impacts, especially as they relate to the environment, safety, transparency and the economy. The Community Scorecard tracks and measures company performance in areas of importance to both the company and the community. By being transparent and responsive to community concerns, the company aims to demonstrate it genuinely listens to the community, understands its concerns, and is willing to make changes, thereby building trust and improving business practice.

The proposal specific mitigation measures are outlined in Section 21.5.2 and include a commitment to the development of a Social Impact Management Plan (SIMP) to set in place a process to improve relationships. It is noted that this mechanism is commonly employed in Queensland. The SIMP would be developed in consultation with the Bulga community, in addition to other relevant stakeholders, and articulate how the applicant will manage and monitor the implementation of strategies to mitigate social impacts and enhance opportunities. The SIMP would detail implementation responsibilities, timing, performance indicators and targets; and monitoring measures. As an example, if agreed with key stakeholders, the aforementioned 'Community Scorecard' could be one of the key strategies included in the SIMP to mitigate concerns regarding transparency and trust. A core aim of the SIMP is to promote an active and ongoing role for communities, local authorities and other stakeholders throughout operation and future decommissioning and closure of the project. The applicant believes that this process will assist in improving its relationship with the community as recommended by the Commission.

### 5.3 Commission review report Section 5.5.3 – air quality mitigation for mine-owned properties

In addition to privately-owned properties, the Commission found a number of mine-owned properties would also be affected by dust above the relevant criteria. NSW Health has raised concerns regarding air quality on tenants of these properties and has recommended tenants be informed of potential health risks. Further in relation to these properties the Department has recommended that the Warkworth Mine be required to undertake additional dust mitigation measures (i.e. provide air filters or air conditioning) at the request of tenants of any mine-owned receivers predicted to be affected by dust impacts above EPA criteria. The Commission considers this appropriate.

The existing development consent at Warkworth Mine (Development Consent No. DA 300-9-2002-i) contains provisions for mine-owned land. Condition 13(c) in Schedule 4 states:

13. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions by the development do not cause exceedances of the criteria in Tables 3, 4 and 5 at any occupied residence on mine-owned land unless:

(c) air mitigation measures such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant or landowner (if the residence is owned by another mining or petroleum company);

The applicant supports the incorporation of the existing requirements as stated above into Condition 18 of the recommended conditions of consent.

## 5.4 Commission review report Section 5.10.1

### i Roads Contributions

The applicant in its RTS disagreed with the RMS's contribution requirement as it is of the view that the intersection is part of the State road network and its EIS intersection assessment indicated minimal change in any of the intersection delay parameters at this intersection.

The Secretary's environmental assessment report provided a detail assessment of the transport and traffic issue and concluded that the local and regional road network is capable of accommodating the traffic associated with the proposed expansion subject to the identified upgrade works. The Department agrees with the RMS that the applicant should pay a contribution of \$1million towards the upgrade of the Golden Highway/Putty Road and Mitchell Line of Road intersection, and design and build the Putty Road underpass/bridge to the satisfaction of the RMS. Draft conditions have been included accordingly.

Based on the EIS assessments, upgrade of the Putty Road/Mitchell Line of Road intersection, or alternatively carry out upgrade works of an equivalent value on the intersection to the satisfaction of RMS, is not justifiable.

The traffic and transport study was prepared in accordance with the *Guide to Traffic Generating Development* (RTA 2002), which is the standard template for the preparation of traffic impact studies for major projects in NSW.

As described in the traffic and transport study, this intersection was assessed to determine both the proposal's impacts as well as any cumulative effects. A specific assessment scenario was selected, the year 2017, which corresponds to the first year of Wallaby Scrub Road traffic detours and also includes proposed construction traffic movements for Bulga Coal Complex's Bulga Optimisation Project (BOP) (Umwelt 2013).

The results show minimal change in any of the intersection delay parameters at this intersection. The only detectable changes in the intersection peak hour levels of service at this intersection (which remain at level of service B for all the year 2017 proposal traffic analysis scenarios considered) are primarily due to the assumed +2 per cent per annum locality background traffic growth in the Mount Thorley area, which is independent of existing and proposed mining projects in the area.

It is not evident from the RMS submission on the EIS nor the Secretary's environmental assessment report that a clear justification for the cost of intersection improvement works to the value of \$1million, at the Putty Road/ Mitchell Line of Road intersection can be clearly attributed to either the existing traffic operations or the future traffic impacts of the proposal.

If future intersection traffic improvements are required at the Putty Road/ Mitchell Line of Road intersection, it is likely these will be primarily required as a result of locality background traffic growth. Existing funding mechanisms for state highways such as the Golden Highway would contribute to any such future upgrade or improvement. As noted in Section 1.1 of the RTS, the proposal is conservatively estimated to generate \$567million in NPV terms in royalties to the state which would contribute to schools, hospitals and roads and other infrastructure and services.

## ii Lydes Lane site access

The applicant in its RTS disagreed with the RMS's recommendation to close the existing intersection of Lydes Lane and the northbound on load ramp of the Golden Highway.

As stated in Section 4.10.2 of the RTS, Lydes Lane is a north-south road connecting to Putty Road at its southern end and the Golden Highway at its northern end. The Lydes Lane/Golden Highway intersection (a left turn in and left turn out only access, with a concrete median barrier in the centre of the Golden Highway to prevent unauthorised right turns) is an existing access point to the site. However, the primary access is the southern end of Lydes Lane via Putty Road.

Due to the aforementioned physical safety restrictions, the Lydes Lane/Golden Highway access is used by a small proportion of the MTW workforce (approximately 7 percent) travelling north via the Golden Highway when exiting the site.

Whilst closure of this access to ensure road safety and network efficiency is unlikely to significantly adversely affect the accessibility of the mine site, the applicant would welcome the opportunity to discuss alternative traffic safety solutions with the RMS.

## Chapter 6

### Conclusion





Chapter 6 — Conclusion

## 6 Conclusion

Warkworth Mine and the adjoining MTO are long standing members of the community having commenced operations more than 30 years ago. An average workforce of approximately 1,300 people including full-time contractors is employed at MTW. Development consent for the proposal is required to enable the long-term viability of operations at Warkworth Mine.

In accordance with the terms of reference set out by the Minister for Planning, the Commission carefully considered the proposal, submissions made to the Commission and to the DP&E, matters raised at the public hearing, advice from government agencies, and other documents referred to throughout the proposal. The concluding remarks of the report state:

The Commission recognises that the project provides for mining of a significant resource and will have very significant direct and indirect economic and social benefits for the State and the Hunter region. It further notes that if the project was not approved, there would be substantial adverse economic impacts, especially to the towns of Singleton and Cessnock.

...the Commission considers that, subject to the detailed recommendations outlined in the report, the project is consistent with government policy and legislation and is capable of being approved.

The application for the proposal has been extensively reviewed and assessed by government agencies, peer reviewers and the Minister-delegated consent authority (ie the Commission) through a number of important steps and processes stipulated in the NSW planning system. The EIS for the proposal was publically exhibited from 25 June to 6 August 2014 and a RTS was prepared which responded to submissions received. A total of 1,967 special interest group and community submissions were received: 1,670 or approximately 85 per cent were in support; and 297 or approximately 15 per cent were in objection. Submissions were also received from Singleton Council and nine government agencies. Of note, there were no objections to the proposal, only proposed conditions of consent from these agencies.

The Secretary's environmental assessment report considered the EIS, submissions received and the RTS. Its report was finalised and sent to the Commission on 14 November 2014 to assist in its merit review of the proposal. The DP&E concluded:

Based on its assessment, the Department is satisfied that Warkworth has designed the project in a manner that achieves a reasonable balance between maximising the recovery of the coal resource and minimizing the potential impacts on surrounding land users and the environment... and that it is in the public interest and should be approved, subject to stringent conditions.

The mine has demonstrated its ability to coexist with neighbouring communities since its inception in 1981. The applicant, however, acknowledges and respects the concerns held by aspects of the community raised in submissions regarding the proposal. Coal & Allied is committed to co-existence with the local community, and ensuring Bulga village is sustainable in the future. In this regard, the applicant welcomes the Commission's recommendation for a Village Enhancement Strategy.

WML is committed to industry best practice environmental management and continual improvement over the life of the proposal to manage potential impacts. Extensive ongoing engagement with near neighbours will be implemented with feedback received continuing to be an important consideration in the operational management of the mine.

Following the Commission's review report, the conclusion as presented in both the EIS and RTS remains - while the proposal has some residual social and environmental impacts some of which would be experienced by near neighbours, it should be approved as:

- the resource within the footprint of the proposal is significant (enabling the long-term employment of approximately 1,187 people, \$5.7billion in expenditure and \$567million in royalties in NPV terms – attributable to Warkworth Mine);
- direct and indirect benefits from the disposable income earned by MTW employees living in Singleton LGA are substantial;
- all of the Mining SEPP's non-discretionary standards are met with the exception of air quality where the cumulative annual average criteria is exceeded for two properties already afforded acquisition rights by neighbouring mines, although this standard is met for all privately-owned properties;
- impacts on near neighbours have been minimised to the greatest extent possible using all reasonable and feasible measures while maintaining an economically viable mine plan;
- it is consistent with all government policies;
- Warkworth Mine has a long history of minimal non-compliances with government approvals;
- it ensures maximum return on the substantial capital invested in the mine since it commenced in the 1981 and has access to existing infrastructure such as road, rail and port;
- the applicant is committed to industry best practice mitigation and continual improvement to manage potential impacts from the mine's operations. This includes contribution to a Near Neighbour Amenity Resource which would provide services such as property maintenance to residents surrounding the operation; and
- it provides a state significant economic benefit to the local, regional, state and national economies.

## Appendix A

### Updated economic study



Appendix A — Updated economic study

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A



Response to Planning  
Assessment Commission  
Recommendations on  
Economic Impact  
Assessment for Warkworth  
and Mount Thorley  
Continuation Projects

Prepared for Rio Tinto Coal Australia

Client name: RTCA  
Date: March 2015

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## Table of contents

<b>1# Summary</b> .....	<b>2#</b>
1.1# Current economic environment .....	2#
1.2# Sensitivity of net economic benefits .....	2#
1.3# Sensitivity analysis .....	3#
1.4# Additional sensitivity testing.....	3#
<b>References</b> .....	<b>5#</b>

# 1 Summary

BAEconomics and Rio Tinto Coal Australia have reviewed the Planning Assessment Commission (PAC) Reports (2015) for the Warkworth and Mount Thorley Continuation Projects.

This short report responds to Recommendation 1 that: 'The Applicant's economic assessment, including the CBA, should be updated to reflect the current economic climate'. It is noted that Recommendation 2 is a matter for the Department of Environment & Planning (DPE) and Deloitte Access Economics (DAE).

Both the PAC and DPE have concluded that the expansion of the MTW mining complex would result in a significant positive net economic benefit for the Hunter Region and NSW, and that the matters raised by DAE in their peer review do not substantially change this conclusion. The sensitivity analysis presented in BAEconomics (2014) encompasses a low case that represents an Australian dollar thermal coal price that is lower than the combination of the 2015 consensus thermal US\$ coal price and exchange rates and is estimated to result in a significant net benefit to NSW. As a result, the need for an updated economic assessment is not clear. At the same time, BAEconomics continue to be of the view that coal price and exchange rate expectations over the term of the investment, that is long-term forecasts, are more relevant in an assessment such as this.

Notwithstanding this, BAEconomics has addressed the recommendation by demonstrating below that the economic benefits of the project to NSW and the region are significant even in the current economic environment. Specifically, adopting the most recent consensus forecasts for thermal coal prices and the Australia/US dollar exchange rate does not materially change the previous estimate of the net present value of the proposals to NSW.

## 1.1 Current economic environment

BAEconomics assumes that the PAC has used the term 'current economic climate' to refer to the lower spot prices currently being experienced in the Australian / international thermal coal market compared with the long term coal price projections used in the original economic assessment. Exchange rate assumptions are also relevant in this context, given that the majority of coal produced at MTW is exported.

## 1.2 Sensitivity of net economic benefits

Each component of net public benefit has a different level of sensitivity to changes in coal prices and exchange rates. For example, compensation of employees / contractors (compared to what they otherwise could have earned) is valued at \$612

million (in NPV terms) in the CBA. This is the additional disposable income received by MTW employees and long-term contractors who live in NSW as a result of the proposals. Changes in coal prices and exchange rates do not have a material impact on this value because Rio Tinto Coal Australia compensates employees and contractors regardless of changes in coal prices and exchange rates. If the proposals were not approved then any salaries and other compensation that would have been earned by workers over and above what they could have earned elsewhere would be foregone thus leading to a net loss to workers resident in NSW.

Other components of net public benefit, such as royalty payments and company taxes, are more sensitive to changes in coal prices and exchange rates and as a result, are considered further below.

### 1.3 Sensitivity analysis

Tables 3.5 and 3.6 of the Economic Impact Assessment (BAEconomics, 2014) show the sensitivity of key components of net public benefit to variations in coal prices and exchange rates. A range of coal prices and exchanges rates were used and resulted in incremental production-related benefits of between \$1.2 and \$1.8 billion. The benefits of the proposals using current consensus prices and exchange rates fall within these bands:

- The worst case scenario in the Economic Impact Assessment assumed a coal price of US\$75/t and a USD:AUD exchange rate of 0.95. This equates to a coal price in Australian dollar terms of \$79/t. Under this scenario, the incremental production-related benefit of the proposals to NSW is \$1,235 (NPV A\$ m 2014).
- Assumptions based on current consensus<sup>1</sup> prices for thermal coal in 2015 (US\$63/t) and a USD:AUD exchange rate of 0.78 equate to a coal price in Australian dollar terms of \$81/t coal, which is still above the worst case scenario assessed in the sensitivity analysis.

### 1.4 Additional sensitivity testing

To further test the resilience of key components of the production related benefits of the proposals, BAEconomics recalculated the net present value of the MTW proposals for the central case using the most recent consensus forecasts for both thermal coal

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<sup>1</sup> The consensus is taken as the average of the price and exchange rate forecasts provided by analysts AME and Wood Mackenzie and brokers Deutsche Bank, Citigroup, Goldman Sachs, Macquarie, Morgan Stanley, RBC, Merrill Lynch, UBS, Credit Suisse, Barclays and JP Morgan (reports date from December 2014 – February 2015).

prices and the exchange rate. The consensus thermal coal price in 2015 for the most recent forecasts available is \$US63/t and the consensus exchange rate is 0.78. The long run thermal coal price (after 2021) and exchange rate were assumed to be \$US85 and 0.85 as assumed in the original economic assessment. These assumptions remain close to current long run average broker and analyst consensus of \$US84/t for thermal coal and an exchange rate of 0.86. Coal prices and exchange rates for the years 2016 to 2020 were taken to be consensus forecasts; thermal coal prices ranged from \$US66/t in 2016 to \$US84/t in 2021 and exchange rates ranged from 0.75 in 2016 to 0.86 in the long run.

Given the above short and medium term forecasts together with the long run price and exchange rate assumptions, the net present value of the production related benefits to NSW of the continuation of MTW is A\$1,491m compared to the estimate provided in BAEconomics (2014) of A\$1,501m. The revised estimate, taking account of the 'current economic climate', is marginally smaller because of an estimated loss in the net present value of royalty payments of A\$4m and a fall in company taxes of A\$6m.

Other production related benefits did not change as a consequence of changing short run thermal coal prices and exchange rates. As mentioned above, compensation of employees and contractors is not sensitive to thermal coal prices and exchange rates. In addition, rates, payroll taxes, and any other payments that are directly related to staff payments such as the NSW's share of the Medicare levy are also not sensitive to coal prices and exchange rates. Similarly the estimated regional impacts of the proposals are insensitive to changes in short term coal prices and exchange rates, so no updates have been made to the Regional Economic Impact Assessment (Chapter 4 of BAEconomics, 2014).

These results confirm the conclusions from the sensitivity analysis presented in BAEconomics (2014) that, under a wide range of coal price and exchange rate assumptions, approval of the proposals would lead to a significant net contribution to NSW and the local region in which the mines operate.

## References

BAEconomics Pty Ltd (2014), Economic Impact Assessment for Warkworth Continuation 2014 and Mount Thorley Operations 2014, June.

Planning Assessment Commission (PAC) (2015), Reports for the Warkworth and Mount Thorley Continuation Projects.

## Appendix B

### Warkworth Mine calm weather calculations



Appendix B — Warkworth Mine calm weather calculations

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# B

12 March 2015

Anthony Russo  
Manager – Project Approvals  
Rio Tinto  
Level 25 – 123 Albert Street  
Brisbane Qld 4000

Re: | MTW Calm weather calculation

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Dear Anthony,

EMM confirms calculation of annual occurrences of calm conditions is 1.8 per cent based on an analysis of the MTW operated weather station at Charlton Ridge for data between 2006 and 2013.

Other available information prepared by Todoroski Air Sciences follows:

- MTW Charlton Ridge CALMET data for 2012 show that wind speeds were below 0.5m/s for 0.8% of the time annually, the same result occurs in Year 3 of the Project. For Year 14 of the Project (after Saddleback Ridge is removed/ mined through) wind speeds would be below 0.5m/s for 0.6% of the time annually. This shows that calm conditions at the Charlton Ridge station are infrequent and would remain infrequent with the removal of Saddleback Ridge.
- Section 5.2.1 of App 8 Air Quality Impact Assessment the Bulga Optimisation Project EIS, states that the new station (located atop the Bulga mine dumps, and 2.5 km from the Charlton Ridge station) recorded wind speeds below 0.5m/s for 1.3% of the time annually, which is generally consistent with the Charlton Ridge data. Bulga calculated wind speeds below 0.5m/s for 0.5% of the time annually for the MTW station for 2010.

We trust this information meets your needs.

Yours sincerely



Najah Ishac  
Director  
[nishac@emgamm.com](mailto:nishac@emgamm.com)



## Appendix C

### MTW noise management plan



Appendix C — MTW noise management plan

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MOUNT THORLEY WARKWORTH  
NOISE MANAGEMENT PLAN

MTW-10-ENVMP-SITE-061

7 August 2014



# NOISE MANAGEMENT PLAN

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## Document control

Version	Date	Prepared by	Reviewed by
1.0	31/08/2012	Nicola Proctor	Mark Nolan
2.0	31/03/2014	Gerard Gleeson	Andrew Speechly

## Revisions

Version	Date	Revision Description	Author	Approved by
1.1	26/09/2012	Final submitted to DP&I for approval	Kelly O'Mullane	Mark Nolan
1.2	30/10/2012	Revised final submitted to DP&I for approval following direction to amend under Condition 4 of Schedule 3.	Kelly O'Mullane	Mark Nolan
1.3	31/10/2012	Revised final submitted to DP&I for approval following request for amendment to Table 1. Approved by Director-General on 31/10/2012.	Kelly O'Mullane	Mark Nolan
2.0	31/03/2014	Revised following Warkworth Modification 6 Approval	Gerard Gleeson	Andrew Speechly
2.1	17/07/2014	V2.0 revised following feedback from DP&E	Gerard Gleeson	Andrew Speechly
2.2	07/08/2014	V2.0 formatting and finalisation following Approval from DP&E.	Gerard Gleeson	Andrew Speechly

## DEFINITIONS

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Term	Definition
<b>L<sub>A</sub></b>	The A-weighted root mean squared (RMS) noise level at any instant
<b>L<sub>A90</sub></b>	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The LA90 level is often referred to as the 'background' noise level and is commonly used to determine noise criteria for assessment purposes.
<b>L<sub>Aeq</sub></b>	The average noise energy during a measurement period
<b>dB(A)</b>	Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise
<b>dB(C)</b>	Follows the frequency sensitivity of the human ear at very high noise levels. The C-weighting scale includes much more of the low-frequency range of sounds than the A scale.
<b>Sound Power Level (L<sub>w</sub>)</b>	10 times the logarithm of energy radiated from a source (as noise) divided by a reference power, the reference power being 1 picowatt.
<b>Sound Pressure Level (SPL)</b>	Fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
<b>Hertz (Hz)</b>	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together.
<b>Exceedance</b>	When the measured mining noise level (mining noise only, other sources having been excluded), measured through the compliance (attended) monitoring programme, exceeds the relevant Project Approval criterion under applicable meteorological conditions.
<b>Non-Compliance</b>	When a measured <b>exceedance</b> exceeds the relevant Project Approval Criterion by greater than 2dB under applicable meteorological conditions.
<b>Sound Attenuated</b>	Where equipment is fitted with engineering modifications to reduce nominal sound power
<b>Noise Event</b>	Any instance of elevated noise as measured through the supplementary noise monitoring regime which requires operational modifications to correct.

# CONTENTS

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DEFINITIONS	3
CONTENTS	4
<b>1. PREFACE</b>	<b>7</b>
1.1 Introduction	7
1.2 Scope of the Noise Management Plan	7
1.3 Objectives	22
<b>2. BACKGROUND</b>	<b>24</b>
2.1 Background	24
2.1.1 Project Approval	24
2.1.1.1 2013 Land and Environment Court judgment	24
2.1.2 Environmental Protection Licence	24
2.2 Relevant Standards and Guidelines	25
2.3 Internal Requirements	25
2.4 Commitments Made in Environmental Assessments	25
<b>3. CONSULTATION</b>	<b>25</b>
3.1 Government Agencies	25
3.2 Nearby/Neighbouring Mines	25
<b>4. EXISTING CHARACTER</b>	<b>26</b>
4.1 Existing Character	26
4.2 Infrastructure	26
4.3 Site Noise Emissions	28
4.4 Meteorological Conditions	28
4.5 Detailed Baseline Data	28
4.6 Relevant Noise Criteria	28
<b>5. MANAGEMENT OPTIONS / MITIGATION OPTIONS</b>	<b>28</b>
5.1 Principles and framework	28
5.2 Best Management Practice	28
<b>6. MITIGATION MEASURES / MANAGEMENT CONTROLS</b>	<b>29</b>
6.1 Objectives	29
6.2 Standard Mitigation Measures	29
6.3 Proactive Measures	29
6.3.1 Sound Suppressed Fleet	29
6.3.2 Sound Power Control	30
6.3.2.1 Sound Power Level Testing	30
6.3.2.2 Routine Maintenance Scheduling	30

6.3.2.3	Daily pre-start inspections	30
6.3.3	Proactive Planning	30
6.4	Reactive Measures	31
6.4.1	Real Time Noise monitoring network	31
6.4.2	Validation of Real Time monitoring locations	31
6.4.3	Real Time Noise alarm received	31
6.4.4	Supplementary handheld noise monitoring	32
6.4.5	Operational Modifications	32
6.4.6	Sound Power Level Testing – ad-hoc	33
6.5	Management of Unpredicted Impacts	33
6.6	Continuous Improvement	33
<b>7.</b>	<b>MONITORING PROGRAM</b>	<b>33</b>
7.1	Independent Review and Land Acquisition Process	33
<b>8.</b>	<b>IMPLEMENTATION OF THE NOISE MANAGEMENT PLAN</b>	<b>34</b>
8.1	Reporting	34
8.1.1	Internal reporting	34
8.1.2	External Reporting	34
8.2	Comparison of Attended and real-time monitoring data	34
8.3	Annual Assessment and model validation	34
8.4	Complaints Management	34
8.5	Review of this Management Plan	35
8.6	Roles and Responsibilities	36
Appendix A – Noise Monitoring Programme		39
Appendix B – Consultation with the EPA		48
Appendix C – Detailed Baseline Data		51

PREFACE  
NOISE MANAGEMENT PLAN





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Mr Gerard Gleeson  
Environmental Specialist – Systems and Monitoring  
Coal & Allied – Rio Tinto Coal Australia.  
PO Box 315  
SINGLETON NSW 2330

Our ref: 34/95  
300-9-2002-i

Dear Gerard

**Management Plan Approval  
Warkworth Extension Project (300-9-2002-i) &  
Mt Thorley Coal Mine (DA 34/95)  
Noise and Air Quality Management Plans**

On 31<sup>st</sup> March 2014 we received copies of Mt Thorley – Warkworth Complex wide Noise Management and Air Quality Management Plans. The Noise Management Plan included the Noise Monitoring Program and the Air Quality Management Plan included the MTW Air Quality Monitoring Program.

These 2 management plans were required by Conditions 16 and 21 Schedule 4 of the January 2014 Warkworth Mine modified approval. These plans apply to both the Warkworth and Mt Thorley mines.

I advise that the Secretary, Dept. of Planning & Environment has approved the Noise and Air Quality Management Plans.

Would you please forward the final version of the 2 plans and annexures in two files for the Department's records by the 15<sup>th</sup> August 2014.

Should you have any enquiries on this matter please contact Scott Brooks on (02) 6575 3401.

Yours sincerely

Scott Brooks  
**Team Leader, Compliance  
Singleton**

6-8-2014

As Nominee for the Secretary, Dept. of Planning & Environment.

# 1. PREFACE

## 1.1 Introduction

Mount Thorley Warkworth (MTW) is an integrated operation of two open cut mines, Warkworth Mining Limited (WML) and Mount Thorley Operations (MTO) which are located adjacent to each other and 15 km south west of Singleton in the Hunter Valley region of New South Wales. The operation supplies international and domestic markets with semi-soft coking coal and thermal coal.

MTW is an open cut mine, using dragline and truck and shovel method. Employees work in shifts 24 hours a day, seven days a week.

Operations are centred in the Wittingham Coal Measures of the Hunter Coalfield which is part of a Permian coal basin known as the Sydney basin.

In 2013 MTW produced more than 12.4 million tonnes of saleable coal.

After being washed and prepared for sale, the coal is loaded onto trains for transportation 90km to the Port Waratah Coal Terminal in Newcastle where it is shipped to international customers.

The WML Development Consent (DA 300-9-2002-i) was granted on 19 May 2003. The development consent was modified (Modification 6) on 29 January 2014. This modification is described in detail in the Environmental Assessment (Warkworth Modification 6 Environmental Assessment (November 2013)). The MTO project was approved on 22 June 1996 (DA 34/95) and was most recently modified on 2 May 2012 (MTO Project Approval). The MTO project is described in detail in the Statement of Environmental Effects (SEE) which supported the application for modification which was approved in May 2012 (EMGA, 2010). The WML and MTO Approvals (jointly referred to herein as the Approvals) have separate noise criteria.

## 1.2 Scope of the Noise Management Plan

This Noise Management Plan (NMP) has been prepared in accordance with the requirements of Schedule 4, Condition 21 (WML) and Schedule 3, Condition 10 (MTO)

of the Approvals to manage project specific and cumulative noise impacts associated with MTW mining operations. This NMP has also been prepared in consultation with the NSW Environment Protection Authority (EPA), required under the Approvals. Copies of communication with the EPA are included in Appendix B.

Table 1.1 below lists the Approval conditions required to be covered by this Noise Management Plan and the sections within this document in which they are addressed.

Table 1.2 lists where items in the Statement of Commitments (SOC) related to noise impacts are addressed.

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement																	
<b>Mount Thorley Development Consent (DA34/95)</b>																			
Sch. 3 Cond. 1	<p><b>Acquisition on Request</b></p> <p>Upon receiving a written request for acquisition from an owner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 7-8 of Schedule 4, subject to the notes below.</p> <p><i>Table 1: Land subject to acquisition on request</i></p> <table border="1"> <thead> <tr> <th>Acquisition Basis</th> <th>Land</th> </tr> </thead> <tbody> <tr> <td>Noise</td> <td>81, 87, 97, 144, 146, 148, 149, 150, 153, 189, 190, K</td> </tr> </tbody> </table> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>To interpret the land referred to in Table 1, see the applicable figures in Appendix 4.</li> <li>Each of these properties is also listed as being subject to acquisition on request in the project approval for the Warkworth Extension Project (MP 09_0202). It is accepted that the primary responsibility for the Mt Thorley-Warkworth mine complex to acquire this land arises from the Warkworth Extension Project, and consequently there is no obligation to acquire land under this condition whilever the Warkworth Extension approval MP 09_0202 is in force and continues to have effect to acquire this land.</li> </ul>	Acquisition Basis	Land	Noise	81, 87, 97, 144, 146, 148, 149, 150, 153, 189, 190, K	N/A													
Acquisition Basis	Land																		
Noise	81, 87, 97, 144, 146, 148, 149, 150, 153, 189, 190, K																		
Sch. 3 Cond. 2	<p><b>Additional Noise and Air Quality Mitigation on Request</b></p> <p>Upon receiving a written request from the owner of any residence on the land listed in Table 1 or Table 2, the Applicant shall implement additional noise and/or air quality mitigation measures (such as double-glazing, insulation, air filters, a first flush roof water drainage system and/or air conditioning) at the residence in consultation with the landowner, subject to the notes below. These measures must be reasonable and feasible, and directed towards reducing the noise and/or air quality impacts of the development on the residence.</p> <p>If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.</p> <p><i>Table 2: Land subject to additional noise and/or air quality mitigation on request</i></p> <table border="1"> <thead> <tr> <th>Mitigation Basis</th> <th>Land</th> </tr> </thead> <tbody> <tr> <td>Noise</td> <td>25, 27, 29, 34, 42, 50, 53, 55, 56, 57, 58, 59, 60, 62, 63, 64, 65, 66, 68, 69, 71, 72, 73, 75, 82, 210</td> </tr> <tr> <td>Air</td> <td>111</td> </tr> </tbody> </table> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>To interpret the land referred to in Table 2, see the applicable figures in Appendix 4; and</li> <li>Each of these properties is also listed as being subject to noise and/or air quality mitigation on request in the project approval for the Warkworth Extension Project (MP 09_0202). It is accepted that the primary responsibility for the Mt Thorley-Warkworth mine complex to undertake this mitigation arises from the Warkworth Extension Project, and consequently there is no obligation to undertake mitigation under this condition whilever the Warkworth Extension approval MP 09_0202 is in force and continues to have effect to require this mitigation.</li> </ul>	Mitigation Basis	Land	Noise	25, 27, 29, 34, 42, 50, 53, 55, 56, 57, 58, 59, 60, 62, 63, 64, 65, 66, 68, 69, 71, 72, 73, 75, 82, 210	Air	111	N/A											
Mitigation Basis	Land																		
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Air	111																		
Sch. 3 Cond. 3	<p><b>Noise Criteria</b></p> <p>Except for the noise-affected land in Table 1, the Applicant shall ensure that the noise generated at the Mount-Thorley Warkworth mine complex does not exceed the criteria in Table 3 at any residence on privately owned land or on more than 25 per cent of any privately-owned land.</p> <p><i>Table 3: Noise Criteria dB(A)</i></p> <table border="1"> <thead> <tr> <th>Location</th> <th>Land</th> <th>Day (<math>L_{Aeq}</math> (15min))</th> <th>Evening (<math>L_{Aeq}</math> (15min))</th> <th>Night (<math>L_{Aeq}</math> (15min))</th> <th>Night (<math>L_{A1}</math> (1 min))</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Bulga</td> <td>65, 68, 75, 210</td> <td>42</td> <td>42</td> <td>42</td> <td>48</td> </tr> <tr> <td>25, 27, 29, 34, 42, 50, 53, 55, 56, 57, 58, 59, 60, 62, 63, 64, 66, 69, 71, 72, 73, 82</td> <td>41</td> <td>41</td> <td>41</td> <td>48</td> </tr> </tbody> </table>	Location	Land	Day ( $L_{Aeq}$ (15min))	Evening ( $L_{Aeq}$ (15min))	Night ( $L_{Aeq}$ (15min))	Night ( $L_{A1}$ (1 min))	Bulga	65, 68, 75, 210	42	42	42	48	25, 27, 29, 34, 42, 50, 53, 55, 56, 57, 58, 59, 60, 62, 63, 64, 66, 69, 71, 72, 73, 82	41	41	41	48	Section 6 and Appendix A
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Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement			
	17, 19, 24, 30, 31, 35, 36, 39, 40, 43, 44, 46, 47, 48, 49, 52, 74	40	40	40	48
	13, 16, 18, 20, 21, 22, 23, 26, 32, 33, 37, 41, 45, 54, 61, 89	39	39	39	48
	67, 70,	37	37	37	48
	8, 10	36	36	36	48
	1, 2, 3, 4, 5, 6, 7, 9	35	35	35	48
	All other privately owned land	38	38	38	48
Warkworth	All privately owned land	38	38	38	48
Maison Dieu	118	39	39	39	45
	117, 169	38	38	38	45
	121, 123, 127, 170	37	37	37	47
	124, 141	36	36	36	47
	120, 122, 167, 168	35	35	35	47
	All other privately owned land	38	38	38	45
Gouldsville, Long Point	126	44	44	44	47
	125, 128,	42	42	42	47
	130, 137, 139	40	40	40	47
	142, 143, 172, 173	39	39	39	47
	134, 176	37	37	37	47
	179	36	36	36	47
	All other privately owned land	38	38	38	45
Hambleton Hill/ Wylies Flat	191	43	43	43	45
	152, 183, 186, 187	42	42	42	45
	181, 184, 188	41	41	41	45
	155, 156, 157, 182	40	40	40	48
	All other privately owned land	38	38	38	45
Mount Thorley	All privately owned land	38	38	38	48

Notes:

- To interpret the land referred to in Table 3, see the applicable figures in Appendix 4; and
- Noise generated by the Mt Thorley-Warkworth mine complex is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

However, these criteria do not apply if the Applicant has an agreement with the relevant owner/s of these residences / land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.

These criteria may be replaced by lower criteria imposed by declaration of the Director-General consequent to the

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement																																											
	<p>comprehensive review of criteria to be undertaken under Condition 9(g).</p> <p><i>Note: After the first review of any EPL granted for this development under section 78 of the POEO Act, nothing in this consent prevents the EPA from imposing stricter noise limits on the mining operations on site under the EPL.</i></p>																																												
Sch. 3 Cond. 4	<p><b>Noise Acquisition Criteria</b></p> <p>If the noise generated at the Mount Thorley Warkworth mine complex causes sustained exceedances of the criteria in Table 4 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land, then upon receiving a written request for acquisition from the landowner, the Applicant shall acquire the land in accordance with the procedures in conditions 7-8 of schedule 4.</p> <p><i>Table 4: Land acquisition criteria dB(A) <math>L_{Aeq}(15min)</math></i></p> <table border="1"> <thead> <tr> <th style="text-align: center;">Location</th> <th style="text-align: center;">Land</th> <th style="text-align: center;">Day (<math>L_{Aeq}(15min)</math>)</th> <th style="text-align: center;">Evening (<math>L_{Aeq}(15min)</math>)</th> <th style="text-align: center;">Night (<math>L_{Aeq}(15min)</math>)</th> </tr> </thead> <tbody> <tr> <td>Bulga</td> <td>All privately owned land</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> </tr> <tr> <td>Warkworth</td> <td>All privately owned land</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> </tr> <tr> <td>Maison Dieu</td> <td>All privately owned land</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> </tr> <tr> <td rowspan="2">Gouldsville / Long Point</td> <td style="text-align: center;">125, 126, 128</td> <td style="text-align: center;">45</td> <td style="text-align: center;">45</td> <td style="text-align: center;">45</td> </tr> <tr> <td>All other privately owned land</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> </tr> <tr> <td>Hambledon Hill / Wylies Flat</td> <td>All privately owned land</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> </tr> <tr> <td rowspan="2">Mount Thorley</td> <td>All privately owned land</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> <td style="text-align: center;">43</td> </tr> <tr> <td>All other privately owned land</td> <td style="text-align: center;">40</td> <td style="text-align: center;">40</td> <td style="text-align: center;">40</td> </tr> </tbody> </table> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>To interpret the land referred to Table 4, see the applicable figures in Appendix 4; and</li> <li>Noise generated by the Mt Thorley-Warkworth mine complex is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.</li> </ul>	Location	Land	Day ( $L_{Aeq}(15min)$ )	Evening ( $L_{Aeq}(15min)$ )	Night ( $L_{Aeq}(15min)$ )	Bulga	All privately owned land	43	43	43	Warkworth	All privately owned land	43	43	43	Maison Dieu	All privately owned land	43	43	43	Gouldsville / Long Point	125, 126, 128	45	45	45	All other privately owned land	43	43	43	Hambledon Hill / Wylies Flat	All privately owned land	43	43	43	Mount Thorley	All privately owned land	43	43	43	All other privately owned land	40	40	40	Section 6 and Appendix A
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	All other privately owned land	40	40	40																																									
Sch. 3 Cond. 5	<p><b>Cumulative Noise Criteria</b></p> <p>Except for the noise-affected land in Table 1, the Applicant shall implement all reasonable and feasible measures to ensure that the noise generated by the Mount Thorley Warkworth mine complex combined with the noise generated by other mines in the area does not exceed the criteria in Table 5 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land.</p> <p><i>Table 5: Cumulative noise impact assessment criteria dB(A) <math>L_{Aeq}(period)</math></i></p> <table border="1"> <thead> <tr> <th style="text-align: center;">Location</th> <th style="text-align: center;">Day (<math>L_{Aeq}(period)</math>)</th> <th style="text-align: center;">Evening (<math>L_{Aeq}(period)</math>)</th> <th style="text-align: center;">Night (<math>L_{Aeq}(period)</math>)</th> </tr> </thead> <tbody> <tr> <td>Bulga, Warkworth and Mount Thorley</td> <td style="text-align: center;">55</td> <td style="text-align: center;">45</td> <td style="text-align: center;">40</td> </tr> <tr> <td>All other privately-owned land</td> <td style="text-align: center;">50</td> <td style="text-align: center;">45</td> <td style="text-align: center;">40</td> </tr> </tbody> </table> <p><i>Note: Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.</i></p>	Location	Day ( $L_{Aeq}(period)$ )	Evening ( $L_{Aeq}(period)$ )	Night ( $L_{Aeq}(period)$ )	Bulga, Warkworth and Mount Thorley	55	45	40	All other privately-owned land	50	45	40	Section 6 and Appendix A																															
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Sch. 3 Cond. 6	<p><b>Cumulative Noise Acquisition Criteria</b></p> <p>If the cumulative noise generated by the Mount Thorley Warkworth mine complex combined with the noise generated by other mines in the area cases sustained exceedances of the criteria in Table 6 at any residence on privately-owned land or on more than 25 per cent of any privately-owned land, then upon receiving a written request from the landowner, the Applicant shall acquire the land on as equitable basis as soon as possible with the relevant mines in accordance with the procedures in conditions 7-8 of schedule 4.</p>	Section 6 and Appendix A																																											

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement												
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Location	Day ( $L_{Aeq}(period)$ )	Evening ( $L_{Aeq}(period)$ )	Night ( $L_{Aeq}(period)$ )											
Bulga, Warkworth and Mount Thorley	60	50	45											
All other privately-owned land	55	50	45											
Sch. 3 Cond 7	<p><b>Attenuation of Plant</b></p> <p>The Applicant shall:</p> <ol style="list-style-type: none"> <li>Ensure that:                             <ul style="list-style-type: none"> <li>All new trucks, dozers, drills and excavators purchased for use on the site after the date of this modification are commissioned as noise suppressed (or attenuated) units;</li> <li>The existing fleet of trucks, dozers, drills and excavators on site at the date of this consent is progressively fitted with suitable noise attenuation packages to ensure that 100% of the fleet being used on site is attenuated by the end of 2015;</li> <li>Where reasonable and feasible, improvements are made to existing noise suppression equipment as technologies become available; and</li> </ul> </li> <li>Monitor and report on the implementation of these requirements annually on its website.</li> </ol>	Section 6.3.2												
Sch. 3 Cond. 8	<p>The Applicant shall:</p> <ol style="list-style-type: none"> <li>Conduct an annual testing program of the attenuated plant on site to ensure that the attenuation remains effective;</li> <li>Restore the effectiveness of any attenuation if it is found to be defective; and</li> <li>Report on the results of any testing and/or attenuation work on its website annually.</li> </ol>	Section 6.3.2.1												
Sch. 3 Cond. 9	<p><b>Operating Conditions</b></p> <p>The Applicant shall:</p> <ol style="list-style-type: none"> <li>Implement best management practice to minimise the operational, low frequency and traffic noise of the development;</li> <li>Operate a comprehensive noise management system on site that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;</li> <li>Maintain the effectiveness of noise suppression equipment on plant at all times and ensure defective plant is not used operationally until fully repaired;</li> <li>Ensure that noise attenuated plant is deployed preferentially in locations relevant to sensitive receivers;</li> <li>Minimise the noise impacts of the Mount Thorley Warkworth mine complex during meteorological conditions when the noise limits in this consent do not apply;</li> <li>Undertake a comprehensive review of the noise criteria in Condition 3 to determine whether these criteria should be reduced commensurate with the performance of the Mount Thorley Warkworth mine complex after implementation of noise mitigation and management measures. This review shall be conducted during 2015, in consultation with OEH by a suitably qualified and experienced person whose appointment has been endorsed by the Director-General; and</li> <li>Co-ordinate the noise management on site with the noise management at nearby mines (including the Bulga, Wambo and Hunter Valley Operations mines) to minimise the cumulative noise impacts of these mines and the Mount Thorley Warkworth mine complex,</li> </ol> <p>To the satisfaction of the Director-General.</p>	<p>Section 6.2 and Appendix A</p> <p>Section 6.3.3, 6.4.1 and 6.4.4</p> <p>Section 6.3.2.2</p> <p>Section 6.3.1</p> <p>Section 6.4.1</p> <p>Appendix A</p> <p>Section 3.2</p>												

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement
Sch. 3 Cond. 10	<p><b>Noise Management Plan</b></p> <p>The Applicant shall prepare and implement a Noise Management Plan for the Mount Thorley Warkworth mine complex to the satisfaction of the Director-General. This plan must:</p> <ol style="list-style-type: none"> <li>a) Be prepared in consultation with the EPA, and submitted to the Director-General for approval by the end of September 2012;</li> <li>b) Describe the measures that would be implemented to ensure:                             <ul style="list-style-type: none"> <li>• Best management practice is being employed;</li> <li>• The noise impacts of the Mount Thorley Warkworth mine complex are minimised during meteorological conditions when the noise limits in this consent do not apply; and</li> <li>• Compliance with the relevant conditions of this consent;</li> </ul> </li> <li>c) Describe the proposed noise management system in detail;</li> <li>d) Include a monitoring program that:                             <ul style="list-style-type: none"> <li>• Uses a combination of real-time and supplementary attended monitoring measures to evaluate the performance of the Mount Thorley Warkworth mine complex;</li> <li>• Adequately supports the proactive and reactive noise management system on site;</li> <li>• Includes a protocol for determining exceedances of the relevant conditions in this consent;</li> <li>• Evaluates and reports on the effectiveness of the noise management system on site;</li> <li>• Provides for the annual validation of the noise model for the Mount Thorley Warkworth mine complex; and</li> </ul> </li> <li>e) Include a protocol that has been prepared in consultation with the owners of nearby mines (including the Bulga, Wambo and Hunter Valley Operations mines) to minimise the cumulative noise impacts of these mines and the Mount Thorley Warkworth mine complex.</li> </ol>	This Management Plan
Sch. 5 Cond. 3	<p><b>Management Plan Requirements</b></p> <p>The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <ol style="list-style-type: none"> <li>a) Detailed baseline data;</li> <li>b) A description of                             <ul style="list-style-type: none"> <li>• The relevant statutory requirements (including any relevant consent, licence or lease conditions);</li> <li>• Any relevant limits or performance measures / criteria;</li> <li>• The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development of any management measures;</li> </ul> </li> <li>c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures / criteria;</li> <li>d) A program to monitor and report on the:                             <ul style="list-style-type: none"> <li>• Impacts and environmental performance of the development;</li> <li>• Effectiveness of any management measures (see c above)</li> </ul> </li> <li>e) A contingency plan to manage any unpredicted impacts and their consequences;</li> <li>f) A program to investigate and implement ways to improve the environmental performance of the development over time;</li> <li>g) A protocol for managing any:                             <ul style="list-style-type: none"> <li>• Incidents;</li> <li>• Complaints;</li> </ul> </li> </ol>	<p>Appendix C – Detailed Baseline <b>Data</b></p> <p>Table 1.1, Table 1.2; Appendix A</p> <p>Section 6</p> <p>Appendix A</p> <p>Section 6.5</p> <p>Section 6.6</p>

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement
	<ul style="list-style-type: none"> <li>• Non-compliances with statutory requirements; and</li> <li>• Exceedances of the impact assessment criteria and/or performance criteria; and</li> </ul> <p>h) A protocol for periodic review of the plan.</p>	Section 8.1.2 and 8.4
		Section 8.5
Sch. 5 Cond. 5	<p><b>Review of Strategies, Plans and Programs</b></p> <p>Within 3 months of the submission of an:</p> <ul style="list-style-type: none"> <li>a) Annual review under condition 4 above;</li> <li>b) Incident report under condition 7 below;</li> <li>c) Audit under condition 9 below; and</li> <li>d) Any modification to the conditions of this consent,</li> </ul> <p>The Applicant shall review, and if necessary revise, the strategies, plans and programs required under this consent to the satisfaction of the Director-General.</p> <p><i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</i></p>	Section 8.5
Sch. 5 Cond. 7	<p><b>Incident Reporting</b></p> <p>The Applicant shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Director-General and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.</p>	Section 8.1.2 and Appendix A – Noise Monitoring Programme
Sch. 5 Cond. 8	<p><b>Regular Reporting</b></p> <p>The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.</p>	Section 8.1.2
Sch. 5, Cond. 11	<p><b>Access to Information</b></p> <p>The Applicant shall:</p> <ul style="list-style-type: none"> <li>a) Make the following information publically available on its website:                             <ul style="list-style-type: none"> <li>• The EIS;</li> <li>• Current statutory consents for the development;</li> <li>• Approved strategies, plans or programs required under the conditions of this consent;</li> <li>• A comprehensive summary of the monitoring results of the development, which have been reported in accordance with the various plans and programs approved under the conditions of this consent;</li> <li>• A complaints register, which is to be updated on a monthly basis;</li> <li>• Minutes of CCC meetings;</li> <li>• The last five annual reviews;</li> <li>• Any independent environmental audit, and the Applicant's response to the recommendations in any audit;</li> <li>• Any other matter required by the Director-General; and</li> </ul> </li> <li>b) Keep this information up to date</li> <li>c) Investigate and report on reasonable and feasible measures to make predictive meteorological data and real time monitoring data publically available on its website</li> </ul>	Section 8.1.2

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement																
To the satisfaction of the Director-General.																		
<b>Warkworth Mining Limited Development Consent (DA 300-9-2002-i) – Modification 6</b>																		
Sch. 4 Cond. 18	<p><b>Noise Criteria</b></p> <p>The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 9 at any residence on privately-owned land.</p> <p><i>Table 9: Noise criteria</i></p> <table border="1"> <thead> <tr> <th>Day/Evening/Night <math>L_{Aeq}(15\text{ minute})</math></th> <th>Land Number</th> </tr> </thead> <tbody> <tr> <td>39</td> <td>31, 38, 58</td> </tr> <tr> <td>38</td> <td>5, 35, 47, 70</td> </tr> <tr> <td></td> <td>Bulga Village<sup>1</sup></td> </tr> <tr> <td></td> <td>Warkworth Village<sup>2</sup></td> </tr> <tr> <td>37</td> <td>4, 39, 40, 41, 45, 49, 50, 56, 69</td> </tr> <tr> <td>36</td> <td>7, 9, 11, 42, 43, 54, 55, 125</td> </tr> <tr> <td>35</td> <td>All other residential or sensitive receptors, excluding: 10, 34, 36, 46, 127, 128, 129</td> </tr> </tbody> </table> <p><sup>1</sup> Bulga Village includes the residential or sensitive receptors generally within the area bounded by properties 18, 20, 23, 22, 117, 122, 89, and 111 on the map EIS-35 in Volume 4 of the EIS.  <sup>2</sup> Warkworth Village includes the residential or sensitive noise receptors generally within the area bounded by properties 29, 68, and 121 on the map EIS-35 in Volume 4 of the EIS.</p> <p>Noise generated by the development is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy. Appendix 4 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria</p> <p>However, these criteria do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.</p>	Day/Evening/Night $L_{Aeq}(15\text{ minute})$	Land Number	39	31, 38, 58	38	5, 35, 47, 70		Bulga Village <sup>1</sup>		Warkworth Village <sup>2</sup>	37	4, 39, 40, 41, 45, 49, 50, 56, 69	36	7, 9, 11, 42, 43, 54, 55, 125	35	All other residential or sensitive receptors, excluding: 10, 34, 36, 46, 127, 128, 129	Appendix A – Noise Monitoring Programme
Day/Evening/Night $L_{Aeq}(15\text{ minute})$	Land Number																	
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	Warkworth Village <sup>2</sup>																	
37	4, 39, 40, 41, 45, 49, 50, 56, 69																	
36	7, 9, 11, 42, 43, 54, 55, 125																	
35	All other residential or sensitive receptors, excluding: 10, 34, 36, 46, 127, 128, 129																	
Sch. 4 Cond. 19	<p><b>Land Acquisition Criteria</b></p> <p>The land acquisition criteria for noise generated by the development as listed in Table 10<sup>3</sup></p> <p><i>Table 10: Land acquisition criteria</i></p> <table border="1"> <thead> <tr> <th>Day/Evening/Night <math>L_{Aeq}(15\text{ minute})</math></th> <th>Land Number</th> </tr> </thead> <tbody> <tr> <td>44</td> <td>129</td> </tr> <tr> <td>43</td> <td>1, 26, 127, 128</td> </tr> <tr> <td></td> <td>Bulga Village<sup>4</sup></td> </tr> <tr> <td></td> <td>Warkworth Village<sup>5</sup></td> </tr> <tr> <td>42</td> <td>10 - Russell P &amp; C</td> </tr> <tr> <td>40</td> <td>All other residential or sensitive receptors</td> </tr> </tbody> </table> <p><i>Note: To interpret the land referred to in Table 1, see the applicable figure in Appendix 3.</i></p>	Day/Evening/Night $L_{Aeq}(15\text{ minute})$	Land Number	44	129	43	1, 26, 127, 128		Bulga Village <sup>4</sup>		Warkworth Village <sup>5</sup>	42	10 - Russell P & C	40	All other residential or sensitive receptors	Appendix A – Noise Monitoring Programme		
Day/Evening/Night $L_{Aeq}(15\text{ minute})$	Land Number																	
44	129																	
43	1, 26, 127, 128																	
	Bulga Village <sup>4</sup>																	
	Warkworth Village <sup>5</sup>																	
42	10 - Russell P & C																	
40	All other residential or sensitive receptors																	
Sch. 4 Cond. 20	<p>The Applicant shall:</p> <ol style="list-style-type: none"> <li>Implement best management practice to minimise the operational and road noise of the development;</li> <li>Ensure noise attenuated plant is preferentially deployed in locations that would be effective in reducing noise impacts on surrounding privately-owned residences;</li> <li>operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day-to-day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;</li> <li>minimise the noise impacts of the development during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 4);</li> <li>co-ordinate noise management on site with the noise management at nearby mines to minimise</li> </ol>	<p>Section 6.2</p> <p>Section 6.3.1</p> <p>Sections 6.3 and 6.4.1</p> <p>Section 6.4.1</p>																

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement
	<p>cumulative noise impacts; and</p> <p>f) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent (see Appendix 4), to the satisfaction of the Director-General.</p>	<p>Section 3.2</p> <p>Appendix A – Noise Monitoring Programme</p>
Sch. 4 Cond. 21	<p>The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Director-General. This plan must:</p> <p>a) be prepared in consultation with the EPA, and submitted to the Director-General for approval by 31 March 2014, unless the Director-General agrees otherwise;</p> <p>b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this consent;</p> <p>c) describe the noise management system in detail;</p> <p>d) include a monitoring program that:</p> <ul style="list-style-type: none"> <li>• evaluates and reports on: <ul style="list-style-type: none"> <li>- the effectiveness of the on-site noise management system including the preferential deployment of attenuated plant to reduce noise impacts on surrounding privately-owned residences;</li> <li>- compliance against the noise criteria in this consent; and</li> <li>- compliance with the noise operating conditions;</li> </ul> </li> <li>• includes a program to calibrate and validate real-time noise monitoring results with attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria and as a trigger for additional attended monitoring);</li> <li>• defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.</li> </ul>	This NMP
Sch. 5 Cond. 2	<p><b>Notification of Landowners / Tenants</b></p> <p>Prior to entering into any tenancy agreement for any land owned by the Applicant that is predicted to experience exceedances of the recommended dust and/or noise criteria, the Applicant shall:</p> <p>a) Advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time); and</p> <p>b) Advise the prospective tenants of the rights they would have under this consent,</p> <p>to the satisfaction of the Director-General.</p>	N/A
Sch. 5 Cond. 3	<p>As soon as practicable after obtaining monitoring results showing:</p> <p>a) An exceedance of any relevant criteria in schedule 4, the Applicant shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria;</p>	Section 8.1.2
Sch. 5, Cond. 4	<p><b>Independent Review</b></p> <p>If an owner of privately-owned land considers the development to be exceeding the criteria in schedule 4, then he/she may ask the Director-General in writing for an independent review of the impacts of the development on his/her land.</p> <p>If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-Generals decision, the Applicant shall:</p> <p>a) Commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the Director-General to:</p> <ul style="list-style-type: none"> <li>• Consult with the landowner to determine his/her concerns;</li> </ul>	Section 7.1 and <b>Error! Reference source not found.</b>

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement
	<ul style="list-style-type: none"> <li>• Conduct monitoring to determine whether the development is complying with the relevant impact assessment criteria in Schedule 4; and</li> <li>• If the development is not complying with these criteria then:                             <ul style="list-style-type: none"> <li>○ Determine if more than one mine or development is responsible for the exceedance, and if so the relative share of each mine or development regarding the impact on the land; and</li> <li>○ Identify the measures that could be implemented to ensure compliance with the relevant criteria; and</li> </ul> </li> <li>b) Give the Director-General a copy of the independent review.</li> </ul>	
Sch. 6 Cond. 2	<p><b>Community Liaison Officers</b></p> <p>For the duration of the development (unless otherwise agreed with the Director-General), the Applicant shall employ suitably qualified and experienced full time community liaison officers, to support the implementation of the air quality, noise and blast management plans and monitoring programs for the development in the local community.</p>	Section 6.4.4
Sch. 6 Cond. 3	<p><b>Adaptive Management</b></p> <p>The Applicant shall assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&amp;A Act or EP&amp;A Regulation.</p> <p>Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity:</p> <ul style="list-style-type: none"> <li>a) Take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;</li> <li>b) Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and</li> <li>c) Implement remediation measures as directed by the Director-General,</li> </ul> <p>To the satisfaction of the Director-General.</p>	Sections 6.4.5, 6.5 and 6.6
Sch. 6 Cond. 4	<p><b>Management Plan Requirements</b></p> <p>The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <ul style="list-style-type: none"> <li>a) Detailed baseline data;</li> <li>b) A description of                             <ul style="list-style-type: none"> <li>• The relevant statutory requirements (including any relevant consent, licence or lease conditions);</li> <li>• Any relevant limits or performance measures / criteria;</li> <li>• The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development of any management measures;</li> </ul> </li> <li>c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures / criteria;</li> <li>d) A program to monitor and report on the:                             <ul style="list-style-type: none"> <li>• Impacts and environmental performance of the development;</li> <li>• Effectiveness of any management measures (see c above)</li> </ul> </li> <li>e) A contingency plan to manage any unpredicted impacts and their consequences;</li> <li>f) A program to investigate and implement ways to improve the environmental performance of the development over time;</li> <li>g) A protocol for managing any:</li> </ul>	<p>Appendix C – Detailed Baseline <b>Data</b></p> <p>Table 1.1</p> <p>Appendix A – Noise Monitoring Programme</p> <p>Section 6</p> <p>Section 6.5</p>

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement
	<ul style="list-style-type: none"> <li>• Incidents;</li> <li>• Complaints;</li> <li>• Non-compliances with statutory requirements; and</li> <li>• Exceedances of the impact assessment criteria and/or performance criteria; and</li> </ul> <p>h) A protocol for periodic review of the plan.</p>	<p>Section 6.6</p> <p>Sections 8.1.1, 8.1.2 and 8.4</p>
		Section 8.5
Sch. 6 Cond. 5	<p><b>Annual Review</b></p> <p>By 31 March of each year, or as otherwise agreed by the Director-General, the Applicant shall review the environmental performance of the development to the satisfaction of the Director-General. This review must:</p> <ul style="list-style-type: none"> <li>a) Describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;</li> <li>b) Include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the                             <ul style="list-style-type: none"> <li>• The relevant statutory requirements, limits or performance measurements / criteria;</li> <li>• The monitoring results of previous years; and</li> <li>• The relevant predictions in the EA;</li> </ul> </li> <li>c) Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;</li> <li>d) Identify any trends in the monitoring data over the life of the project;</li> <li>e) Identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and</li> <li>f) Describe what measures will be implemented over the next year to improve the environmental performance of the project.</li> </ul>	Section 8.1.2
Sch. 5 Cond. 5	<p><b>Review of Strategies, Plans and Programs</b></p> <p>Within 3 months of the submission of an:</p> <ul style="list-style-type: none"> <li>e) Annual review under condition 4 above;</li> <li>f) Incident report under condition 7 below;</li> <li>g) Audit under condition 9 below; and</li> <li>h) Any modification to the conditions of this consent,</li> </ul> <p>The Applicant shall review, and if necessary revise, the strategies, plans and programs required under this consent to the satisfaction of the Director-General.</p> <p><i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</i></p>	Section 8.5
Sch. 5 Cond. 7	<p><b>Incident Reporting</b></p> <p>The Applicant shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Director-General and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.</p>	Section 8.1.2
Sch. 5 Cond. 8	<p><b>Regular Reporting</b></p> <p>The Applicant shall provide regular reporting on the environmental performance of the development on its website, in</p>	Section 8.1.2

**Table 1.1 Consent Conditions Addressed**

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement
	accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.	
Sch. 5, Cond. 11	<p><b>Access to Information</b></p> <p>The Applicant shall:</p> <p>d) Make the following information publically available on its website:</p> <ul style="list-style-type: none"> <li>• The EIS;</li> <li>• Current statutory consents for the development;</li> <li>• Approved strategies, plans or programs required under the conditions of this consent;</li> <li>• A comprehensive summary of the monitoring results of the development, which have been reported in accordance with the various plans and programs approved under the conditions of this consent;</li> <li>• A complaints register, which is to be updated on a monthly basis;</li> <li>• Minutes of CCC meetings;</li> <li>• The last five annual reviews;</li> <li>• Any independent environmental audit, and the Applicant’s response to the recommendations in any audit;</li> <li>• Any other matter required by the Director-General; and</li> </ul> <p>e) Keep this information up to date</p> <p>f) Investigate and report on reasonable and feasible measures to make predictive meteorological data and real time monitoring data publically available on its website</p> <p>To the satisfaction of the Director-General.</p>	Section 8.1.2
App. 4 Cond. 1	<p><b>Noise Compliance Assessment</b></p> <p><b>Applicable Meteorological Conditions</b></p> <p>The noise criteria in Table 9 in Schedule 4 are to apply under all meteorological conditions except the following:</p> <p>a) During periods of rain or hail;</p> <p>b) Average wind speed at microphone height exceeds 5m/sec</p> <p>c) Winds greater than 3m/sec measured at 10m above ground level; or</p> <p>d) Temperature inversion conditions greater than 3°C/100m</p>	Appendix A – Noise Monitoring Programme
App. 4 Cond. 2	<p><b>Determination of Meteorological Conditions</b></p> <p>Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station required under condition 17 of schedule 4.</p>	Appendix A – Noise Monitoring Programme
App. 4 Cond. 3	<p><b>Compliance Monitoring</b></p> <p>Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.</p>	Appendix A – Noise Monitoring Programme
App. 4 Cond. 4	<p>This monitoring must be carried out at least once a month (but at least two weeks apart) unless the Director-General directs otherwise.</p>	Appendix A – Noise Monitoring Programme
App. 4 Cond. 5	<p>Unless the Director-General agrees otherwise, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the <i>NSW Industrial Noise Policy</i> (as amended from time to time), in particular the requirements relating to:</p> <p>a) Monitoring locations for the collection of representative noise data;</p> <p>b) Meteorological conditions during which collection of noise data is not appropriate;</p>	Appendix A – Noise Monitoring Programme

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of NMP which addresses this requirement
	c) Equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and	
	d) Modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.	

Table 1.2 Statement of Commitments Addressed

SOC reference	Commitments	Where Commitment is addressed
<b>Abbey Green Project Alterations – Statement of Environmental Effects (Jan 2010)</b>		
3.3.2 Other Noise emissions	Construction activities for the proposed modification will be confined to daytime periods and associated noise levels at assessment locations will be less than those predicted to result from mining activities.	Section 6.2
3.3.3 Management and Monitoring	Coal and Allied has detailed plans and procedures in place for blasting and noise management, monitoring and assessment, which currently govern noise and vibration management across MTO. They will be updated as required to reflect changes to MTO resulting from the proposed modification.	This Noise Management Plan
<b>Extension of Warkworth Coal Mine – Environmental Impact Statement (Aug 2002)</b>		
11.7 – Noise Monitoring and Management	A detailed noise management plan will be used to reduce impacts further. Real time monitoring of operations will be used to demonstrate compliance with consent conditions. Where non-conformances are detected, additional safeguards will be investigated to satisfy CNA's statutory obligations.	This Noise Management Plan
<b>Warkworth Modification 6 – Environmental Assessment (Nov 2013)</b>		
13.3 Statement of commitments	Continued commitment to the implementation of proactive, reactive and effective tools, such as the TARP, to manage noise and air quality emissions from MTW as described in Section 6.4. Warkworth Mine is committed to reasonable and feasible continuous improvement and currently are working towards implementing a PMI and alternative real time noise monitoring technology known as the environmental noise compass as described in Section 6.6	Section 6
13.3 Statement of commitments	In conjunction with their suppliers, MTW are progressing with the attenuation of its fleet of haul trucks and other mining equipment.	Sections 6.2 and 6.3.1
13.3 Statement of commitments	Existing environmental management plans will be updated in accordance with the proposed modification, if required.	This Noise Management Plan

Table 1.3 Environment Protection Licence Conditions Addressed

EPL reference	Commitments	Where Commitment is addressed
<b>EPL 1376 – Warkworth Coal Mine</b>		
U1 – Premises Noise Limits	The licensee must submit a report to the Manager, Hunter Region, by no later than 30 September 2012, that includes the following: <ol style="list-style-type: none"> <li>Project Specific Noise Levels (PSNL's) for the nearest noise sensitive receiver location(s). The PSNL's may be sourced from recent documentation submitted in support of a project approval application, or determined specifically in response to this condition, provided that: <ul style="list-style-type: none"> <li>The source of the PSNL's is stated;</li> <li>The PSNL's have been derived in accordance with the NSW Industrial Noise Policy;</li> </ul> </li> </ol>	Section 2.1.2

**Table 1.3 Environment Protection Licence Conditions Addressed**

EPL reference	Commitments	Where Commitment is addressed
	<ul style="list-style-type: none"> <li>• Details are provided of how the PSNL's have been derived; and</li> <li>• The nearest noise sensitive receiver locations chosen are representative of those potentially most affected by noise from the premises.</li> </ul> <p>2. Predicted or measured noise level contributions for the noise sensitive receiver locations identified in 1 above as a result of all activities and operations carried out at the premises. These may be sourced from recent documentation submitted in support of a project approval or determined specifically in response to this condition provided that:</p> <ul style="list-style-type: none"> <li>• The source of the predicted or measured noise level(s) are stated;</li> <li>• Noise levels have been predicted or measured in accordance with the INP; and</li> <li>• Details of how noise levels have been predicted is provided.</li> </ul> <p>3. Noise limits proposed for the locations(s) in 1 above, derived with regard to the PSNL's and predicted noise level contributions from 1 and 2 above, that can be placed on the licence, for all activities and operations carried out at the premises.</p> <p>4. Details of methods to be used to determine compliance with the limits in 3 above.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• A reference to the INP includes a reference to the INP Application Notes.</li> <li>• Noise sensitive receiver locations do not include any locations owned by the licensee or another coal mine or where a negotiated agreement (as outlined in the INP) is in place between the landowner and any licence holder.</li> </ul>	
<b>EPL 1976 – Mount Thorley Operations</b>		
U1 – Premises Noise Limits	<p>The licensee must submit a report to the Manager, Hunter Region, by no later than 30 September 2012, that includes the following:</p> <p>5. Project Specific Noise Levels (PSNL's) for the nearest noise sensitive receiver location(s). The PSNL's may be sourced from recent documentation submitted in support of a project approval application, or determined specifically in response to this condition, provided that:</p> <ul style="list-style-type: none"> <li>• The source of the PSNL's is stated;</li> <li>• The PSNL's have been derived in accordance with the NSW Industrial Noise Policy;</li> <li>• Details are provided of how the PSNL's have been derived; and</li> <li>• The nearest noise sensitive receiver locations chosen are representative of those potentially most affected by noise from the premises.</li> </ul> <p>6. Predicted or measured noise level contributions for the noise sensitive receiver locations identified in 1 above as a result of all activities and operations carried out at the premises. These may be sourced from recent documentation submitted in support of a project approval or determined specifically in response to this condition provided that:</p> <ul style="list-style-type: none"> <li>• The source of the predicted or measured noise level(s) are stated;</li> <li>• Noise levels have been predicted or measured in accordance with the INP; and</li> <li>• Details of how noise levels have been predicted is provided.</li> </ul> <p>7. Noise limits proposed for the locations(s) in 1 above, derived with regard to the PSNL's and predicted noise level contributions from 1 and 2 above, that can be placed on the licence, for all activities and operations carried out at the premises.</p> <p>8. Details of methods to be used to determine compliance with the limits in 3</p>	Section 2.1.2

**Table 1.3 Environment Protection Licence Conditions Addressed**

EPL reference	Commitments	Where Commitment is addressed
	<p>above.</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• A reference to the INP includes a reference to the INP Application Notes.</li> <li>• Noise sensitive receiver locations do not include any locations owned by the licensee or another coal mine or where a negotiated agreement (as outlined in the INP) is in place between the landowner and any licence holder.</li> </ul>	

### 1.3 Objectives

The purpose of this NMP is to describe reasonable and feasible measures to address potential noise impacts of the Project as identified in the Approvals and satisfy the relevant conditions of the Approvals.

This NMP describes procedures required to ensure compliance with the Approval conditions relating to noise impacts including the measures that Coal & Allied will use to manage noise impacts. This Noise Management Plan details the management framework and mitigation actions to be taken in operating the Project. This NMP also provides a mechanism for assessing noise monitoring results against the relevant noise impact assessment criteria.

The key elements of the mitigation strategies will be,

- Continuation of the HME sound suppression regime;
- On-going noise monitoring to assess the performance of the mining operations against the predicted noise levels;
- Modification of operations where monitoring data indicates the need;
- Pro-active mine planning, such as the provision of alternative areas for overburden emplacement where practical or management and scheduling of mobile equipment, dependent on the prevailing meteorological conditions;
- Use of predictive meteorological forecasting to inform operational decision making; and
- Ongoing attended noise monitoring.

The objectives of this NMP are to:

- Describe how Coal & Allied will ensure best management practice is employed at MTW;
- Set out the measures that will be used to minimise the noise impacts from MTW;

- Detail how Coal & Allied will ensure compliance with the conditions of Approval (see Table 1.1);
- Describe how Coal & Allied intends to ensure that operational noise from MTW is effectively managed;
- Provide a program for monitoring performance, evaluating compliance and measuring the effectiveness of controls undertaken by site to effectively manage noise; and
- Describe how Coal & Allied intend to co-operate with neighbouring mines to minimise the cumulative noise impacts of those mines and MTW.

BODY  
NOISE MANAGEMENT PLAN



## 2. BACKGROUND

### 2.1 Background

This NMP has been prepared to fulfil the requirements of relevant legislation, the Approvals, EA commitments, Environment Protection Licence (EPL) conditions and relevant standards and guidelines.

#### 2.1.1 Project Approval

The Approvals and subsequent amendments were assessed under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act.). The current Warkworth Approval was granted on 19 May 2003 and subsequently modified by the Planning Assessment Commission as delegate of the Minister for Planning and Infrastructure on 29 January 2014.

The current Mount Thorley Approval was granted on 22 June 1996 and subsequently modified on 2 May 2012.

The Approvals stipulate the noise criteria that operational activities at MTW must comply with. The Warkworth Approval sets out the core requirements of this NMP. The noise criteria under the Approvals are reproduced in Table 1.1.

The requirement for this NMP arises from Condition 21 of Schedule 4 of the Warkworth Approval, and Condition 10 in Schedule 3 of the Mount Thorley Approval. A list of the relevant conditions of both Approvals, and commitments made in the respective Environmental Assessments, and references to where each requirement is addressed in this NMP can be found in Section 1.2 (see in particular Tables 1.1 and 1.2)

##### 2.1.1.1 2013 Land and Environment Court judgment

During 2012, Warkworth gained approval for the Warkworth Extension Project (PA 09\_0202), and a modification application to the Mount Thorley consent (DA 34/95). At the time, it was considered appropriate to replicate the conditions of the WML approval into the MTO Modification, reflecting the combined management approach currently in place at MTW.

Significant complexity was introduced to the noise management and compliance assessment process

following the NSW Land and Environment Court Judgment of 15 April 2013.

For the purposes of this Noise Management Plan, reference is made to conditions in the Mount Thorley Approval which impose various requirements and limits on the 'Mount Thorley Warkworth Mine Complex'.

In various sections of the L&E Court Judgment, there is doubt as to the legality of applying conditions in this way, including in section 373 which states:

*"...and any conditions imposed on a project approval must relate to that project, and be capable of implementation by whomever is carrying out the activities authorised by the approval..."*

In the context of the above, it is therefore considered appropriate that any reference in the Mount Thorley Approval to 'The Mount Thorley Warkworth Mine Complex' apply only to the Mount Thorley Operations consent area, and activities therein.

The outcomes of the L&E Court judgment are also relevant with respect to Schedule 3, Condition 10(d) of the Mount Thorley consent, which requires that the noise monitoring program "provides for the annual validation of the noise model for the Mount Thorley-Warkworth mine complex". As the model which is described by the condition is that which applies to the (now disapproved) Warkworth Extension Project, it is not possible to undertake an annual review of Mount Thorley Operations with respect to the predictions of the model. Further information on processes employed by MTW to review the noise model are provided in section 8.3.

##### 2.1.2 Environmental Protection Licence

The *Protection of the Environment Operations Act 1997* (NSW) (PoEO Act) is the principal piece of legislation regulating pollution (including noise pollution) emissions in NSW. At the time of submission of the NMP, EPL's 1376 for Warkworth Coal Mines (issued on 21 August 2000) and 1976 for Mount Thorley Operations (issued on 28 September 2000) do not stipulate Project Specific Noise Limits (PSNL's) for MTW. EPL 24 for Mount Thorley Coal Loading does not stipulate any conditions relating to noise at the time of submission of this NMP.

EPL's 1976 and 1376 stipulate a requirement for submission of a report outlining Project Specific Noise Limits for each licence area, due 30 September 2012. MTW has submitted reports to the EPA as required, and is awaiting further direction from the EPA following review of those reports.

## 2.2 Relevant Standards and Guidelines

Guidelines and standards applying to noise at MTW include:

- New South Wales Industrial Noise Policy (INP, 2000); and
- Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise'.
- Rio Tinto Health, Safety, Environment Quality Management System Environment Performance Standard E6 – Noise and Vibration Control

## 2.3 Internal Requirements

Clause 2.1 of Rio Tinto Environmental Performance Standard E6 specifies that MTW must:

*"Implement a procedure to manage noise and vibration where an assessment based on modelling and/or monitoring results indicates the need, in order to meet regulatory requirements and accommodate community expectations".*

Noise modelling undertaken during the Environmental Assessment phase of current operations identified a number of properties which would be potentially impacted by mine noise from MTW. As such, this Management Plan has been developed to ensure compliance with Clause 2.1 of Rio Tinto Environmental Performance Standard E6.

## 2.4 Commitments Made in Environmental Assessments

Table 1.3 details the management, mitigation and monitoring commitments made in the relevant environmental assessments.

## 3. CONSULTATION

Schedule 4, Condition 21 of the Warkworth Approval, and Schedule 3, Condition 10 of the Mount Thorley Approval requires the Noise Management Plan be prepared in consultation with various external parties.

### 3.1 Government Agencies

In a letter to the EPA dated 12 March 2014, Coal and Allied sought to clarify the EPA's position with regard to the review and input of Environmental Management Plans. In a letter dated 2 July 2014, the EPA confirmed that consultation with the agency on the development of environmental management plans is not required (See Appendix B).

### 3.2 Nearby/Neighbouring Mines

Neighbouring mines adjacent to MTW mining operations were also consulted to create communication protocols to effectively manage cumulative noise impacts under a cooperative arrangement.

Under that arrangement MTW, utilising the services of the Community Response Officer role (or similar) will inform neighbouring mines when handheld noise assessments (see section 6.4.5) identify neighbouring mines to be contributing significantly to measured levels.

At the time of submission of this NMP, MTW is in consultation with Bulga Open Cut (BOC) to improve on existing cooperation practices. Under a formal land access agreement, MTW has established the first-of-class Environmental Noise Compass on lands owned by BOC. Following completion of commissioning of the new monitor, MTW and BOC will explore avenues to allow for sharing of real time directional noise data in the Bulga area.

Similarly, Wambo Coal will be contacted when noise contribution from that mine is assessed as equal to or exceeding 40dB.

In the same way, MTW will act in good faith when informed by neighbouring mines of excessive noise. In the same manner as for the investigation of a complaint or to validate a noise alarm, MTW will investigate the

circumstances as described by the neighbouring mine, and act accordingly.

Rio Tinto Coal Australia also manages the neighbouring Hunter Valley Operations mine. As environmental management is undertaken by a shared Environmental Services team, there is no formal cooperation agreement in place with respect to noise between MTW and HVO. Where practical however, monitoring systems and reactive processes are common across both HVO and MTW. This includes access to all real time monitoring data to operational personnel at both sites.

- WML open cut mine;
- MTO open cut mine;
- WML Run Of Mine pad (ROM) and Coal Handling Prep Plant (CHPP);
- MTO ROM and CHPP;
- MTCL rail load-out facility;
- Workshop and administration facilities; and
- Tailings Storage Facilities.

Figure 1 shows the layout of MTW.

## 4. EXISTING CHARACTER

### 4.1 Existing Character

Mount Thorley Warkworth (MTW) is an integrated operation of two open cut mines, Warkworth Mining Limited (WML) and Mount Thorley Operations (MTO) which are located adjacent to each other and 15 km south west of Singleton in the Hunter Valley region of New South Wales. The operation supplies international and domestic markets with semi-soft coking coal and thermal coal.

MTW is generally bounded by public roads – the Golden Highway alongside the Northern and Eastern WML boundary, Wallaby Scrub and Charlton Roads to the West. The operation is bisected by Putty Road, WML to the North of the road, and MTO to the South.

MTO shares its southern boundary with the adjoining Bulga Open Cut Mine (BOC).

Surrounding land uses include Mining (nearby operations include Bulga Coal, Wambo Coal and Hunter Valley Operations), agriculture (to the east in the areas of Mount Thorley and Hambledon Hill), Industrial pursuits in the Mount Thorley Industrial Estate, and nearby residential communities of Bulga, Milbrodale, Warkworth and Long Point. The township of Singleton is located approximately 7km to the east of WML.

### 4.2 Infrastructure

MTW comprises the following major areas and infrastructure:



Figure 1 - Layout of MTW

### 4.3 Site Noise Emissions

MTW operates 24 hours per day, seven days per week. MTW aims to comply with the noise criteria stipulated in the Approvals.

Site noise can be emitted from mobile or fixed plant as listed in Table 1 and Table 2. These noise emissions have the potential to adversely affect the acoustic environment and surrounding residences.

Product coal is loaded onto trains at Mount Thorley Coal Loader, and then transported to the Port of Newcastle. Noise from trains on the loading loop is regulated through the Australian Rail Track Corporation's (ARTC's) EPL (No. 3142).

### 4.4 Meteorological Conditions

Meteorological conditions experienced at MTW are considered typical for the Upper Hunter. Wind patterns follow an annualised cycle predominantly blowing from the north-west during the cooler months, and from the south east during the warmer months.

Since 2004, average annual rainfall is 629.22mm. Rainfall during 2013 was 665.3mm, approximate 5% above the annual average of the previous ten years. Records of wind speed, wind direction and sigma-theta (used to calculate Pasquill Stability Classes) has been analysed for the purposes of noise assessment during the environmental assessment phase of the Project. The combined occurrence of atmospheric stability class F and G indicates that temperature inversions are considered to be a feature of the region during Autumn nights, with potential to enhance noise propagation. This analysis is consistent with the INP which shows a similar percentage occurrence of Stability Class F for the area encompassing the Project and surrounds.

### 4.5 Detailed Baseline Data

Baseline noise data for MTW is provided in Appendix D.

### 4.6 Relevant Noise Criteria

Noise criteria as stipulated in the Approvals is reproduced in Table 1.1.

## 5. MANAGEMENT OPTIONS / MITIGATION OPTIONS

### 5.1 Principles and framework

- Rio Tinto Coal Australia integrated Health, Safety, Environment, Quality Management System (HSEQMS) Framework - Plan, Do, Check, Review
- "Plan" component of framework:
  - undertake risk analysis of noise impacts;
- "Do" component of framework:–
  - Complaints management;
  - Dynamic improvement/evolution;
  - Reactive and proactive mitigation measures;
  - Co-ordination/cumulative impact management;
- "Check" component of framework:
  - regular monitoring; and
- "Review" component of framework:
  - Reporting and analysis;
  - Further risk analysis.

### 5.2 Best Management Practice

Best management practice in this NMP is defined as practices used to manage noise impacts that are consistent with the following:

- The measure should firstly aim to prevent noise impacts, and where that is not practicable, to generally reduce impacts to the environment as a whole;

- The measure is reasonably accessible and is developed on a scale which allows implementation in the Project, under economically and technically viable conditions, taking into consideration the costs and advantages; and
- Of the options available, it is the most effective in achieving a generally high level of protection of the environment as a whole.

This definition is derived from the European Union Directive 2008/1/EC definition of Best Available Techniques.

MTW will implement best management practice measures to minimise the operational, road and rail traffic noise associated with the development.

These best practice management measures are outlined in Section 6.

## 6. MITIGATION MEASURES / MANAGEMENT CONTROLS

### 6.1 Objectives

In order to mitigate any potential impacts from noise creating activities, a number of management controls will be implemented throughout the life of MTW.

Measures to manage MTW noise emissions have been divided into three categories, namely:

- Standard mitigation measures;
- Proactive mitigation measures; and
- Reactive mitigation measures

Together, these three categories make up the MTW Noise Management System.

### 6.2 Standard Mitigation Measures

The following controls are implemented under standard conditions:

- plant, machinery and haul roads will be maintained in good condition according to manufacturer's specification and repaired as

required to ensure that equipment remains in a serviceable operating condition;

- noise impacts will be considered during risk analysis and change management procedures for substantive changes to operating conditions;
- sound power level testing of equipment will be undertaken annually;
- activities that generate complaints will be monitored and modified if supplementary monitoring results confirm that Approval noise criteria are potentially being exceeded;
- environmental inductions will ensure that relevant employees are aware of potential impacts on sensitive receptors from equipment and its operation;
- all new trucks, dozers, drills and excavators purchased for use onsite will be commissioned as noise suppressed (attenuated) units;
- Coal haulage by rail or conveyor, and programs to encourage staff car-pooling to minimise the road noise of the development;
- attended monitoring of noise will be undertaken on a monthly basis at representative sites, by a qualified acoustic consultant;
- Directional real-time monitoring with frequency filtering capabilities will be employed at sensitive receptor locations. Noise alarms will be generated, received and responded to in real time to effectively manage noise emissions; and
- Frequent reporting on the Rio Tinto Coal Australia website on the outcomes of real time and attended noise monitoring.

### 6.3 Proactive Measures

#### 6.3.1 Sound Suppressed Fleet

MTW currently operates and maintains a number of pieces of HME (Heavy Mining Equipment) which have been commissioned as sound suppressed units, or retro-

fitted with suppression equipment. Based on known and predicted noise risk, the sound suppressed units will be deployed preferentially to manage noise.

At this time, the assignment of sound suppressed trucks is based on prevailing meteorology and known risk areas (through understanding recent and historical non-compliance events). It is anticipated that a Predictive Modelling Interface (PMI) (see section 6.3.3) will be used in the future as another trigger for preferential placement of sound suppressed fleet.

MTW will report on the progress of the sound attenuation program annually in the Annual Review (AR).

### 6.3.2 Sound Power Control

Sound power control will be managed by a combination of sound power testing, a rigorous maintenance schedule and daily pre start checks. In accordance with Schedule 3, Condition 9 (c) of the MTO Approval, MTW will maintain the effectiveness of any installed suppression equipment.

#### 6.3.2.1 Sound Power Level Testing

Sound power level testing (sound screening) will be undertaken on 33% of the attenuated HME fleet annually. In this way, 100% of attenuated equipment will be screened on a rolling three-year cycle. The results of sound screening will be used for the following:

- to inform MTW of equipment which is experiencing degradation in suppression equipment and requiring repair;
- to inform MTW of fleet types and units which can be preferentially deployed into or removed from noise risk areas;
- to periodically update the PMI to increase model accuracy and usefulness; and
- to compare against the predicted noise levels in the environmental assessment, reported annually in the AR (model validation).

MTW will assign an operational noise limit (sound power) specification to each fleet type, derived from existing

Sound Power Level data. The operational specifications will be in place for all fleet types by 30 September 2014.

When one piece of equipment measures >3 dB(L) against operational specifications, MTW maintenance staff will inspect and assign the piece of equipment to the appropriate maintenance schedule.

#### 6.3.2.2 Routine Maintenance Scheduling

Routine equipment inspections include assessment of the condition of the attenuation components. If, during the services and inspections, a major noise attenuation component is found to be absent, worn or broken to the point of being ineffective, that piece of equipment will be repaired or replaced as required. Routine maintenance is undertaken at a frequency of six weeks for Komatsu 830E haul units, and four weeks for all other haul units. Additional maintenance events can be scheduled within two weeks where required.

#### 6.3.2.3 Daily pre-start inspections

Daily pre-start inspection is undertaken by the operators, which includes walking around equipment and undertaking a visual inspection of the vehicle, including any installed sound attenuation equipment. Vehicle operators will be trained to assess the attenuation components. Where potentially defective plant is identified (major noise attenuation component absent or broken), these will be noted and reported to the appropriate staff. Maintenance staff will assess the severity of the defect (with respect to the effectiveness of the sound attenuation equipment) and action accordingly. If the potential defect is confirmed (major noise attenuation component absent or broken), that piece of equipment will be assigned to the appropriate maintenance schedule for rectification. Where possible, maintenance will be accelerated to address more serious / severe defects.

### 6.3.3 Proactive Planning

Schedule 3, Condition 9 (b) of the MTO Approval, and Schedule 4, Condition 20(c) requires “*proactive ... mitigation measures*”.

MTW will continue development and refinement of the Predictive Modelling Interface (PMI), received during 2013. The PMI utilises site based inputs (mine plan

information, updated topographical maps, and available Sound Power Level data) to predict likely noise impacts on sensitive receptors, based on forecast met conditions for the following shift. Updated modelling will be undertaken 4 times per annum (nominally once per quarter).

The initial testing of the tool has proved challenging. The level of agreement between predicted noise levels and measured levels to date has been poor. This is expected to improve as development and validation continues, however the tool will not be considered fit for full integration into the site noise management system until a greater level of confidence in the predicted outputs is achieved. MTW will continue to validate the tool, and report on development in future Annual Reviews.

An assessment of forecast information at the commencement of each night shift identifies likely direction of meteorological enhancement of noise (if any). Sound attenuated haul fleet is preferentially deployed to tasks which are considered to pose the greatest level of noise risk to sensitive receptors under those conditions.

Handheld noise monitoring is undertaken on a proactive basis in neighbouring communities on a night-to-night basis, as well as in response to triggers and complaints.

## 6.4 Reactive Measures

The aforementioned pro-active management actions are supported by a system of reactive management measures. These measures utilise a combination of real time noise monitoring and operational surveillance of mining equipment and conditions to ensure noise limits are complied with at all times.

### 6.4.1 Real Time Noise monitoring network

The existing real time monitoring network is comprised of directional and non-directional monitors. Four of the existing units are currently utilised on a day-to-day basis, informing operations in real time of noise levels approaching noise limits at the receiver locations. These units are located at:

- Bulga;
- Wambo Road;

- Inlet Road West; and
- Wollemi Peak Road.

The monitoring system is planned to be improved in 2014 as follows:

- Implementation of real time noise alarms from the Long Point BarnOwl unit, shared with HVO. MTW alerts will be operational by 31 October 2014.
- Ongoing works to commission and integrate the first-of-class Environmental Noise Compass in the southern area of Bulga Village. MTW will meet with Department of Planning and Environment before 31 October 2014 to update on progress toward implementation.

### 6.4.2 Validation of Real Time monitoring locations

To ensure that the prescribed real time monitoring locations adequately represent all privately owned land surrounding MTW, validation surveys will be undertaken on an as required basis. The surveys will be conducted upon request by way of either attended or unattended monitoring at private residence(s) (subject to landowner agreement) for a nominal period to enable comparison with measured levels at the corresponding real time monitoring location. Where monitoring data indicates that real time triggers are not ensuring noise levels below the relevant impact assessment criteria at a particular residence the triggers will be reviewed.

### 6.4.3 Real Time Noise alarm received

MTW operates and maintains a series of unattended, real time and directional noise monitors. The real time system transmits live, directional, low pass (<1000Hz) data to site personnel via the Supervisory Control and Data Acquisition (SCADA) system. Required by Schedule 3, Conditions 9(b) and 10(d) of the MTO Approval, and Schedule 4, Condition 20 (c) of the WML Approval, real time noise alarms are considered best practice use of real time monitoring systems, providing a warning mechanism to operational personnel of levels that are approaching a relevant noise criterion.

The real time noise alarm process operates as follows:

- A noise alarm is generated following two consecutive 15min measurements at a monitor location from the directions of MTW operations (<1000Hz low pass data, from the direction of either of MTO, WML, or MTW combined) above the trigger threshold, detailed in Table 6;
- Real time noise data is compared against current meteorological conditions, and operate to a conservative wind threshold (higher than the applicable wind conditions listed in the INP, 2000, and do not consider inversion conditions);
- Alerts are active between 8pm and 5am, seven days per week;
- Triggers are followed up with an assessment of validity; and
- Where handheld assessment supports the alarm (noise issue identified), remedial actions are implemented to reduce the noise level accordingly (see section 6.4.4).

Table 6 - Real-Time noise alarms

Monitoring Location	Consent Area	Amber Alert (dB(A))	Red Alert (dB(A))
Bulga	WML	36	38
	MTO	40	42
Wambo Road	WML	36	38
	MTO	36	38
Wollemi Peak Road	WML	N/A	35
	MTO	N/A	38
Inlet Road West	MTW	N/A	35

Note: Wollemi Peak Road does not utilise amber alert triggers due to geographical overlap of the noise monitor bearings to WML and MTO

#### 6.4.4 Supplementary handheld noise monitoring

A program of targeted supplementary attended noise monitoring is operated at MTW to support the real-time directional monitoring network and ensure the highest level of noise management is maintained.

The supplementary program is undertaken by MTW personnel and involves:

- Undertaking routine inspections from both inside and outside the mine boundary;

- Routine and as-required handheld noise assessments (undertaken in response to noise alarm and/or community complaint), comparing measured levels against consent noise limits; and
- Validation monitoring following operational modifications to assess the adequacy of the modifications.

#### 6.4.5 Operational Modifications

Where noise assessment undertaken identifies noise emissions which are exceeding the consent noise limit for any particular residence, modifications will be made so as to ensure that the noise event is resolved within 75 minutes of identification. The actions taken are commensurate with the nature and severity of the noise event, but can include:

- Replacement of non-attenuated equipment with sound attenuated equipment;
- Changing the haul route to a less noise sensitive haul;
- Changing dump locations (in-pit or less exposed dump option);
- Reducing equipment numbers;
- Shut down of task; or
- Site shut down

When noise has been reduced to an acceptable level, a 15 minute period of monitoring will be undertaken to confirm noise is maintained at this level. Any subsequent restart of equipment will be accompanied by an initial period of monitoring so as to prevent as far as practicable any return to previously elevated noise. Noting that this will not prevent a subsequent increase to the mine noise output if this is due to subsequent meteorological or operational changes which were not related to the initial noise event. In the event that alarms are received from other monitoring locations during this period of monitoring priority is given to these other locations.

In the event that subsequent instances of elevated noise are detected at the same monitoring location (which may occur from time to time due to changes in operating practice and location, or more commonly, changes in meteorological conditions), MTW will resolve these events within 75 minutes of detection.

#### **6.4.6 Sound Power Level Testing – ad-hoc**

Where MTW staff identify equipment which is perceived to be experiencing degradation of sound attenuation, ad-hoc sound power level testing will be arranged as required to assess the equipment. MTW maintenance staff will inspect the equipment, and where a defect is identified, it shall be actioned accordingly.

### **6.5 Management of Unpredicted Impacts**

In the event that unpredicted noise impacts are found to be occurring at nearby privately owned residences, MTW will consider management options on a case-by-case basis such as:

- Entering into an impact cooperation agreement with the landowner
- Review of management controls and monitoring systems specific to the affected residence
- Mitigation options (such as installation of double glazed windows and air conditioning units)
- Acquisition of the affected property

### **6.6 Continuous Improvement**

MTW has demonstrated strong commitment to continuous improvement in the area of noise management in recent years.

In accordance with the requirements of the Rio Tinto Coal Australia Health, Safety, Environment and Quality Management System, MTW will continuously seek to further noise management by way of improving existing controls and investigating new and emerging technologies, implementing new controls where required, and thoroughly investigating any exceedance and non-compliance events.

In accordance with Clause 3.6 of the Rio Tinto standard for Hazard Identification and Risk Management, MTW will continue to develop action plans to reduce the risk of non-compliance with the relevant noise conditions of the Approvals. Identified actions will be documented in the site HSEQ Improvement Plan, recorded in the action management system, and tracked to completion.

## **7. MONITORING PROGRAM**

Appendix A sets out the MTW Noise Monitoring Programme, including a protocol for evaluating non-compliances, and contains information on the definitions and protocols regarding Noise Incidents.

Appendix A sets out the MTW Noise Monitoring Programme.

### **7.1 Independent Review and Land Acquisition Process**

In accordance with the relevant conditions of the approvals, landowners who consider the development(s) to be exceeding the noise criteria can request Independent Review of noise impacts at any time. Such requests must be made in writing, to the Director-General.

The Director-General will assess the request and, if satisfied that an Independent Review is warranted, will communicate same to MTW to commence the Review.

A scoping document is included in this NMP as Appendix B. The scoping document will form the basis of any Independent Review of Noise impacts to be undertaken at MTW.

Where Independent Review determines MTW to be exceeding the relevant criteria, MTW will work with the Dept. and the resident to implement appropriate measures to ensure compliance with the relevant criteria.

## **8. IMPLEMENTATION OF THE NOISE MANAGEMENT PLAN**

### **8.1 Reporting**

#### **8.1.1 Internal reporting**

Determining exceedances of noise criteria will be undertaken in accordance with the protocol for evaluating compliance (Noise Monitoring Programme), reproduced in Appendix A.

Internal reporting of noise incidents (exceedances and non-compliances of noise criteria) will be undertaken in accordance with Rio Tinto Coal Australia HSEQ14 – Incident and Action Management.

The Environmental Specialist – Systems and Monitoring will report any potential or confirmed exceedance / non-compliance to relevant site personnel, including the General Manager, Manager – Mining, and Manager Environment NSW.

Non-compliance events will be investigated. Where additional controls are identified for implementation to reduce the risk of repeated non-compliance, these will be assigned to the relevant accountable person. Actions are tracked to completion.

#### **8.1.2 External Reporting**

The Environmental Specialist – Systems and Monitoring will report any potential or confirmed exceedance / non-compliance in writing to the Dept. as soon as practicable following receipt of information indicating any such potential or confirmed exceedance / non-compliance. As required by the Approvals, non-compliances will also be reported to the EPA as soon as practicable. No further agencies are considered relevant, and thus do not require notification of noise non-compliance events.

Affected residences will be notified in writing in the event of a confirmed non-compliance with noise conditions.

Noise monitoring data, collected in accordance with this NMP will be made available on the Rio Tinto Coal Australia website ([www.riotintocoalaustralia.com.au](http://www.riotintocoalaustralia.com.au)) via the Monthly Environmental Management Report, and Annual Review.

At the time of submission of this NMP, MTW does not have any noise monitoring requirements listed in EPL's 1376, 1976 or 24.

### **8.2 Comparison of Attended and real-time monitoring data**

Schedule 4, Condition 21 (d) requires that the Noise Monitoring Programme “*includes a program to calibrate and validate real-time noise monitoring results with attended monitoring results over time (so the real time program can be used as a better indicator of compliance with the noise criteria and as a trigger for additional attended monitoring)*”.

The supplementary handheld noise monitoring regime is structured so as to allow for additional attended noise monitoring on nights where noise enhancement is witnessed. This includes identification of increased noise through both proactive handheld monitoring and the receipt and validation of real-time alarms.

Triggers and processes for increased frequency of attended monitoring per the Dept. guidance note is described in the Protocol for determining compliance (see Appendix A).

### **8.3 Annual Assessment and model validation**

The Annual Review prepared each year for MTW will include all noise monitoring results for the corresponding year. The Review will also include a comparison of monitoring results against the predictions from the noise model. This will be done by directly comparing the measured results against the predictions for INP weather conditions in the closest operating scenario to the actual operating conditions for the given year.

### **8.4 Complaints Management**

Community Complaints are lodged via the Community Complaints line, 1800 656 892. The hotline number prominently displayed on the Rio Tinto coal Australia website and regularly advertised in the local newspaper. The Complaints Hotline operates 24 hours per day, seven days a week. Complaints will be recorded and investigated by MTW staff (see Section 6.4.5). Complaints lodged via other means (letter, in person, fax

etc) will also be recorded and investigated by the Environmental Coordinator.

Where the investigation identifies potential non-compliance with a consent or licence condition, action to mitigate the cause of the complaint will be taken.

The details of all noise complaints, and any mitigating actions taken, will be circulated to senior management and other key personnel. Where requested, follow-up correspondence with the complainant will be provided.

It is a condition of EPL's 1376, 1976 and 24 that MTW maintain a register of pollution complaints. MTW maintains a register of all complaints, recording the following information (at minimum):

- Date and time of the complaint
- Method by which the complaint was made
- Any personal details of the complainant which were provided
- The nature of complaint
- Any action taken in relation to the complaint
- If no action, the reason why no action was taken

A record of each complaint will be kept for a minimum of four years, and will be produced on request to any authorised officer of the EPA.

## 8.5 Review of this Management Plan

This NMP will be reviewed within three months of the submission of the Annual Review and updated to the satisfaction of the Director-General of the DP&I where necessary.

This NMP will also be reviewed, and revised if necessary, within three months of the completion of an independent environmental audit, any non-compliance of the Approvals' criteria or any modification to the conditions of the Approvals.

Any major amendments to this NMP that affect its application will be undertaken in consultation with the appropriate regulatory authorities and stakeholders. Minor changes such as formatting edits may be made with version control on the Project website.

This NMP may also be revised due to:

- deficiencies being identified;
- introduction of additional mitigation measures or controls;
- results from the monitoring and review programme, including exceedances of criteria;
- recommendations resulting from the monitoring and review programme;
- changing environmental requirements;
- improvements in knowledge or technology becoming available;
- changes in legislation;
- identification of a requirement to alter this NMP following a risk assessment; or,
- updating of the Mining Operation Plan.

## 8.6 Roles and Responsibilities

**Table 9: Roles and Responsibilities<sup>1</sup>**

<p><b>Manager – Environment NSW</b></p> <ul style="list-style-type: none"> <li>• Implementation of Management Plan</li> <li>• Regulator liaison</li> <li>• Technical oversight</li> </ul>
<p><b>Manager – Mining</b></p> <ul style="list-style-type: none"> <li>• Direction and operational oversight of management practices</li> </ul>
<p><b>Manager – Mine Planning</b></p> <ul style="list-style-type: none"> <li>• Provision of mine plans for proactive model</li> <li>• Allocation of contingency mine plan options in consideration of noise impacts</li> </ul>
<p><b>Manager – Maintenance</b></p> <ul style="list-style-type: none"> <li>• Administer Sound Power Level Testing regime</li> <li>• Co-ordination of sound attenuation program</li> <li>• Direction and oversight of processes used in identifying and repairing defective equipment</li> </ul>
<p><b>Community Response Officer</b></p> <ul style="list-style-type: none"> <li>• Implementation of real time surveillance program</li> <li>• Community liaison</li> <li>• Complaints administration management</li> </ul>
<p><b>Environment – Operations</b></p> <ul style="list-style-type: none"> <li>• Assistance with exceedance investigation</li> <li>• Community and regulator liaison</li> <li>• Complaints administration management</li> </ul>
<p><b>Environment – Systems and Monitoring</b></p> <ul style="list-style-type: none"> <li>• Administer noise monitoring programme</li> <li>• Non-compliance reporting</li> <li>• Co-ordination of Management Plan review</li> <li>• Systems development and implementation</li> <li>• Co-ordination of exceedance investigation</li> <li>• Regulator liaison</li> <li>• Technical oversight</li> <li>• Routine and Ad-hoc reporting</li> </ul>
<p><b>Shift Co-ordinator</b></p> <ul style="list-style-type: none"> <li>• Implementation of operational modifications in response to triggers</li> <li>• Infrequent community liaison</li> </ul>
<p><b>Mine Monitoring and Control (MAPS)</b></p> <ul style="list-style-type: none"> <li>• Support to Shift Co-ordinator and Community Response Officer (access to real time tools)</li> </ul>
<p><b>Consultants</b></p> <ul style="list-style-type: none"> <li>• Attended compliance monitoring and Technical oversight</li> </ul>

<sup>1</sup> Roles and responsibilities may be changed from time to time outside of the approval process of this NMP

## REFERENCES

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- Warkworth Mining Limited Development Consent (DA 300\_9\_2002\_i)
- Mount Thorley Operations Development Consent (DA 34/95)
- The Environmental Impact Statement '*Extension of Mining at Mount Thorley Operations*' – ERM Mitchell McCotter, August 1995
- The Environmental Impact Statement '*Extension of Warkworth Coal Mine*' – Environmental Resource Management Australia Pty Ltd, August 2002
- The Statement of Environmental Effects '*Abbey Green Project Alterations*' – Environmental Management Group Australia, January 2010
- The Environmental Assessment '*Warkworth Modification 6*' – EMGA Mitchell McLennan, November 2013
- Environment Protection Licence 1376 (WML)
- Environment Protection Licence 1976 (MTO)
- NSW Industrial Noise Policy (EPA, 2000)
- DRAFT NSW Department of Planning and Infrastructure Guideline – Noise Monitoring Application Note (DP&I, 2013)
- Australian Standard 1055 (Standards Australia, 1997)
- Mobile Plant Sound Power Specification (Global Acoustics, March 2012)
- MTW-13-ENVMPR-SITE-E6-011 (MTW Noise Monitoring Programme)
- CNA-09-EWI-SITE-003 (Environmental Complaints Line)
- CNA-09-EWI-SITE-058 (Complaints Database)

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APPENDICES

NOISE MANAGEMENT PLAN



## Appendix A – Noise Monitoring Programme

### MOUNT THORLEY WARKWORTH NOISE MONITORING PROGRAMME

#### 1. Purpose

This document provides a summary of the noise monitoring programme for Mount Thorley Warkworth.

The programme includes a protocol for evaluating compliance with the noise criteria, and a representation of the properties which have been captured in this noise monitoring programme. The monitoring locations are subject to change and will be updated periodically to align with management and compliance needs and to accommodate progression of mining and changes to local landholdings.

#### 2. Programme

Table 1 – Monitoring Programme

Parameter	Frequency	Monitor Location	Sampling Method
Attended Noise LA1 (1min) LAeq LCeq	Minimum of twelve (12) monitoring events (nominally once per month, at least two weeks apart) <sup>3</sup>	Mount Thorley Industrial Estate Bulga Village Gouldsville Road Inlet Road – West Long Point Wollemi Peak Road South Bulga Wambo Road Warkworth <sup>5</sup>	NSW EPA Industrial Noise Policy 2000  AS1055.1997
Real Time Noise <sup>1</sup> LAeq LA90	Continuous	<b>Directional Monitors</b> Long Point Bulga Wambo Road Inlet Road Wollemi Peak Road South Bulga <sup>4</sup>  <b>Non-Directional Monitors</b> Mount Thorley Industrial Estate <sup>2</sup> Warkworth <sup>2</sup>	Directional and Non-Directional monitors used.  AS1055.1997

Notes:

<sup>1</sup> Real time noise parameters are assessed for both All Pass and Low Pass LAeq (noise levels less than 1000 Hertz)

<sup>2</sup> Real time alarms are not in place for non-directional real time noise monitors. Data is used in support of field observations only.

<sup>3</sup> Additional monitoring events undertaken following non-compliance may occur within two weeks of the previous measurement.

<sup>4</sup> South Bulga monitor is a first-of-class Environmental Noise Compass, under commissioning at the time of submission.

<sup>5</sup> Attended monitoring at Warkworth Village is suspended and can be reintroduced at the request of the regulator.

### 3. Noise Limits for assessment

Table Two – Noise Limits

Monitoring Location	Consent Area	L <sub>Aeq</sub> Impact Assessment Criteria (dB)	L <sub>Aeq</sub> Land Acquisition Criteria (dB)	L <sub>A1</sub> (1min) criteria (dB)	L <sub>Aeq</sub> Cumulative Impact Criteria (dB)	L <sub>Aeq</sub> Cumulative Acquisition Criteria (dB)
Mount Thorley Industrial Estate	WML	N/A	44dB			
	MTO	N/A <sup>1</sup>	N/A <sup>1</sup>	N/A <sup>1</sup>	N/A <sup>1</sup>	N/A <sup>1</sup>
Bulga Village	WML	38	43			
	MTO	40	43	48	40 <sup>2</sup>	45 <sup>2</sup>
Gouldsville Road	WML	N/A	43			
	MTO	44	45	47	45 <sup>2</sup>	45 <sup>2</sup>
Inlet Road – West	WML	35	40			
	MTO	35	43	48	40 <sup>2</sup>	45 <sup>2</sup>
Long Point	WML	37	40			
	MTO	39	43	47	40 <sup>2</sup>	45 <sup>2</sup>
Wollemi Peak Road	WML	35	40			
	MTO	38	43	48	40 <sup>2</sup>	45 <sup>2</sup>
South Bulga	WML	35	40			
	MTO	37	43	48	40 <sup>2</sup>	45 <sup>2</sup>
Wambo Road	WML	38	40			
	MTO	40	43	48	40 <sup>2</sup>	45 <sup>2</sup>

Notes:

<sup>1</sup> - Properties in the vicinity of the Mount Thorley Industrial Estate have right to Acquisition upon request under DA34/95

<sup>2</sup> - Averaging period for cumulative noise criteria (listed in DA34/95 as modified) is L<sub>Aeq (period)</sub> – Period refers to a 9hr block

Noise Monitoring Location Plan



## PROTOCOL FOR EVALUATING NON-COMPLIANCES

### 1. Purpose

This document outlines the key considerations in evaluating compliance with the relevant noise criteria in the approvals.

### 2. Noise Descriptors

Some definitions of typical noise descriptors are provided in Table 1.

Table 1 NOISE DESCRIPTORS

Descriptor	Definition
L <sub>A</sub>	The A-weighted root mean squared (RMS) noise level at any instant.
L <sub>A1</sub>	The noise level exceeded for 1 per cent of the time.
L <sub>A1,1min</sub>	The noise level exceeded for 1 per cent of 1 minute. This is 0.6 of a second; effectively the L <sub>Amax</sub> for that minute. The worst case L <sub>A1,1min</sub> in a 15-minute period is therefore the L <sub>Amax</sub> in that period.
L <sub>A10</sub>	The noise level which is exceeded for 10 per cent of the time, which is approximately the average of the maximum noise levels.
L <sub>A90</sub>	The level exceeded for 90 per cent of the time, which is approximately the average of the minimum noise levels. The L <sub>A90</sub> level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
L <sub>Aeq</sub>	The average noise energy during a measurement period.
Exceedance	Noise level attributed to MTW (either Mount Thorley or Warkworth), measured during attended monitoring, which is in excess of a consent noise limit.
Non-compliance	Exceedance measured during applicable meteorological conditions, which is greater than 2dB above the relevant consent noise limit.

### 3. Mining Noise

As a preface to discussion of affectation and compliance it is appropriate to consider some specific characteristics of mining noise in the Hunter Valley. These are:

- Most receptors are located a considerable distance from mine sites with regard to noise propagation (greater than 1000 metres);
- Mining noise is typically inaudible during the day period – this is supported by the DRAFT NSW Department of Planning and Infrastructure Guideline – Noise Monitoring Application Note, which states "*Extensive experience has shown that daytime or evening criteria is rarely, if ever exceeded and that night time criteria is the limiting criterion*"
- Received levels of mining noise usually vary greatly from one night to the next at any receptor location. Different meteorological conditions from one night to the next are the primary cause of different received levels at receptors.
- Mining noise from a large open cut operation, received at a receptor, is typically a continuum with minor event noises that are usually not very emergent;
- The received mining noise spectrum generally does not have any significant content (if any) above 1000 Hertz; and

- Other noise sources at a receptor location can often be considerably louder than received mining noise. This is particularly true for noise events (dogs, cows, cars etc.), which influence the total  $L_{Aeq}$ .

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#### 4. Noise affectation / Sustained non-compliance

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The Approvals stipulate noise criteria which must be met during the life of the development(s). Assessment of compliance with these noise criteria is undertaken as per the noise monitoring described in this document.

The approvals however do not stipulate requirements or give guidance on noise affectation, or the frequency or duration of any non-compliance which would constitute noise affectation.

Primarily, determination of noise affectation is a comparison of measured noise levels against consent conditions under a governing set of meteorological conditions, with the results either meeting the criteria on the consent condition or not.

Guidelines regarding affectation are contained in the NSW Environment Protection Authority (EPA) Industrial Noise Policy (INP).

With regard to land acquisition, the INP (page 6) comments that criteria “seek to restrict the risk of people being highly annoyed to less than 10 percent, and to meet this for at least 90 percent of the time”. This is consistent with an approved assessment methodology where a set of results, for a range of temperature gradients, wind speeds and wind directions (in combination), is calculated and the 90th percentile result (10 percent of results are higher than this number) is used to represent intrusive noise impact.

The INP also indicates (page 47) that higher-level noise is a problem when it occurs “for a significant period of time –approximately two nights a week in winter”. This equates to approximately 30 percent of a week and is consistent with the INP assessment requirement (pages 33 and 34) that noise enhancement, and hence the possibility of annoyance, need not be considered if the meteorological conditions leading to increased noise levels occur less than 30 percent of the time. This equates to approximately 8 nights per month.

In summary, the INP in various sections infers that noise levels greater than the limiting criterion are acceptable on occasion. Whilst not definitive, this document indicates that higher noise levels are allowable between 3 and 8 nights per month.

So, in regard to frequency of criteria non-compliance, it would appear that anywhere up to 8 nights per month would be necessary before a location could be considered noise affected.

However, the frequency of attended monitoring does not allow for a determination of nights per month affectation.

To allow for more robust assessment of the frequency and/or duration of any non-compliance, MTW will assess noise in line with the DRAFT NSW Department of Planning and Infrastructure Guideline – Noise Monitoring Application Note. Sections 2.5 and 4.2 (Period monitoring requirements) and 4.5 (result acceptance) are of particular relevance in the context of noise affectation:

##### *2.5 Monitoring Periods*

*Extensive experience has shown that daytime or evening criteria is rarely, if ever exceeded and that night time criteria is the limiting criterion. Furthermore, where the day or evening criteria are being approached, it is found that the noise enhancing conditions that are more likely to occur at night which will have the greatest potential to cause exceedances. It is the Department's desire that resources be focused on monitoring the periods of the day which are the most sensitive and those where generated levels or noise are likely to be the most annoying.*

*Consequently, unless there are compelling reasons to require monitoring during the day or evening periods at a specific location, any requirement to measure during these periods is suspended and this monitoring effort is to be directed towards fulfilling the additional night time monitoring requirements.*

#### 4.2 Period Monitoring Requirements

*Requirements for Day and Evening monitoring shall be suspended, but the requirement can be reactivated by the Department at any time following valid complaints or concerns.*

*Night time noise monitoring can commence from 9 pm onwards but must be assessed against the night time criteria.*

In line with the above, MTW will not focus resources on compliance assessment or management of daytime or evening noise (in the current context considered to cease at 9pm, not 10pm), unless there is a compelling reason to do so. It is noted that the Department can reactivate these requirements at any time;

#### 4.5 Result acceptance

*A 15 minute reading shall be taken and assessed against the applicable criteria. If the reading is below the criteria, then the consultant will record the result, note the site has passed and move on to the next monitoring site. If reading exceeds criteria and is attributable to the mine operation and taken in valid meteorological conditions then the following steps are to be followed:*

1. *Consultant to record the reading, advise the mine a reading has exceeded the criteria and proceed to Step 2.*
2. *Within 75 mins after first reading (and no earlier than 10pm) a second 15 minute reading is to be taken. If this reading exceeds the criteria then proceed to Step 3 otherwise proceed to Step 4.*
3. *If the reading exceeds criteria and is attributable to the mine operation and taken in valid meteorological conditions then proceed to Step 5.*
4. *The consultant will record the result, note the site has passed, schedule an additional monitoring test to be undertaken at the site within 1 week, and move on to the next monitoring site.*
5. *The consultant will record the result, note the site has failed and is deemed a 'noise affected night' at that site. An additional monitoring test should be scheduled to be undertaken at the site within 1 week, and move on to the next monitoring site.*

MTW will undertake compliance assessments in the manner outlined in section 4.5 of the DRAFT guideline. A monitoring location will be considered 'noise affected' if there are two instances of 'noise affected nights' measured at a particular location during the same calendar month.

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## 5 MONITORING

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As defined in Appendix 4 of the Warkworth Approval (DA 300-9-2002-i):

- Attended Monitoring will be used to evaluate compliance with the relevant conditions of consent;
- Monitoring will be carried out at least once per month (but at least two weeks apart);
- Monitoring will be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy*.

Attended monitoring would be conducted from a selection of nine sites as detailed in the MTW Monitoring Programme<sup>1</sup>. The duration of each night measurement will be 15 minutes. Monitoring will be undertaken in accordance with the EPA INP guidelines, the Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise' and Rio Tinto Procedure HSEQMS13 – Measuring and Monitoring.

Chapter 11 of the NSW Industrial Noise Policy deems a development to be in non-compliance only when 'the monitored noise level is more than 2dB above the statutory noise limit specified in the consent or licence condition. As such, MTW will be considered to be in non-compliance with an applicable noise criterion when a measured exceedance (MTW contribution to the noise environment exceeds the Project Approval criteria), exceeds the relevant criterion by greater than 2dB.

## 6 Approvals & criteria

### 6.1 Current Approvals

Table 2 APPLICABLE CONSENTS FOR MTW

Consent Area	Consent	
Warkworth Mining Limited	DA 300-9-2002-i	Warkworth Coal Mine
Mount-Thorley Operations	DA 34/95 (as modified 2 <sup>nd</sup> May 2012)	The development consent for the Mount Thorley open cut coal mine

The above Approval documents list noise criteria for nearby private residences. Refer to Table Two of the Noise Monitoring Programme for relevant noise limits applicable to the monitoring locations. As the noise limits are applicable to each individual Approval area, an assessment of mine noise levels from each of Warkworth and Mount Thorley must be undertaken during the assessment.

## 7 Reporting

### 7.1 Reporting of measurements taken during Attended Monitoring

Outcomes of Attended Monitoring will be reported as follows:

- Regular updates (quarterly) in accordance with Schedule 5, Condition 14(a)
- By the end of March each year, in the Annual Review
- To relevant residents, by exception, in the event of non-compliance
- To the Director-General or delegate, by exception, in the event of potential exceedance, or non-compliance
- Summarised and presented to the Community Consultative Committee

### 7.2 Reporting of Real-Time noise measurements

Outcomes of real-time monitoring will be summarised in the Annual Review, submitted to the Director-General by the end of March each year.

## 8 Review

This Noise Monitoring Programme shall be reviewed on an as required basis, at a frequency not exceeding three years.

A detailed review will be undertaken during 2015 as required by Condition 9(f) in Schedule 3 of the noise criteria in condition 3 of the Mount Thorley Approval. The review shall assess "whether these criteria should be reduced commensurate with the performance of the Mt Thorley Warkworth mine complex after implementation of noise mitigation and management measures. This review shall be conducted... in consultation with OEH by a suitably qualified and experienced person whose appointment has been endorsed by the Director-General".

## REPRESENTATION OF PRIVATE RESIDENCES

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### 1. Purpose

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This document outlines the representation of private residences by attended noise monitoring locations identified in the Mount Thorley Warkworth (MTW) Interim Noise Monitoring Programme.

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### 2. Representation of Private residences

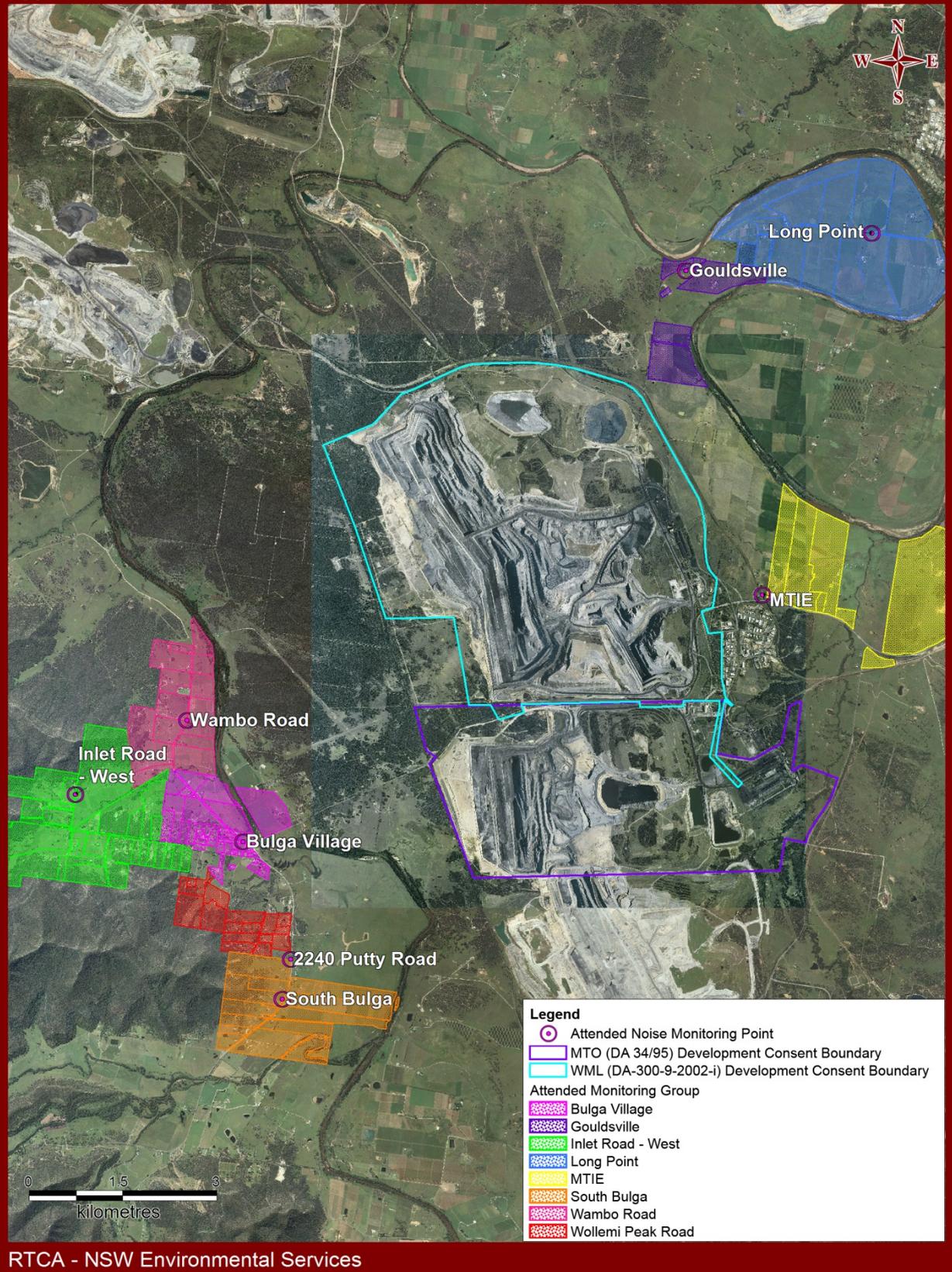
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Attended noise monitoring results from each monitoring location will be assessed against the relevant impact assessment and land acquisition criteria as listed in Table 2 of the Interim noise monitoring programme. In the event of an exceedance of the prescribed criteria, the landowner will be notified in writing.

A review of represented receivers along with property ownership status will be undertaken on an annual basis. Environmental Services will maintain a register of property ownership. The attended monitoring location and the receptors that it represents are shown in Figure 1.

**Mount Thorley Warkworth  
Noise Monitoring Programme  
Appendix 2: Representation of Private Residences**

Date: 140717  
Plan By: DS  
Version: 1.5



## Appendix B – Consultation with the EPA

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12 March 2014

Environmental Protection Authority NSW  
PO Box 448G  
NEWCASTLE NSW 2300

**ATTN: Bill George**

Dear Bill

**RE: Coal & Allied Operations – EPA Consultation on Noise, Air Quality,  
Blasting and Water Management Plans**

We refer to relevant conditions in contemporary Approvals granted under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act), requiring Coal and Allied to consult with the EPA during development of Environmental Management Plans for Noise, Air Quality and Greenhouse Gas, Blasting, and Water.

We note that the EPA has previously advised (including letter from the EPA to Hunter Valley Operations, reference DOC13/22620, LIC07/2074-07), that while "*the...EPA encourages the development of such plans... [the] EPA does not review these documents as our role is...not to be directly involved in the development of strategies to achieve those objectives*".

We therefore write seeking confirmation on whether EPA requires to be consulted on the drafting of such plans for Coal & Allied's mining operations in the Hunter Valley in future.

We would be grateful if you could please advise of the EPA's position in this regard by 30 April 2014.

We look forward to hearing from you.

Yours sincerely

A handwritten signature in blue ink, appearing to be "Andrew Speechly", written over a faint circular stamp or watermark.

**Coal & Allied Operations Pty Ltd**  
ABN 16 000 023 656

Lemington Road, Ravensworth via Singleton NSW 2330 Australia  
PO Box 315 Singleton NSW 2330 Australia  
Telephone +61 2 6570 0300 Facsimile +61 2 6570 0399

**Andrew Speechly**  
Manager Environment NSW  
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[Andrew.Speechly@riotinto.com](mailto:Andrew.Speechly@riotinto.com) <http://www.riotintocoalaustralia.com.au>



Your reference:  
Our reference: DOC14/115042, EF13/2793  
Contact: Bill George (02) 4908 6821  
Electronic correspondence to: [hunter.region@epa.nsw.gov.au](mailto:hunter.region@epa.nsw.gov.au)

Coal & Allied Operations Pty Ltd  
PO Box 315  
Singleton NSW 2330

Attention: Andrew Speechly

Dear Mr Speechly

**RE: COAL & ALLIED OPERATIONS – EPA CONSULTATION ON NOISE, AIR QUALITY  
BLASTING AND WATER MANAGEMENT PLANS**

I refer to your letter to the Environment Protection Authority (EPA) dated 12 March 2014 seeking confirmation that the EPA does not require to be consulted on Management Plans. I apologise for the delay in responding to your letter.

As stated previously, the EPA encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, the EPA does not review these documents as our role is to set environmental objectives for environmental management, not to be directly involved in the development of strategies to achieve those objectives.

The EPA therefore confirms that we do not wish to be consulted on the drafting and/or the review of management plans.

If you wish require any further information regarding this advice please contact me on (02) 4908 6821.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Bill George', followed by the date '2.7.14'.

**BILL GEORGE**  
Head Regional Operations Unit – Hunter  
Environment Protection Authority

## Appendix C – Detailed Baseline Data

Baseline data presented is sourced from attended compliance monitoring data for the periods January - September 2012, and July – December 2013. The period October 2012 – June 2013 is not presented, as the monitoring data collected during this period was collected with respect to the noise emissions from the *Mount Thorley Warkworth Mine Complex*, and thus is not comparable to the noise criteria in the approvals, and is not considered relevant.

The data is presented on a 'per monitoring location, per mine' basis and represents the 15minute  $L_{Aeq}$  determination from the direction of interest (either of WML or MTO).

Where a monitoring result is recorded as 'not measurable', this denotes that the site of interest was audible, but at such low levels as to prevent accurate determination of the noise level.

### 154 Broke Road

Location	Date and Time	$L_{Aeq}$ (15min) - Warkworth Mine (dB(A))
154 Broke Rd	17/02/2012 1:03	Inaudible
154 Broke Rd	23/02/2012 13:04	Inaudible
154 Broke Rd	29/02/2012 2:02	36
154 Broke Rd	12/03/2012 0:36	28
154 Broke Rd	27/03/2012 1:25	Inaudible
154 Broke Rd	8/05/2012 11:58	Not Measurable
154 Broke Rd	15/05/2012 1:44	<25
154 Broke Rd	22/06/2012 1:18	36
154 Broke Rd	24/06/2012 1:34	Not Measurable
154 Broke Rd	29/06/2012 1:48	Not Measurable
154 Broke Rd	19/07/2012 1:37	Inaudible
154 Broke Rd	5/09/2012 2:04	35
154 Broke Rd	13/09/2012 1:16	Inaudible
154 Broke Rd	16/09/2012 22:13	35

### 1893 Putty Road

Location	Date and Time	$L_{Aeq}$ (15min) - Warkworth Mine (dB(A))
1893 Putty Rd	16/02/2012 23:04	32
1893 Putty Rd	23/02/2012 9:44	<30
1893 Putty Rd	28/02/2012 23:58	30
1893 Putty Rd	11/03/2012 23:04	38
1893 Putty Rd	26/03/2012 23:38	Inaudible
1893 Putty Rd	8/05/2012 11:00	Not Measurable
1893 Putty Rd	14/05/2012 23:56	Inaudible
1893 Putty Rd	21/06/2012 23:16	29
1893 Putty Rd	23/06/2012 23:41	Not Measurable
1893 Putty Rd	28/06/2012 23:57	Not Measurable
1893 Putty Rd	18/07/2012 23:54	Inaudible
1893 Putty Rd	4/09/2012 23:14	37

1893 Putty Rd	12/09/2012 23:33	35
1893 Putty Rd	17/09/2012 0:42	Inaudible

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
1893 Putty Rd	16/02/2012 23:04	35
1893 Putty Rd	23/02/2012 9:44	<30
1893 Putty Rd	28/02/2012 23:58	37
1893 Putty Rd	11/03/2012 23:04	38
1893 Putty Rd	26/03/2012 23:38	38
1893 Putty Rd	8/05/2012 11:00	Inaudible
1893 Putty Rd	14/05/2012 23:56	27
1893 Putty Rd	21/06/2012 23:16	Inaudible
1893 Putty Rd	23/06/2012 23:41	36
1893 Putty Rd	28/06/2012 23:57	39
1893 Putty Rd	18/07/2012 23:54	30
1893 Putty Rd	4/09/2012 23:14	37
1893 Putty Rd	12/09/2012 23:33	39
1893 Putty Rd	17/09/2012 0:42	40

### **367 Wambo Road**

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
367 Wambo Rd	16/02/2012 23:33	35
367 Wambo Rd	23/02/2012 11:24	25
367 Wambo Rd	29/02/2012 0:30	35
367 Wambo Rd	12/03/2012 1:18	31
367 Wambo Rd	26/03/2012 23:09	34
367 Wambo Rd	8/05/2012 10:33	Inaudible
367 Wambo Rd	14/05/2012 22:00	< 25
367 Wambo Rd	21/06/2012 23:42	Inaudible
367 Wambo Rd	23/06/2012 23:15	Not Measurable
367 Wambo Rd	28/06/2012 23:29	35
367 Wambo Rd	18/07/2012 23:24	23
367 Wambo Rd	4/09/2012 23:43	31
367 Wambo Rd	12/09/2012 23:06	33
367 Wambo Rd	16/09/2012 23:45	36

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
367 Wambo Rd	16/02/2012 23:33	Inaudible
367 Wambo Rd	23/02/2012 11:24	Inaudible
367 Wambo Rd	29/02/2012 0:30	Inaudible
367 Wambo Rd	12/03/2012 1:18	30
367 Wambo Rd	26/03/2012 23:09	Inaudible
367 Wambo Rd	8/05/2012 10:33	Inaudible
367 Wambo Rd	14/05/2012 22:00	30

367 Wambo Rd	21/06/2012 23:42	Inaudible
367 Wambo Rd	23/06/2012 23:15	Inaudible
367 Wambo Rd	28/06/2012 23:29	Not Measurable
367 Wambo Rd	18/07/2012 23:24	Inaudible
367 Wambo Rd	4/09/2012 23:43	Inaudible
367 Wambo Rd	12/09/2012 23:06	Inaudible
367 Wambo Rd	16/09/2012 23:45	Inaudible

**Bulga Village**

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
Bulga Village	17/02/2012 0:23	35
Bulga Village	23/02/2012 10:47	Inaudible
Bulga Village	29/02/2012 1:20	32
Bulga Village	12/03/2012 0:02	34
Bulga Village	26/03/2012 22:43	Inaudible
Bulga Village	8/05/2012 9:34	27
Bulga Village	14/05/2012 22:33	Inaudible
Bulga Village	22/06/2012 0:39	28
Bulga Village	23/06/2012 22:39	Not Measurable
Bulga Village	28/06/2012 22:39	<30
Bulga Village	18/07/2012 22:40	Inaudible
Bulga Village	4/09/2012 22:00	Not Measurable
Bulga Village	5/09/2012 1:14	35
Bulga Village	12/09/2012 22:34	38
Bulga Village	16/09/2012 23:06	Inaudible
Bulga Village	17/09/2012 0:10	Not Measurable
Bulga Village	31/07/2013 23:31	Not Measurable
Bulga Village	8/08/2013 23:28	Inaudible
Bulga Village	19/09/2013 23:17	<20
Bulga Village	9/10/2013 23:23	38
Bulga Village	20/11/2013 23:28	32
Bulga Village	12/12/2013 23:20	29

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
Bulga Village	17/02/2012 0:23	35
Bulga Village	23/02/2012 10:47	26
Bulga Village	29/02/2012 1:20	32
Bulga Village	12/03/2012 0:02	35
Bulga Village	26/03/2012 22:43	37
Bulga Village	8/05/2012 9:34	Inaudible
Bulga Village	14/05/2012 22:33	<25
Bulga Village	22/06/2012 0:39	Inaudible
Bulga Village	23/06/2012 22:39	35
Bulga Village	28/06/2012 22:39	36
Bulga Village	18/07/2012 22:40	Inaudible

Bulga Village	4/09/2012 22:00	41
Bulga Village	5/09/2012 1:14	35
Bulga Village	12/09/2012 22:34	34
Bulga Village	16/09/2012 23:06	42
Bulga Village	17/09/2012 0:10	36
Bulga Village	31/07/2013 23:31	29
Bulga Village	8/08/2013 23:28	Inaudible
Bulga Village	19/09/2013 23:17	Inaudible
Bulga Village	9/10/2013 23:23	Inaudible
Bulga Village	20/11/2013 23:28	Not Measurable
Bulga Village	12/12/2013 23:20	<25

### South Bulga

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
South Bulga	17/02/2012 0:00	32
South Bulga	23/02/2012 10:17	Inaudible
South Bulga	29/02/2012 0:58	Not Measurable
South Bulga	11/03/2012 23:37	33
South Bulga	26/03/2012 22:19	Inaudible
South Bulga	8/05/2012 9:58	Inaudible
South Bulga	14/05/2012 23:32	Inaudible
South Bulga	22/06/2012 0:11	29
South Bulga	23/06/2012 22:01	Inaudible
South Bulga	28/06/2012 22:11	Inaudible
South Bulga	18/07/2012 22:04	Inaudible
South Bulga	5/09/2012 0:13	Inaudible
South Bulga	12/09/2012 22:01	Inaudible
South Bulga	16/09/2012 22:44	Inaudible
South Bulga	1/08/2013 0:56	Inaudible
South Bulga	9/08/2013 1:12	Inaudible
South Bulga	20/09/2013 0:56	33
South Bulga	10/10/2013 0:47	Inaudible
South Bulga	21/11/2013 0:51	Inaudible
South Bulga	13/12/2013 0:41	Inaudible

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
South Bulga	17/02/2012 0:00	32
South Bulga	23/02/2012 10:17	Inaudible
South Bulga	29/02/2012 0:58	33
South Bulga	11/03/2012 23:37	34
South Bulga	26/03/2012 22:19	37
South Bulga	8/05/2012 9:58	Inaudible
South Bulga	14/05/2012 23:32	<25
South Bulga	22/06/2012 0:11	Inaudible
South Bulga	23/06/2012 22:01	30

South Bulga	28/06/2012 22:11	34
South Bulga	18/07/2012 22:04	Inaudible
South Bulga	5/09/2012 0:13	36
South Bulga	12/09/2012 22:01	35
South Bulga	16/09/2012 22:44	37
South Bulga	1/08/2013 0:56	30
South Bulga	9/08/2013 1:12	<25
South Bulga	20/09/2013 0:56	Inaudible
South Bulga	10/10/2013 0:47	30
South Bulga	21/11/2013 0:51	35
South Bulga	13/12/2013 0:41	31

**MTIE**

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
MTIE	31/07/2013 23:01	42
MTIE	8/08/2013 22:57	43
MTIE	19/09/2013 22:48	44
MTIE	9/10/2013 22:54	44
MTIE	20/11/2013 22:59	Inaudible
MTIE	12/12/2013 22:50	Inaudible

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
MTIE	16/02/2012 22:00	Inaudible
MTIE	23/02/2012 12:35	Inaudible
MTIE	28/02/2012 22:00	Not Measurable
MTIE	11/03/2012 22:00	Not Measurable
MTIE	27/03/2012 0:59	Not Measurable
MTIE	8/05/2012 12:29	Inaudible
MTIE	15/05/2012 0:35	41
MTIE	21/06/2012 22:12	Inaudible
MTIE	24/06/2012 0:11	Not Measurable
MTIE	29/06/2012 0:33	42
MTIE	19/07/2012 1:08	Inaudible
MTIE	4/09/2012 22:00	Inaudible
MTIE	13/09/2012 0:53	Not Measurable
MTIE	31/07/2013 23:01	Not Measurable
MTIE	8/08/2013 22:57	Not Measurable
MTIE	19/09/2013 22:48	Inaudible
MTIE	9/10/2013 22:54	Not Measurable
MTIE	20/11/2013 22:59	<35
MTIE	12/12/2013 22:50	35

**Gouldsville Road**

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
Gouldsville Rd	31/07/2013 22:34	<35

Gouldsville Rd	8/08/2013 22:27	42
Gouldsville Rd	19/09/2013 22:23	Inaudible
Gouldsville Rd	9/10/2013 22:26	<35
Gouldsville Rd	20/11/2013 22:27	31
Gouldsville Rd	12/12/2013 22:25	37

Location	Date and Time	LAeq (15min) - Mount Thorley Mine (dB(A))
Gouldsville Rd	16/02/2012 22:29	Inaudible
Gouldsville Rd	23/02/2012 12:01	Inaudible
Gouldsville Rd	28/02/2012 22:30	Inaudible
Gouldsville Rd	11/03/2012 22:29	Inaudible
Gouldsville Rd	27/03/2012 0:22	Inaudible
Gouldsville Rd	8/05/2012 13:00	Inaudible
Gouldsville Rd	14/05/2012 22:36	Inaudible
Gouldsville Rd	15/05/2012 1:10	Inaudible
Gouldsville Rd	21/06/2012 22:41	Inaudible
Gouldsville Rd	24/06/2012 0:51	Inaudible
Gouldsville Rd	29/06/2012 1:18	Inaudible
Gouldsville Rd	19/07/2012 0:32	Inaudible
Gouldsville Rd	4/09/2012 22:34	Inaudible
Gouldsville Rd	13/09/2012 0:25	Inaudible
Gouldsville Rd	17/09/2012 1:15	Inaudible
Gouldsville Rd	31/07/2013 22:34	Inaudible
Gouldsville Rd	8/08/2013 22:27	Inaudible
Gouldsville Rd	19/09/2013 22:23	Inaudible
Gouldsville Rd	9/10/2013 22:26	Inaudible
Gouldsville Rd	20/11/2013 22:27	Inaudible
Gouldsville Rd	12/12/2013 22:25	Inaudible

**Inlet Road West**

Location	Date and Time	LAeq (15min) - Warkworth Mine (dB(A))
Inlet Road West	1/08/2013 0:27	Inaudible
Inlet Road West	9/08/2013 0:20	<20
Inlet Road West	20/09/2013 0:06	Inaudible
Inlet Road West	10/10/2013 0:17	<20
Inlet Road West	21/11/2013 0:21	31
Inlet Road West	13/12/2013 0:14	28

Location	Date and Time	LAeq (15min) - Mount Thorley Mine (dB(A))
Inlet Road West	1/08/2013 0:27	27
Inlet Road West	9/08/2013 0:20	<20
Inlet Road West	20/09/2013 0:06	Inaudible
Inlet Road West	10/10/2013 0:17	Inaudible
Inlet Road West	21/11/2013 0:21	Not Measurable

Inlet Road West	13/12/2013 0:14	Not Measurable
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**Long Point**

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
Long Point	31/07/2013 22:01	32
Long Point	8/08/2013 22:00	36
Long Point	19/09/2013 22:00	34
Long Point	9/10/2013 22:00	34
Long Point	20/11/2013 22:00	Inaudible
Long Point	12/12/2013 22:01	Inaudible

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
Long Point	31/07/2013 22:01	Inaudible
Long Point	8/08/2013 22:00	Inaudible
Long Point	19/09/2013 22:00	Inaudible
Long Point	9/10/2013 22:00	Inaudible
Long Point	20/11/2013 22:00	Inaudible
Long Point	12/12/2013 22:01	Inaudible

**Wollemi Peak Road**

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
Wollemi Peak Rd	1/08/2013 1:17	Inaudible
Wollemi Peak Rd	9/08/2013 0:47	Inaudible
Wollemi Peak Rd	20/09/2013 0:32	25
Wollemi Peak Rd	10/10/2013 1:11	Inaudible
Wollemi Peak Rd	21/11/2013 1:14	30
Wollemi Peak Rd	13/12/2013 1:05	Inaudible

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
Wollemi Peak Rd	1/08/2013 1:17	31
Wollemi Peak Rd	9/08/2013 0:47	27
Wollemi Peak Rd	20/09/2013 0:32	Inaudible
Wollemi Peak Rd	10/10/2013 1:11	30
Wollemi Peak Rd	21/11/2013 1:14	36
Wollemi Peak Rd	13/12/2013 1:05	32

**Wambo Road**

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
Wambo Rd	31/07/2013 23:59	Inaudible
Wambo Rd	8/08/2013 23:51	Inaudible
Wambo Rd	19/09/2013 23:39	Inaudible
Wambo Rd	9/10/2013 23:49	<25
Wambo Rd	20/11/2013 23:52	32
Wambo Rd	12/12/2013 23:46	27

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
Wambo Rd	31/07/2013 23:59	25
Wambo Rd	8/08/2013 23:51	22
Wambo Rd	19/09/2013 23:39	Inaudible
Wambo Rd	9/10/2013 23:49	Inaudible
Wambo Rd	20/11/2013 23:52	<25
Wambo Rd	12/12/2013 23:46	Inaudible

**Warkworth**

Location	Date and Time	L <sub>Aeq</sub> (15min) - Warkworth Mine (dB(A))
Warkworth	23/07/2013 23:16	38
Warkworth	29/08/2013 2:29	Not Measurable
Warkworth	19/09/2013 2:02	Inaudible
Warkworth	15/10/2013 22:35	Inaudible
Warkworth	21/11/2013 1:13	Not Measurable
Warkworth	18/12/2013 0:00	Not Measurable

Location	Date and Time	L <sub>Aeq</sub> (15min) - Mount Thorley Mine (dB(A))
Warkworth	23/07/2013 23:16	Inaudible
Warkworth	29/08/2013 2:29	Inaudible
Warkworth	19/09/2013 2:02	Inaudible
Warkworth	15/10/2013 22:35	Inaudible
Warkworth	21/11/2013 1:13	Inaudible
Warkworth	18/12/2013 0:00	Inaudible



## Appendix D

### MTW blast management plan



Appendix D — MTW blast management plan

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D

MOUNT THORLEY WARKWORTH  
BLAST MANAGEMENT PLAN

Prepared by Rio Tinto Coal Australia | 10 September 2014



## BLAST MANAGEMENT PLAN

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### Document control

Version	Date	Prepared by	Reviewed by
1.0	31/08/2012	Nicola Proctor	Mark Nolan
2.0	31/03/2014	Gerard Gleeson	Andrew Speechly

### Revisions

Version	Date	Revision Description	Author	Approved by
1.0	31/08/2012	Draft as submitted to Department of Planning and Infrastructure.	Nicola Proctor	Mark Nolan
1.1	26/09/2012	Final draft submitted to Department of Planning and Infrastructure for approval.	Kelly O'Mullane	Mark Nolan
1.2	30/10/2012	Revised final draft submitted to Department of Planning and Infrastructure for approval and approved by the Director-General on 31/10/2012.	Kelly O'Mullane	Mark Nolan
2.0	31/03/2014	Major revision following Warkworth Modification 6 Approval	Gerard Gleeson	Andrew Speechly
2.1	25/07/2014	V2.0 revised incorporating DP&E feedback / comments	Gerard Gleeson	Andrew Speechly
2.2	08/09/2014	V2.1 revised incorporating DP&E feedback / comments	Gerard Gleeson	Andrew Speechly
2.3	10/09/2014	Formatting and finalisation following DP&E Approval	Gerard Gleeson	Andrew Speechly

## DEFINITIONS

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<b>Term</b>	<b>Definition</b>
<b>Airblast/Overpressure</b>	An airborne shock wave resulting from detonation of explosives. An airblast may be caused by blasted material movement or the release of expanding gas into the air.
<b>Blast</b>	Refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.
<b>Blasting</b>	Any activity involving the use of explosives for the purpose of producing an explosion to fragment rock for mining in the mining area (excludes small blasts for ancillary purposes including, without limitation, removing rock from coal crusher).
<b>dB(LinPeak)</b>	The peak sound pressure level expressed as decibels with no frequency weighting.
<b>Flyrock</b>	Rock that is propelled outside of the blasting area through the air or along the ground as a result of the detonation of explosives.
<b>Ground vibration</b>	The movement of the ground caused by the blast wave emanating from the blast.
<b>Particle Velocity</b>	A measure of ground vibration. Particulate velocity describes the velocity at which a particle of ground vibrates when excited by a seismic wave.

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# CONTENTS

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DEFINITIONS	3
CONTENTS	4
1.1 Introduction	7
1.2 Scope of the Blast Management Plan	7
1.3 Objectives	22
<b>2. REGULATORY REQUIREMENTS</b>	<b>24</b>
2.1 Background	24
2.2 Project Approvals	24
2.2.1 2013 Land & Environment Court Judgment	24
2.3 Environmental Protection Licence	24
2.4 Dangerous Goods	24
2.5 Commitments Made in Environmental Assessments	24
<b>3. CONSULTATION</b>	<b>24</b>
3.1 Government Agencies	25
3.1.1 EPA	25
3.1.2 Singleton Shire Council (SSC)	25
3.1.3 Roads and Maritime Service (RMS)	25
3.2 Nearby Mines	25
<b>4. EXISTING CHARACTER &amp; IMPACT ASSESSMENT CRITERIA</b>	<b>26</b>
4.1 Existing Character	26
4.2 Impact Assessment Criteria	28
4.2.1 Residence on Privately Owned Land	28
4.2.2 Public Infrastructure	28
4.3 Heritage Features	28
4.3.1 St. Phillips Church	28
4.3.2 Wambo homestead	28
4.3.3 Aboriginal Grinding Groove sites	28
<b>5. BLAST MANAGEMENT CONTROLS</b>	<b>28</b>
5.1 Introduction	28
5.2 Operational controls	29
5.2.1 Blasting Hours	29
5.2.2 Blasting Frequency	29
5.2.3 Limitations on Blasting	29
5.2.4 Meteorological considerations	29

5.2.5	Best Practice measures	30
5.2.6	Notifying Interested Parties	30
5.2.7	Further Developments	30
5.2.8	Monitoring and Administration	30
5.3	Management of Flyrock	31
5.4	Road closure	31
5.5	Management of Unpredicted Impacts	31
5.5.1	Blast Fume	31
5.5.2	Airblast overpressure / Ground Vibration exceedance	31
5.6	Continuous Improvement	31
5.7	Monitoring Programme	32
<b>6.</b>	<b>PROPERTY INVESTIGATIONS AND INSPECTIONS</b>	<b>32</b>
6.1	Property Inspections	32
6.2	Property Investigations	32
6.3	Independent Review and Land Acquisition Process	32
<b>7.</b>	<b>IMPLEMENTATION OF THE BMP</b>	<b>32</b>
7.1	Reporting	32
7.1.1	Internal reporting	32
7.1.2	External Reporting	32
7.1.2.1	Emergency / Non-compliance reporting	32
7.1.2.2	Regular reporting	33
7.2	Complaints Management	33
7.3	Review of this Management Plan	34
7.4	Roles and Responsibilities	35

PREFACE  
BLAST MANAGEMENT PLAN





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Mr Gerard Gleeson  
Environmental Specialist – Systems and Monitoring  
Coal & Allied – Rio Tinto Coal Australia.  
PO Box 315  
SINGLETON NSW 2330

Our ref: 34/95  
300-9-2002-i

Dear Gerard

**Management Plan Approval  
Warkworth Extension Project (300-9-2002-i) &  
Mt Thorley Coal Mine (DA 34/95)  
Blast and Water Management Plans**

On 31<sup>st</sup> March 2014 we received a copy of the Mt Thorley – Warkworth Complex wide Blast Management Plan for review. On the 19<sup>th</sup> June we subsequently received a Water Management Plan for review. The Blast Management Plan included road closure requirements. The Water Management Plan included a Site Water Balance, Surface Water Management Plan and a Ground Water Management Plan.

These 2 management plans were required by Conditions 29 and 35 Schedule 4 of the January 2014 Warkworth Mine modified approval. These plans apply to both the Warkworth and Mt Thorley mines.

I advise that the Secretary, Dept. of Planning & Environment has approved the Blast and Water Management Plans. It is noted that the NSW Office of Water provided extensive comment to the Water Management Plan and you responded accordingly on the 3<sup>rd</sup> September 2014. Should the NSW Office of Water provide a further update to your response, we may need to re-review and re-approve the Water Management Plan.

Would you please forward the final version of the 2 plans and annexures in two files for the Department's records by the 30<sup>th</sup> September 2014.

Should you have any enquiries on this matter please contact Scott Brooks on (02) 6575 3401.

Yours sincerely

Scott Brooks  
**Team Leader, Compliance  
Singleton**

*10-9-2014*

As Nominee for the Secretary, Dept. of Planning & Environment.

## PREFACE

**1.1 Introduction**

Mount Thorley Warkworth (MTW) is an integrated operation of two open cut mines, Warkworth Mining Limited (WML) and Mount Thorley Operations (MTO) which are located adjacent to each other and 15 km south west of Singleton in the Hunter Valley region of New South Wales. The operation supplies international and domestic markets with semi-soft coking coal and thermal coal.

MTW is an open cut mine, using dragline and truck and shovel method. Employees work in shifts to keep the mine operational 24 hours a day, seven days a week.

Operations are centred in the Whittingham Coal Measures of the Hunter Coalfield which is part of a Permian coal basin known as the Sydney basin.

In 2013 MTW produced more than 12.4 million tonnes of saleable coal.

After being washed and prepared for sale, the coal is loaded onto trains for transportation to Newcastle where it is shipped to international customers via the Port Waratah Coal Terminal.

The WML Development Consent (DA 300-9-2002-i) was granted on 19 May 2003. The development consent was modified (Modification 6) on 29 January 2014. This modification is described in detail in the Environmental Assessment (Warkworth Modification 6 Environmental Assessment (November 2013)). The MTO project was approved on 22 June 1996 (DA 34/95) and was most recently modified on 2 May 2012 (MTO Project Approval). The MTO project is described in detail in the Statement of Environmental Effects (SEE) which supported the application for modification which was approved in May 2012 (EMGA, 2010). The WML and MTO Approvals (jointly referred to herein as the Approvals) have separate blasting criteria.

This Blast Management Plan (BMP) is the primary tool that will be utilised to reduce potential Blast impacts related to the Project.

**1.2 Scope of the Blast Management Plan**

This BMP was prepared by Rio Tinto Coal Australia in accordance with Schedule 4, Condition 29 (WML) and Schedule 3, Condition 20 (MTO) of the Approvals to manage project specific and cumulative blasting impacts associated with MTW mining operations. As required by the Approvals, this BMP has been prepared in consultation with the EPA. Copies of communication with the EPA are included as Appendix C.

This BMP was submitted to the Director-General of the NSW Department of Planning & Infrastructure (DP&I) for approval on 28 March 2014. If Coal & Allied has not received any feedback on this BMP from DP&I within 3 months of the date of its submission, Coal & Allied will assume the plan is fit for purpose and will commence implementation unless or until advised otherwise by the Director-General.

MTW maintains three (3) Environment Protection Licences (EPL's) issued under the Protection of the Environment Operations Act by the NSW Environment Protection Agency. EPL's 1376 (WML) and 1976 (MTO) contain operating conditions relating to blasting activity. These conditions are also addressed in this BMP (Table 1.3). This BMP is to be applied from the time of approval of this plan, during construction and operation of the Project and incorporates mitigation measures that MTW will employ to effectively manage blasting activities. Table 1.1 below highlights the conditions required to be covered by this BMP and the sections within this document in which they are addressed.

Table 1.2 highlights where items in the Statement of Commitments (SOC) related to blasting impacts are addressed in this BMP.

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
Mount Thorley Development Consent (DA 34/95)		

Sch. 3 Cond. 11	<p><b>Blasting Criteria</b></p> <p>The Applicant shall ensure that the blasting on site does not cause exceedances of the criteria in Table 7.</p>	Appendix E - Blast Monitoring Programme
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Table 7: Blast impact criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50, or alternatively a specific limit determined to the satisfaction of the Director-General by the structural design methodology in AS 2187.2-2006, or its latest version	

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

Sch. 3 Cond. 12	<p>The Applicant shall ensure that blasting on the site does not damage:</p> <ol style="list-style-type: none"> <li>a) The Wambo Homestead, Bulga Bridge, or St Phillips Church;</li> <li>b) Aboriginal grinding groove sites:                             <ul style="list-style-type: none"> <li>• MTW-266 - WSW-09-22</li> <li>• MTW-267 - WSW-09-22</li> <li>• MTW-268 - WSW-09-23; and</li> </ul> </li> <li>c) Aboriginal grinding groove site Mt Thorley M 37-6-0163 (before it is relocated)</li> </ol> <p><i>Note: To identify the Aboriginal grinding grooves referred to above, see the applicable figure in Appendix 5.</i></p>	Section 4.3
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Sch. 3 Cond. 13	<p><b>Blasting Hours</b></p> <p>The Applicant shall only carry out blasting on site between 7am and 5pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Director-General.</p>	Section 5.2.1
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Sch. 3 Cond. 14	<p><b>Blasting Frequency</b></p> <p>The Applicant may carry out a maximum of:</p> <ol style="list-style-type: none"> <li>a) 3 blasts a day, unless an additional blast is required following a blast misfire; and</li> <li>b) 15 blasts a week, averaged over a calendar year,</li> </ol> <p>For all operations at the Mt Thorley-Warkworth mine complex.</p> <p>This condition does not apply to blasts that generate ground vibration of 0.5mm/s or less at any residence on privately-owned land, or blasts required to ensure the safety of the mine or its workers.</p> <p><i>Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired</i></p>	Section 5.2.2
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Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
	<i>in quick succession in a discrete area of the mine.</i>	
Sch. 3 Cond. 15	The Applicant shall not carry out more than 1 blast a day within 500 metres of the Putty Road and Golden Highway.	Section 5.2.3
Sch. 3 Cond. 16	<p><b>Property Inspections</b></p> <p>If the Applicant receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open cut mining pit/s on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to: <ul style="list-style-type: none"> <li>• Establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and</li> <li>• Identify measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and/or structures; and</li> </ul> </li> <li>b) Give the landowner a copy of the new or updated property inspection report.</li> </ol> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Director-General for resolution.</p>	Section 6.1
Sch. 3 Cond. 17	<p><b>Property Investigations</b></p> <p>If the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and</li> <li>b) Give the landowner a copy of the property inspection report.</li> </ol> <p>If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant shall repair the damage to the satisfaction of the Director- General.</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.</p>	Section 6.2
Sch. 3 Cond. 18	<p><b>Operating Conditions</b></p> <p>During mining operations on site, the Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Implement best management practice to: <ul style="list-style-type: none"> <li>• Protect the safety of people and livestock in the surrounding area;</li> <li>• Protect public or private infrastructure / property in the surrounding area from any damage; and</li> <li>• Minimise the dust and fume emissions of any blasting;</li> </ul> </li> <li>b) Minimise the frequency and duration of any road closures, and avoid road closures during peak traffic periods;</li> <li>c) Co-ordinate the timing of blasting on site with the timing of blasting at nearby mines (including the Bulga, Wambo, and Hunter Valley Operations mines) to minimise the cumulative blasting impacts of these mines and the Mt Thorley – Warkworth mine complex; and</li> <li>d) Operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site, <p>To the satisfaction of the Director-General.</p> </li></ol>	Sections 3.2, 5.2.4, 5.2.5, and 5.2.6
Sch. 3 Cond. 19	<p>The Applicant shall not undertake blasting on site within 500m of:</p> <ol style="list-style-type: none"> <li>a) Any public road without the approval of the appropriate road authority; or</li> <li>b) Any land outside the site that is not owned by the Applicant, unless: <ul style="list-style-type: none"> <li>• The Applicant has a written agreement with the relevant landowner to allow blasting to be carried</li> </ul> </li> </ol>	Section 5.2.3

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
	<p>out closer to the land, and the Applicant has advised the Department in writing of the terms of this agreement, or</p> <ul style="list-style-type: none"> <li>• The Applicant has: <ul style="list-style-type: none"> <li>○ Demonstrated to the satisfaction of the Director-General that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and</li> <li>○ Updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land.</li> </ul> </li> </ul>	
Sch. 3 Cond. 20	<p><b>Blast Management Plan</b></p> <p>The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Director-General. This plan must:</p> <ol style="list-style-type: none"> <li>a) Be submitted to the Director-General for approval by the end of September 2012;</li> <li>b) Propose and justify any alternate ground vibration limits for any public infrastructure in the vicinity of the site;</li> <li>c) Describe the measures that would be implemented to ensure <ul style="list-style-type: none"> <li>• Best management practice is being employed;</li> <li>• Compliance with the relevant conditions of this consent;</li> </ul> </li> <li>d) Include a road closure management plan for blasting within 500 metres of a public road, that has been prepared in consultation with RMS and Council;</li> <li>e) Include a monitoring program for evaluating the performance of the development, including <ul style="list-style-type: none"> <li>• Compliance with the applicable criteria;</li> <li>• Any blasting impacts on the heritage items specified in condition 12 above; and</li> <li>• Minimising the fume emissions from the site; and</li> </ul> </li> <li>f) Include a protocol that has been prepared in consultation with the owners of nearby mines (including the Bulga, Wambo and Hunter Valley Operations mines) to minimise the cumulative blasting impacts of these mines and the Mt Thorley-Warkworth mine complex.</li> </ol>	This BMP
Sch. 4 Cond. 3	<p><b>Notification of Landowners / Tenants</b></p> <p>As soon as practicable after obtaining monitoring results showing:</p> <ol style="list-style-type: none"> <li>a) An exceedance of any relevant criteria in Schedule 3, the Applicant shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria</li> </ol>	Section 7.1.2.1
Sch. 4 Cond. 4	<p><b>Independent Review</b></p> <p>If an owner of privately-owned land considers the development to be exceeding the criteria in schedule 3, then he/she may ask the Director-General in writing for an independent review of the impacts of the development on his/her land.</p> <p>If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-General's decision, the Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the Director-General, to: <ul style="list-style-type: none"> <li>• Consult with the landowner to determine his / her concerns;</li> <li>• Conduct monitoring to determine with the development is complying with the relevant impact assessment criteria in schedule 3; and</li> <li>• If the development is not complying with these criteria then: <ul style="list-style-type: none"> <li>○ Determine if more than one mine is responsible for the exceedance, and if so the relative share of each mine regarding the impact on the land;</li> <li>○ Identify the measures that could be implemented to ensure compliance with the relevant criteria; and</li> </ul> </li> </ul> </li> </ol>	Section 6.3

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
Sch. 4 Cond. 5	<p>b) Give the Director-General and landowner a copy of the independent review.</p> <p>If the independent review determines that the development is complying with the criteria in schedule 3, then the Applicant may discontinue the independent review with the approval of the Director-General.</p> <p>If the independent review determines that the development is not complying with the relevant criteria in schedule 3, and that the development is primarily responsible for this non-compliance, then the Applicant shall:</p> <ol style="list-style-type: none"> <li>Implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until the development complies with the relevant criteria; or</li> <li>Secure a written agreement with the landowner to allow exceedances of the relevant impact assessment criteria,</li> </ol> <p>To the satisfaction of the Director-General.</p> <p>If the independent review determines that the development is not complying with the relevant acquisition criteria, and that the development is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Applicant shall acquire all or part of the landowner's land in accordance with the procedures in condition 7-8 below.</p>	Section 6.3
Sch. 4 Cond. 6	<p>If the independent review determines that the relevant criteria are being exceeded, but that more than one mine is responsible for this exceedance, then together with the relevant mine/s the Applicant shall:</p> <ol style="list-style-type: none"> <li>Implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until the development complies with the relevant criteria; or</li> <li>Secure a written agreement with the landowner to allow exceedances of the relevant impact assessment criteria,</li> </ol> <p>To the satisfaction of the Director-General.</p> <p>If the independent review determines that the development is not complying with the relevant acquisition criteria in schedule 3, but that more than one mine is responsible for this noncompliance, then upon receiving a written request from the landowner, the Applicant shall acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s, in accordance with the procedures in conditions 7-8 below.</p>	Section 6.3
Sch. 5 Cond. 2	<p><b>Adaptive Management</b></p> <p>The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&amp;A Act or EP&amp;A Regulation.</p> <p>Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity:</p> <ol style="list-style-type: none"> <li>Take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;</li> <li>Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measured or other course of action; and</li> <li>Implement remediation measures as directed by the Director-General,</li> </ol> <p>To the satisfaction of the Director-General.</p>	Section 5.5
Sch. 5 Cond. 3	<p><b>Management Plan Requirements</b></p> <p>The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <ol style="list-style-type: none"> <li>Detailed baseline data;</li> <li>A description of <ul style="list-style-type: none"> <li>• The relevant statutory requirements (including any relevant consent, licence or lease conditions);</li> <li>• Any relevant limits or performance measures / criteria;</li> <li>• The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development of any management measures;</li> </ul> </li> <li>A description of the measures that would be implemented to comply with the relevant statutory</li> </ol>	<p>Appendix F - Detailed Baseline Data</p> <p>Section 2</p>

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
	<p>requirements, limits, or performance measures / criteria;</p> <p>d) A program to monitor and report on the:</p> <ul style="list-style-type: none"> <li>• Impacts and environmental performance of the development;</li> <li>• Effectiveness of any management measures (see c above)</li> </ul> <p>e) A contingency plan to manage any unpredicted impacts and their consequences;</p> <p>f) A program to investigate and implement ways to improve the environmental performance of the development over time;</p> <p>g) A protocol for managing any:</p> <ul style="list-style-type: none"> <li>• Incidents;</li> <li>• Complaints;</li> <li>• Non-compliances with statutory requirements; and</li> <li>• Exceedances of the impact assessment criteria and/or performance criteria; and</li> </ul> <p>A protocol for periodic review of the plan.</p>	<p>Section 5</p> <p>Appendix E - Blast Monitoring Programme</p> <p>Section 5.5</p> <p>Section 7.2</p> <p>Section 7.3</p>
Sch. 5 Cond. 4	<p><b>Annual Review</b></p> <p>By the end of 31 March, or other timing as may be agreed by the Director-General, the Applicant shall review the environmental performance of the development to the satisfaction of the Director-General. This review must:</p> <p>a) Describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;</p> <p>b) Include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the</p> <ul style="list-style-type: none"> <li>• The relevant statutory requirements, limits or performance measurements / criteria;</li> <li>• The monitoring results of previous years; and</li> <li>• The relevant predictions in the EA;</li> </ul> <p>c) Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;</p> <p>d) Identify any trends in the monitoring data over the life of the project;</p> <p>e) Identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and</p> <p>Describe what measures will be implemented over the next year to improve the environmental performance of the project.</p>	Section 7.1.2.2
Sch. 5 Cond. 5	<p><b>Review of Strategies, Plans and Programs</b></p> <p>Within 3 months of the submission of an:</p> <p>a) Annual review under condition 4 above;</p> <p>b) Incident report under condition 7 below;</p> <p>c) Audit under condition 9 below; and</p> <p>d) Any modification to the conditions of this consent,</p> <p>The Applicant shall review, and if necessary revise, the strategies, plans and programs required under this consent to the satisfaction of the Director-General.</p> <p><i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</i></p>	Section 7.3
Sch. 5 Cond. 7	<p><b>Incident Reporting</b></p>	Section 5.5

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
	The Applicant shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Director-General and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	
Sch. 5 Cond. 8	<p><b>Regular Reporting</b></p> <p>The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.</p>	Section 7.1.2.2
Sch. 5, Cond. 11	<p><b>Access to Information</b></p> <p>The Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Make the following information publically available on its website:                             <ul style="list-style-type: none"> <li>• The EIS;</li> <li>• Current statutory consents for the development;</li> <li>• Approved strategies, plans or programs required under the conditions of this consent;</li> <li>• A comprehensive summary of the monitoring results of the development, which have been reported in accordance with the various plans and programs approved under the conditions of this consent;</li> <li>• A complaints register, which is to be updated on a monthly basis;</li> <li>• Minutes of CCC meetings;</li> <li>• The last five annual reviews;</li> <li>• Any independent environmental audit, and the Applicant's response to the recommendations in any audit;</li> <li>• Any other matter required by the Director-General; and</li> </ul> </li> <li>b) Keep this information up to date</li> <li>c) Investigate and report on reasonable and feasible measures to make predictive meteorological data and real time monitoring data publically available on its website</li> </ol> <p>To the satisfaction of the Director-General.</p>	Section 7.1.2.2

**WML CONSENT (DA 300-9-2002-i)**

Sch. 4, Cond. 22	<p><b>Airblast Overpressure Impact Assessment Criteria</b></p> <p>The Applicant shall ensure that the airblast overpressure level from blasting at the development does not exceed the criteria in Table 10 at any residence on privately-owned.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 40%;">Airblast overpressure level (dB(Lin Peak))</th> <th style="width: 60%;">Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td>115</td> <td>5% of the total number of blasts over a period of 12 months</td> </tr> <tr> <td>120</td> <td>0%</td> </tr> </tbody> </table>	Airblast overpressure level (dB(Lin Peak))	Allowable exceedance	115	5% of the total number of blasts over a period of 12 months	120	0%	Appendix E - Blast Monitoring Programme
Airblast overpressure level (dB(Lin Peak))	Allowable exceedance							
115	5% of the total number of blasts over a period of 12 months							
120	0%							
Sch. 4, Cond. 23	<p><b>Ground Vibration Impact Assessment Criteria</b></p> <p>The Applicant shall ensure that the ground vibration level from blasting at the development does not exceed the criteria in Table 11 at any residence on privately-owned land..</p>	Appendix E - Blast Monitoring						

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement						
	<p><i>Table 13: Ground vibration impact assessment criteria</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Peak particle velocity (mm/s)</th> <th>Allowable exceedance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">5% of the total number of blasts in a 12 month period</td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">0%</td> </tr> </tbody> </table>	Peak particle velocity (mm/s)	Allowable exceedance	5	5% of the total number of blasts in a 12 month period	10	0%	Programme
Peak particle velocity (mm/s)	Allowable exceedance							
5	5% of the total number of blasts in a 12 month period							
10	0%							
Sch. 4, Cond. 24	<p><b>Blasting Hours</b></p> <p>The Applicant shall only carry out blasting at the development between 7 am and 6 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Director-General.</p>	Section 5.2.1						
Sch. 4 Cond. 25	<p><b>Property Inspections</b></p> <p>If the Applicant receives a written request from the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:                             <ul style="list-style-type: none"> <li>• Establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and</li> <li>• Identify measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and/or structures; and</li> </ul> </li> <li>b) Give the landowner a copy of the new or updated property inspection report.</li> </ol> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Director-General for resolution.</p>	Section 6.1						
Sch. 4 Cond. 26	<p><b>Property Investigations</b></p> <p>If the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and</li> <li>b) Give the landowner a copy of the property inspection report.</li> </ol> <p>If this independent property investigation confirms the landowner’s claim, and both parties agree with these findings, then the Applicant shall repair the damage to the satisfaction of the Director- General.</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.</p>	Section 6.2						
Sch. 4 Cond. 27	<p><b>Operating Conditions</b></p> <p>The Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Implement best management practice to:                             <ul style="list-style-type: none"> <li>• Protect the safety of people and livestock in the surrounding area;</li> <li>• Protect public infrastructure and private property in the surrounding area from any damage; and</li> <li>• Minimise the dust and fume emissions of any blasting;</li> </ul> </li> <li>b) Minimise the frequency and duration of any required road closures; and</li> <li>c) Operate a suitable system to enable the public to get up-to-date and accurate information on the proposed blasting schedule on site,</li> </ol>	Sections 5.2.5, 5.4 and 5.2.6						

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
	To the satisfaction of the Director-General.	
Sch. 4 Cond. 28	<p>The Applicant shall not undertake blasting within 500 metres of:</p> <ol style="list-style-type: none"> <li>a) Any public road; or</li> <li>b) Any land outside of the site not owned by the Applicant,</li> </ol> <p>unless the Applicant has:</p> <ul style="list-style-type: none"> <li>• Demonstrated to the satisfaction of the Director-General that the blasting can be carried out closer to the road or land without compromising the safety of people or livestock, or damaging buildings and/or structures; and</li> <li>• Updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land or road; or</li> <li>• A written agreement with the landowner or relevant road authority (Council or RMS), in the case of any public road, to allow blasting to be carried out closer to the land or road, and the Applicant has advised the Department in writing of the terms of this agreement.</li> </ul>	Section 5.2.3
Sch. 4 Cond. 29	<p><b>Blast Management Plan</b></p> <p>The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Director-General. This plan must:</p> <ol style="list-style-type: none"> <li>a) Be prepared in consultation with the EPA and submitted to the Director-General for approval by 31 March 2014, unless the Director-General agrees otherwise;</li> <li>b) Describe the measures that would be implemented to ensure compliance with the blasting criteria and operating conditions of this consent;</li> <li>c) Propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site (if relevant); and</li> <li>d) Include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions.</li> </ol>	This BMP
Sch. 4 Cond. 51	<p><b>Road Closure</b></p> <p>The Applicant shall not close any public roads without the approval of the relevant road authority.</p>	Section 5.4 and Appendix D - Road Closure Management Plan
Sch. 5 Cond. 3	<p>As soon as practicable after obtaining monitoring results showing:</p> <ol style="list-style-type: none"> <li>a) An exceedance of any relevant criteria in Schedule 4, the Applicant shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria; and</li> </ol> <p>An exceedance of the relevant air quality criteria in Schedule 4, the Applicant shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).</p>	Section 7.1.2.1
Sch. 5 Cond. 4	<p><b>Independent Review</b></p> <p>If an owner of privately-owned land considers the development to be exceeding the criteria in schedule 4, then he/she may ask the Director-General in writing for an independent review of the impacts of the development on his/her land.</p> <p>If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-Generals decision, the Applicant shall:</p> <ol style="list-style-type: none"> <li>a) Commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the Director-General to: <ul style="list-style-type: none"> <li>• Consult with the landowner to determine his/her concerns;</li> <li>• Conduct monitoring to determine whether the development is complying with the relevant impact assessment criteria in Schedule 4; and</li> <li>• If the development is not complying with these criteria then: <ul style="list-style-type: none"> <li>○ Determine if more than one mine or development is responsible for the exceedance, and if so the relative share of each mine or development regarding the impact on the land;</li> </ul> </li> </ul> </li> </ol>	Section 6.3

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
	<p>and</p> <ul style="list-style-type: none"> <li>o Identify the measures that could be implemented to ensure compliance with the relevant criteria; and</li> </ul> <p>Give the Director-General a copy of the independent review.</p>	
Sch. 6 Cond. 2	<p><b>Community Liaison Officers</b></p> <p>For the duration of the development (unless otherwise agreed with the Director-General), the Applicant shall employ suitably qualified and experienced full time community liaison officers, to support the implementation of the air quality, noise and blast management plans and monitoring programs for the development in the local community.</p>	Section 5.2.7
Sch. 6 Cond. 3	<p><b>Adaptive Management</b></p> <p>The Applicant shall assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&amp;A Act or EP&amp;A Regulation.</p> <p>Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity:</p> <ul style="list-style-type: none"> <li>a) Take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;</li> <li>b) Consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and</li> <li>c) Implement remediation measures as directed by the Director-General,</li> </ul> <p>To the satisfaction of the Director-General.</p>	Section 5.5
Sch. 6 Cond. 4	<p><b>Management Plan Requirements</b></p> <p>The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <ul style="list-style-type: none"> <li>a) Detailed baseline data;</li> <li>b) A description of <ul style="list-style-type: none"> <li>• The relevant statutory requirements (including any relevant consent, licence or lease conditions);</li> <li>• Any relevant limits or performance measures / criteria;</li> <li>• The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development of any management measures;</li> </ul> </li> <li>c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures / criteria;</li> <li>d) A program to monitor and report on the: <ul style="list-style-type: none"> <li>• Impacts and environmental performance of the development;</li> <li>• Effectiveness of any management measures (see c above)</li> </ul> </li> <li>e) A contingency plan to manage any unpredicted impacts and their consequences;</li> <li>f) A program to investigate and implement ways to improve the environmental performance of the development over time;</li> <li>g) A protocol for managing any: <ul style="list-style-type: none"> <li>• Incidents;</li> <li>• Complaints;</li> <li>• Non-compliances with statutory requirements; and</li> </ul> </li> </ul>	<p>Appendix F - Detailed Baseline Data</p> <p>Section 2</p> <p>Section 5</p> <p>Appendix E - Blast Monitoring Programme</p> <p>Section 5.5</p> <p>Section 7.2</p> <p>Section 7.3</p>

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
	<ul style="list-style-type: none"> <li>• Exceedances of the impact assessment criteria and/or performance criteria; and</li> <li>A protocol for periodic review of the plan.</li> </ul>	
Sch. 6 Cond. 5	<p><b>Annual Review</b></p> <p>By 31 March of each year, or as otherwise agreed by the Director-General, the Applicant shall review the environmental performance of the development to the satisfaction of the Director-General. This review must:</p> <ul style="list-style-type: none"> <li>f) Describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;</li> <li>g) Include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the <ul style="list-style-type: none"> <li>• The relevant statutory requirements, limits or performance measurements / criteria;</li> <li>• The monitoring results of previous years; and</li> <li>• The relevant predictions in the EA;</li> </ul> </li> <li>h) Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;</li> <li>i) Identify any trends in the monitoring data over the life of the project;</li> <li>j) Identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and</li> </ul> <p>Describe what measures will be implemented over the next year to improve the environmental performance of the project.</p>	Section 7.1.2.2
Sch. 5 Cond. 5	<p><b>Review of Strategies, Plans and Programs</b></p> <p>Within 3 months of the submission of an:</p> <ul style="list-style-type: none"> <li>e) Annual review under condition 4 above;</li> <li>f) Incident report under condition 7 below;</li> <li>g) Audit under condition 9 below; and</li> <li>h) Any modification to the conditions of this consent,</li> </ul> <p>The Applicant shall review, and if necessary revise, the strategies, plans and programs required under this consent to the satisfaction of the Director-General.</p> <p><i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</i></p>	Section 7.3
Sch. 5 Cond. 7	<p><b>Incident Reporting</b></p> <p>The Applicant shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Director-General and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.</p>	Section 5.5
Sch. 5 Cond. 8	<p><b>Regular Reporting</b></p> <p>The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.</p>	Section 7.1.2.2
Sch. 5, Cond. 11	<p><b>Access to Information</b></p> <p>The Applicant shall:</p> <ul style="list-style-type: none"> <li>d) Make the following information publically available on its website:</li> </ul>	Section 7.1.2.2

Table 1.1 Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of BMP which addresses this requirement
	<ul style="list-style-type: none"> <li>• The EIS;</li> <li>• Current statutory consents for the development;</li> <li>• Approved strategies, plans or programs required under the conditions of this consent;</li> <li>• A comprehensive summary of the monitoring results of the development, which have been reported in accordance with the various plans and programs approved under the conditions of this consent;</li> <li>• A complaints register, which is to be updated on a monthly basis;</li> <li>• Minutes of CCC meetings;</li> <li>• The last five annual reviews;</li> <li>• Any independent environmental audit, and the Applicant's response to the recommendations in any audit;</li> <li>• Any other matter required by the Director-General; and</li> </ul> <p>e) Keep this information up to date</p> <p>f) Investigate and report on reasonable and feasible measures to make predictive meteorological data and real time monitoring data publically available on its website</p> <p>To the satisfaction of the Director-General.</p>	

Table 1.2 Statement of Commitments Addressed

SOC reference	Commitments	Where Commitment is addressed
<b>Abbey Green Project Alterations – Statement of Environmental Effects (Jan 2010)</b>		
3.3.2 (d)	MTO's existing blast management practices will be used to control the blast design at AGN and ensure compliance with the MTO consent limits for airblast overpressure and ground vibration. This includes the use of appropriate charge masses, monitoring of all blasts, and blasting during meteorological conditions that will minimise the potential for impact on neighbours. Recommended charge masses are presented in the EMGA (2009) report in Appendix C.	Section 5
Table 9.1 - Blasting	Adequate stemming will be used at all times and blasting when wind speeds are below 5m/sec and not in the direction of residents.	Section 5
<b>Extension of Warkworth Coal Mine – Environmental Impact Statement (Aug 2002)</b>		
16.4.9 Vibration	Measures detailed in Section 16.4.9 are generally reproduced in the Project Approval: <ul style="list-style-type: none"> <li>• 115dB(L) airblast overpressure and 5mm/sec ground vibration limits for 5% of blasts</li> <li>• 120dB(L) airblast overpressure and 10mm/sec ground vibration limits for 0% of blasts</li> <li>• No blasting on Sundays or public holidays</li> <li>• Blasting should be avoided during temperature inversion conditions.</li> <li>• Blasting will occur between the hours of 7am to 6pm</li> </ul>	Section 5 and Appendix E - Blast Monitoring Programme
<b>Warkworth Modification 6 – Environmental Assessment (Nov 2013)</b>		
12.5.3 Conclusion	The blast noise and vibration from the proposed extension area is expected to satisfy criteria at all offsite locations and impacts are expected to be similar to those from previous approved (blasted) areas. The site's existing management protocols will be maintained and will effectively mitigate adverse impacts.	Section 5 and Appendix E - Blast Monitoring Programme

Table 1.3 Environmental Protection Licence 640 Conditions Addressed

EPL reference	Environmental Performance Condition	Where Condition is addressed
<b>Warkworth Mining Limited (EPL 1376)</b>		
L5.1	<p>The airblast overpressure level from blasting operations in or on the premises must not exceed:</p> <ul style="list-style-type: none"> <li>a) 115dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and</li> <li>b) 120dB (Lin Peak) at any time.</li> </ul> <p>At the most affected residence or noise sensitive location that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative overpressure level.</p>	Appendix E - Blast Monitoring Programme
L5.2	<p>The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:</p> <ul style="list-style-type: none"> <li>a) 5mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and</li> <li>b) 10mm/s at any time.</li> </ul> <p>At the most affected residence or noise sensitive location that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative ground vibration level.</p>	Appendix E - Blast Monitoring Programme
L5.3	Blasting in or on the premises must only be carried out between 0700 hours and 1800 hours, Monday to Saturday. Blasting in or on the premises must not take place on Sundays or Public Holidays without the prior approval of the EPA.	Section 5.2.1
M1.1 – Monitoring Records	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Appendix E - Blast Monitoring Programme
M1.2	<p>All records required to be kept by this licence must be:</p> <ul style="list-style-type: none"> <li>a) in a legible form, or in a form that can readily be reduced to a legible form;</li> <li>b) kept for at least 4 years after the monitoring or event to which they relate took place; and</li> <li>c) produced in a legible form to any authorised officer of the EPA who asks to see them.</li> </ul>	Appendix E - Blast Monitoring Programme
M1.3	<p>The following records must be kept in respect of any samples required to be collected for the purposes of this licence:</p> <ul style="list-style-type: none"> <li>a) the date(s) on which the sample was taken;</li> <li>b) the time(s) at which the sample was collected;</li> <li>c) the point at which the sample was taken; and</li> <li>d) the name of the person who collected the sample.</li> </ul>	Appendix E - Blast Monitoring Programme
M7.1	<p>To determine compliance with condition(s) L5.1 and L5.2:</p> <ul style="list-style-type: none"> <li>a) Airblast overpressure and ground vibration levels must be measured at the most affected residence or noise sensitive location that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative blasting level – for all blasts carried out in or on the premises; and</li> <li>b) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006</li> </ul>	Appendix E - Blast Monitoring Programme
M4.1 – Recording of pollution complaints	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Section 7.2
M4.2	<p>The record must include details of the following:</p> <ul style="list-style-type: none"> <li>a) The date and time of the complaint;</li> <li>b) The method by which the complaint was made;</li> <li>c) Any personal details of the complainant which were provided by the complainant, or if no such details were</li> </ul>	Section 7.2

EPL reference	Environmental Performance Condition	Where Condition is addressed
	<p>provided, a note to that effect;</p> <p>d) The nature of the complaint;</p> <p>e) The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and</p> <p>If no action was taken by the licensee, the reasons why no action was taken.</p>	
M4.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Section 7.2
M4.4	The record must be produced to any authorised officer of the EPA who asks to see them.	Section 7.2
<b>Mount Thorley Operations(EPL 1976)</b>		
L4.1	Blasting in or on the premises must only be carried out between 0700 hours and 1800 hours, Monday to Saturday. Blasting in or on the premises must not take place on Sundays or Public Holidays without the prior approval of the EPA.	Section 5.2.1
L4.2	<p>The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:</p> <p>c) 5mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and</p> <p>d) 10mm/s at any time.</p> <p>At the most affected residence or noise sensitive location that is not owned by the licensee of subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative ground vibration level.</p>	Appendix E - Blast Monitoring Programme
L4.3	<p>The airblast overpressure level from blasting operations in or on the premises must not exceed:</p> <p>a) 115dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and</p> <p>b) 120dB (Lin Peak) at any time.</p> <p>At the most affected residence or noise sensitive location that is not owned by the licensee of subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative overpressure level.</p>	Appendix E - Blast Monitoring Programme
M1.1 – Monitoring Records	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Appendix E - Blast Monitoring Programme
M1.2	<p>All records required to be kept by this licence must be:</p> <p>a) in a legible form, or in a form that can readily be reduced to a legible form;</p> <p>b) kept for at least 4 years after the monitoring or event to which they relate took place; and</p> <p>c) produced in a legible form to any authorised officer of the EPA who asks to see them.</p>	Appendix E - Blast Monitoring Programme
M1.3	<p>The following records must be kept in respect of any samples required to be collected for the purposes of this licence:</p> <p>a) the date(s) on which the sample was taken;</p> <p>b) the time(s) at which the sample was collected;</p> <p>c) the point at which the sample was taken; and</p> <p>d) the name of the person who collected the sample.</p>	Appendix E - Blast Monitoring Programme
M5.1 – Recording of pollution complaints	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Section 7.2
M5.2	<p>The record must include details of the following:</p> <p>f) The date and time of the complaint;</p> <p>g) The method by which the complaint was made;</p> <p>h) Any personal details of the complainant which were provided by the complainant, or if no such details were provided, a note to that effect;</p>	Section 7.2

EPL reference	Environmental Performance Condition	Where Condition is addressed
	<ul style="list-style-type: none"> <li>i) The nature of the complaint;</li> <li>j) The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and</li> </ul> <p>If no action was taken by the licensee, the reasons why no action was taken.</p>	
M5.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Section 7.2
M5.4	The record must be produced to any authorised officer of the EPA who asks to see them.	Section 7.2
M8.1	<p>To determine compliance with condition(s) L5.1 and L5.2:</p> <ul style="list-style-type: none"> <li>a) Airblast overpressure and ground vibration levels must be measured at the most affected residence or noise sensitive location that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative blasting level – for all blasts carried out in or on the premises; and</li> <li>b) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006</li> </ul>	Appendix E - Blast Monitoring Programme

### 1.3 Objectives

The purpose of this BMP is to provide reasonable and feasible measures to address potential blasting impacts of the Project as identified in the Approvals and satisfy the relevant conditions of the Approvals.

This BMP describes procedures required to ensure compliance with the Approval conditions relating to blasting impacts. This BMP also provides a mechanism for assessing blast monitoring results against the relevant blast impact assessment criteria.

The key elements of the mitigation strategies will be,

- to ensure that blast design incorporates controls on the maximum instantaneous charge to ensure blasting-induced vibration is within acceptable limits (this will also be addressed through monitoring); and
- managing key environmental issues associated with air blast overpressure and vibration impacts as a result of operational activities that may affect:
  - Communities (Warkworth, Bulga, Long Point, Hambleton Hill, Mount Thorley);
  - Residences within zone of affectation;
  - Residences beyond zone of affectation;
  - Neighbouring mines; and
  - Sensitive infrastructure.

The objectives of this BMP are to:

- meet the requirements of the Approval;
- set out the notification procedure;
- describe the process for assessing real-time weather conditions prior to blasting;
- set out the hours of blasting;
- ensure good blast design and evacuation procedures are in place to ensure safety from fly rock;
- set out a Road Closure Management Plan (see Appendix E);

- describe the monitoring programme and how it will be implemented and maintained (Appendix A);
- detail the controls to be implemented to minimise blasting impacts off site;
- manage community complaints in a timely and effective manner; and
- detail the procedure for reporting blast criteria exceedances to relevant stakeholders.

BODY  
BLAST MANAGEMENT PLAN



## 2. REGULATORY REQUIREMENTS

### 2.1 Background

This BMP has been prepared to fulfil the requirements of relevant legislation, the Approvals, EA commitments, EPL conditions and relevant standards and guidelines.

### 2.2 Project Approvals

The Approvals and subsequent amendments were assessed under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act.). The current Warkworth Approval was granted on 19 May 2003 and subsequently modified by the Planning Assessment Commission as delegate of the Minister for Planning and Infrastructure on 29 January 2014.

The current Mount Thorley Approval was granted on 22 June 1996 and subsequently modified on 2 May 2012.

The Approvals stipulate the blasting criteria that operational activities at MTW must comply with. The Warkworth Approval sets out the core requirements of this BMP.

The requirement for this BQMP arises from Condition 29 of Schedule 4 of the Warkworth Approval, and Condition 20 in Schedule 3 of the Mount Thorley Approval. A list of the relevant conditions of both Approvals, and commitments made in the respective Environmental Assessments, and references to where each requirement is addressed in this BMP can be found in Section 1.2 (see in particular Tables 1.1 and 1.2).

#### 2.2.1 2013 Land & Environment Court Judgment

Significant complexity was introduced to the blast management and compliance assessment process following the NSW Land and Environment Court Judgment of 15 April 2013.

For the purposes of this Blast Management Plan, reference is made to conditions in the Mount Thorley Approval which impose various requirements and limits on *'Mount Thorley Warkworth Mine Complex'*

In various sections of the L&E Court Judgment, there is doubt as to the legality of applying conditions in this way, including in section 373 which states:

*"...and any conditions imposed on a project approval must relate to that project, and be capable of implementation by whomever is carrying out the activities authorised by the approval..."*

In the context of the above, it is therefore considered appropriate that any reference in the Mount Thorley Approval to *'The Mount Thorley Warkworth Mine Complex'* apply only to the Mount Thorley Operations consent area, and activities therein.

### 2.3 Environmental Protection Licence

The *Protection of the Environment Operations Act 1997* (NSW) (PoEO Act) is the principal piece of legislation regulating pollution emissions in NSW. EPL's 1376 for Warkworth Coal Mine (issued on 21 August 2000) and 1976 for Mount Thorley Operations (issued on 28 September 2000) stipulate a range of conditions relating to Blasting. These conditions are reproduced in Table 1.3. While the primary intent of this BMP is to describe the measures which will be implemented to ensure compliance with the relevant conditions of MTW's Planning Approvals, the EPL requirements are also listed for completeness.

### 2.4 Dangerous Goods

Dangerous goods are regulated under the *Work Health and Safety Act 2011* (NSW) and *Explosives Act 2003* (NSW). Coal & Allied will ensure that all regulatory requirements in relation to dangerous goods management are met. The storage of explosives or explosive precursors, are to be managed in accordance with MTW's work instructions and site procedures such as MTW-10-WI-MINE-244-011 'Firing a Shot'. These are internal documents which are regularly updated.

### 2.5 Commitments Made in Environmental Assessments

Table 1.2 details the management, mitigation and monitoring commitments made in the relevant environmental assessments.

## 3. CONSULTATION

The relevant conditions of the Approvals detailing the requirements for this BMP stipulate the agencies and

parties to be consulted during the preparation of this BMP.

### 3.1 Government Agencies

#### 3.1.1 EPA

In a letter to the EPA dated 12 March 2014, Coal and Allied sought to clarify the EPA's position with regard to the review and input of Environmental Management Plans. In a letter dated 2 July 2014 the EPA confirmed that consultation with the agency on the development of environmental management plans is not required (see Appendix A).

#### 3.1.2 Singleton Shire Council (SSC)

MTW holds approval from Singleton Shire Council (SSC) allowing for closure of the Golden Highway, Putty Road, Wallaby Scrub Road, and Charlton Road. The current Council approval is valid until 30 June 2015 and is included in the Road Closure Management Plan.

#### 3.1.3 Roads and Maritime Service (RMS)

In response to correspondence from MTW dated 4 June 2012 (seeking comments from RMS on the Road Closure Management Plan) RMS requested the following:

- MTW provide RMS with a weekly plan showing dates and times of blasting to take place within 500m of Putty Road or the Golden Highway, at least seven (7) days prior to blasting; and
- Any blasting activities that require temporary closure of Putty Road or the Golden Highway will require a Road Occupancy Licence application to be submitted to RMS and subsequent approval to be granted by the Traffic Commander (Hunter).

MTW submits a weekly plan as required detailing blasts planned to take place within 500m of the Putty Road.

MTW holds Road Occupancy Licenses allowing for the closure of the Putty Road and Golden Highway. The current licenses are valid until 1 November 2014, and are included in the Road Closure Management Plan.

### 3.2 Nearby Mines

Neighbouring mines are consulted on an 'as required' basis regarding blasting operations.

At the time of submission of this BMP, an informal agreement exists with Bulga Open Cut (BOC) whereby blast schedule information is shared on a daily basis regarding blasts planned in the Mount Thorley area.

Rio Tinto Coal Australia also manages the neighbouring Hunter Valley Operations mine. As environmental management is undertaken by a shared Environmental Services team, there is no formal cooperation agreement in place with respect to blasting between MTW and HVO. Where practical however, monitoring systems and reactive processes are common across both HVO and MTW. This includes access to all real time monitoring data to operational personnel at both sites.

## 4. EXISTING CHARACTER & IMPACT ASSESSMENT CRITERIA

### 4.1 Existing Character

Mount Thorley Warkworth (MTW) is an integrated operation of two open cut mines, Warkworth Mining Limited (WML) and Mount Thorley Operations (MTO) which are located adjacent to each other and 15 km south west of Singleton in the Hunter Valley region of New South Wales. The operation supplies international and domestic markets with semi-soft coking coal and thermal coal.

MTW is generally bounded by public roads – the Golden Highway alongside the Northern and Eastern WML

boundary, Wallaby Scrub and Charlton Roads to the West. The operation is bisected by Putty Road, WML to the North of the road, and MTO to the South.

MTO shares its southern boundary with the adjoining Glencore Bulga Coal Surface Operations (BCSO).

Surrounding land uses include Mining (nearby operations include Bulga Coal, Wambo Coal and Hunter Valley Operations), agriculture (to the east in the areas of Mount Thorley and Hambledon Hill), Industrial pursuits in the Mount Thorley Industrial Estate, and nearby residential communities of Bulga, Milbrodale, Warkworth and Long Point. The township of Singleton is located approximately 7km to the east of WML. An overview of the layout of MTW is presented in Figure 1.



Figure 1 - Layout of MTW

## 4.2 Impact Assessment Criteria

### 4.2.1 Residence on Privately Owned Land

The Approvals and EPL's specify airblast overpressure impact assessment criteria and ground vibration impact assessment criteria for residences on privately-owned land. These criteria were developed in accordance with relevant guidelines, in consultation with the relevant service providers and in consideration of precedents set by other sites and regulatory agencies.

In recognition of the potential impacts of blasting practices, Coal & Allied have committed to designing blasts so that predicted levels are within the vibration criteria outlined in the Approvals.

### 4.2.2 Public Infrastructure

Bulga Bridge (spanning Wollombi Brook on the Putty Road, to the West of MTW) is the only public infrastructure considered to be within such proximity to MTW for consideration under this BMP. A report by Enviro Strata consulting and dated 27<sup>th</sup> June 2012, commissioned in association with the (then approved) Warkworth Extension Project, details an independent assessment of the potential impacts of that project on the Bulga Bridge. The report is reproduced as Appendix C. The report recommends a ground vibration limit of 50mm/sec be applied to the bridge. This recommendation however does not take account of the close proximity of local residents to the bridge. Given the 5mm/sec (5%) and 10mm/sec limits stipulated in the Approvals, a limit of 50mm/sec is not considered relevant. MTW will continue to monitor and manage blasting impacts on the bridge consistent with the ground vibration criteria associated with private residences as detailed in the Approvals.

## 4.3 Heritage Features

### 4.3.1 St. Phillips Church

The Enviro Strata Consulting report dated 27<sup>th</sup> June 2012, commissioned in association with the (then approved) Warkworth Extension Project recommends a ground vibration limit of 5mm/sec be applied to St. Phillip's Church. The report is reproduced in Appendix C.

### 4.3.2 Wambo homestead

The Enviro Strata Consulting report dated 27<sup>th</sup> June 2012, commissioned in association with the (then approved) Warkworth Extension Project recommends a ground vibration limit of 5mm/sec be applied to Wambo Homestead.

### 4.3.3 Aboriginal Grinding Groove sites

The MTO Approval lists four grinding groove sites in the vicinity of MTW, which (as per the condition) cannot be damaged by blasting operations.

This condition was included in the Approval so as to align the MTO Approval with the conditions of the (then approved) Warkworth Extension Project (PA 09\_0202).

Following the Land & Environment Court Judgment to repeal the Warkworth Extension Approval, MTW no longer has consent to mine in the areas containing these grinding groove sites. As such, the condition is considered Not Applicable under the current terms of Approval.

Per the recommendations of the Lewandowski report (2012), maximum vibration predictions of between 0.5mm/sec and 6.0mm/sec at the 2019 snapshot of the (now disapproved) Warkworth Extension Project indicate that existing vibration limits are sufficient to ensure the protection of these features. Flyrock protection for the grinding grooves will be considered when blasting is approaching to within 400m of the sites.

Regarding site M 37-6-0163, given its location relative to current operations, MTW will consider the installation of flyrock protection should blasting occur within 500m of the site.

## 5. BLAST MANAGEMENT CONTROLS

### 5.1 Introduction

In order to mitigate any potential impacts from blasting activities, a number of management controls will be implemented throughout the life of MTW operations. These controls are detailed in Section 5.2 below.

## 5.2 Operational controls

Coal & Allied will implement the following blast management practices over the life of the project:

### 5.2.1 Blasting Hours

- Blasting at MTW will occur within the hours permissible under the approvals and EPL's (whichever is the lesser):
  - WML – between 7am and 6pm, Monday to Saturday; and
  - MTO – between 7am and 5pm, Monday to Saturday
- No blasting will be undertaken on Sundays, public holidays or any other time, unless written approval is obtained from the Director-General. In such circumstances (possible under extraordinary circumstances), MTW will also endeavour to telephone the DP&I's Singleton office and the EPA to seek verbal approval from the regulatory authorities.
  - DP&I Singleton Compliance Office – (02) 6575 3400
  - Environment Protection Authority Newcastle Office – (02) 4908 6800, or self-report line 131 555

### 5.2.2 Blasting Frequency

- Blasting at MTO will be undertaken at a maximum of three blasts per day (unless an additional blast is required following a blast misfire) and no more than 15 blasts per week. This total number of blasts however does not apply to:
  - blasts that generate ground vibration of 0.5mm/s or less at any residence on privately owned land, or
  - blasts required to ensure the safety of MTO or its workers.

## 5.2.3 Limitations on Blasting

- MTW will not blast within 500m of land not owned by MTW unless:
  - A written agreement with the landowner has been obtained and the DP&I have been advised; or
- Specific measures to ensure the safety of the people and livestock on that land will not be compromised by blasting; and
- MTW will not carry out more than one blast per day in the Mount Thorley Operation within 500m of the Putty Road and Golden Highway.

## 5.2.4 Meteorological considerations

- Consideration of forecast meteorological conditions in blast scheduling (use of publically available forecast information). This is typically undertaken 5 – 7 days out, identifying the days which are most likely to favour blasting;
- Use of publically available and site specific weather forecast information on a daily basis to ensure weather conditions are acceptable. Blasts are brought forward or delayed where possible to account for unfavourable weather conditions, also taking consideration of previously advertised road closure times to minimise public disruption;
- review of the blasting permissions page for the appropriate Pit area (see example of typical permission page in Appendix C) which considers: wind speed and wind direction relative to sensitive receptors and public roads;
- There may be circumstances where blasts may need to be fired in less than ideal weather conditions. In these circumstances MTW will take additional controls to minimise impacts such as implementation of exclusion zones. Such decisions will be taken at the appropriate level of the organisational hierarchy;

### 5.2.5 Best Practice measures

- Ensuring adequate burden is present on all faces. Where necessary face surveying (laser profiling) techniques may be employed to measure overburden between the blast face and blast holes to ensure sufficient burden is present to prevent blowouts and blast anomalies; Use of adequate stemming lengths; and of suitable quality material for all blasts;
- Management of blast fume in accordance with the MTW Post-blast fume generation mitigation and management plan;
- MTW will monitor blasts as mining progresses, in accordance with the existing blast monitoring system, so that blast prediction site laws can be further refined and future blast designs can be optimised based on more detailed site information; and
- Where possible, and for investigative purposes MTW will collect photos and video footage of blasts, including images of blast plumes in the event of offsite migration.

### 5.2.6 Notifying Interested Parties

- The Blasting Schedule Hotline is the primary tool by which members of the public can find information relating to MTW temporary road closures. MTW uses its best endeavours to align the road closure with the advertised time and limit the road closure duration to minimise inconvenience to road users. It should be noted however that the primary concern for MTW is to mitigate safety and environmental impacts from blasting, hence this will take precedence over adherence to road closure scheduling. A number of factors including meteorological conditions, operations impediments and unforeseen circumstances on the public road will often result in road closures being brought forward or delayed from the scheduled time. Advertised road closure times publicised via the methods described herein represent MTW's best assessment of the likely blasting time at the time of publish, and are subject to change.

- The hotline is updated on the morning of each day on which there is a scheduled road closure and can be reached on (freecall) **1800 099 669**. The hotline will advise of a one hour window for the proposed road closure (e.g between 10am and 11am);
- In the event that a road closure is to occur outside the blasting window, and once the revised time is understood, MTW will update the hotline for another one hour window;

- Where mandated, notice of temporary road closures will be provided via the posting of signs on the affected road(s) in the 24 hours prior to blasting. Road closure signage will not be updated from the initial advertised time unless the road closure is postponed to another day; and
- Where necessary, information will be made available to neighbouring mines, relevant authorities (in the event of a road closure), and internal contacts prior to blasting.

### 5.2.7 Further Developments

- MTW will assess the performance of the process detailed in 5.2.6 above for a six-month period. During this time, to expand the communication method for road closures, MTW will investigate feasibility of systems to notify interested parties via SMS (using the existing blast hotline). MTW will inform DP&E of the outcomes of this investigation by 31 March 2015 to determine whether further improvements to the existing blast notification process are warranted.

### 5.2.8 Monitoring and Administration

- Documentation of the date, location of the blast and quantity of explosive used each day;
- Detailed monitoring of blasts over the life of MTW at relevant blast sensitive locations (refer to Appendix E);

- Ad-hoc visual monitoring of blast events where pre-blast risk assessment identifies the need, including use of cameras situated on Charlton Ridge and WML Maintenance Workshop;
- Training will be provided to all relevant personnel on environmental obligations in relation to blasting controls.
- Periodic internal reviews of blast management procedures to evaluate performance and identify corrective action if required.

### 5.3 Management of Flyrock

The generation of fly rock is managed by incorporating appropriate controls in blast designs.

These controls include design of stemming lengths and stemming materials to minimise the potential for generating flyrock. Adequate burden, which is the distance from a charge to a free face, is maintained to minimise the risk of generating flyrock due to face bursting. These measures are used to minimise the risk of damage to property, equipment or powerlines from flyrock.

Appropriate stemming will be used to improve stemming confinement and hence reduce the chance of flyrock and elevated airblast overpressure.

An appropriate exclusion zone will be established around each blast site in accordance with relevant mine safety regulations prior to firing a blast. Generally, the blast exclusion zone will be a minimum of 300 metres for equipment and 500 metres for personnel. The exclusion zone will be established beyond the expected range of any fly rock with an additional safety margin. The establishment of this zone will minimise the risk of any injuries to people or livestock due to flyrock.

Where an unusual level of flyrock is generated by blasting this information will be recorded and used to continually re-assess the adequacy of blast design controls in reducing the generation of flyrock. The information will also be used to re-assess the size of the safety exclusion zone established for people and livestock in the vicinity of a blast.

### 5.4 Road closure

Blasting within 500 meters of a public road requires road closure during the blasting event.

MTW has developed a Road Closure Management Plan in consultation with Singleton Council and the Roads and Maritime Service. The Road Closure Management Plan is included in Appendix D.

Approval will be sought from Singleton Council to temporarily close roads for the purpose of blasting again in mid-2014 and each 12 months thereafter.

Approval from RMS to temporarily close roads for the purpose of blasting will also be sought every six months.

### 5.5 Management of Unpredicted Impacts

#### 5.5.1 Blast Fume

Blast fume is managed in accordance with the MTW Post-blast fume generation mitigation and management plan (see Appendix C).

#### 5.5.2 Airblast overpressure / Ground Vibration exceedance

In the event that a blast event registers airblast overpressure or ground vibration results greater than the allowable limits, or significantly different from the predicted results (airblast overpressure), MTW will undertake a detailed investigation into the event. Where corrective actions are identified to prevent a recurrence, these will be entered into the Rio Tinto Action Management System, and tracked to completion.

### 5.6 Continuous Improvement

In accordance with the requirements of the Rio Tinto Coal Australia Health, Safety, Environment and Quality Management System, MTW will continuously seek to further improve blasting management through the following:

- Investigation into new and emerging technologies, implementing new controls where required;
- Learning from incidents and improving controls;

- Thoroughly investigating any exceedance and non-compliance events; and
- Review of blast monitoring data for emerging trends.

## 5.7 Monitoring Programme

Blast and vibration monitoring at MTW will be undertaken in accordance with the Blast and Vibration Monitoring Programme set out in Appendix E. The monitoring programme includes a protocol for evaluating compliance with the blasting criteria in the approvals.

The monitoring programme will be reviewed annually.

## 6. PROPERTY INVESTIGATIONS AND INSPECTIONS

### 6.1 Property Inspections

In accordance with Condition 16 of Schedule 3 (MTO) and Condition 25 of Schedule 4 (WML), Coal & Allied will undertake the actions as described to establish the baseline condition of buildings and/or structures, or to update a previous inspection.

### 6.2 Property Investigations

If Coal & Allied receives a written claim that buildings and/or structures on a landowners' land have been damaged as a result of blasting on site then MTW will investigate the claim and, where the property investigation confirms the landowner's claim, repair the damage in accordance with Condition 26, Schedule 4 of the WML Approval or Condition 17 of Schedule 3 of the MTO Approval, whichever is relevant.

### 6.3 Independent Review and Land Acquisition Process

Where the owner of privately-owned land has reasonable grounds to believe that MTW (WML or MTO) is exceeding blast criteria, they may request an independent review from the Director General, as per Conditions 4, 5 and 6 of Schedule 4 of the MTO Approval or conditions 4 Schedule 5 of the WML Approval. If the independent review determines that Coal & Allied is not complying with the relevant acquisition criteria, then upon receiving written request from the land owner, Coal & Allied will

purchase the property in accordance with the relevant conditions of the Approvals.

## 7. IMPLEMENTATION OF THE BMP

### 7.1 Reporting

#### 7.1.1 Internal reporting

Determining exceedances of blasting criteria will be undertaken in accordance with the protocol for evaluating compliance (Blast Monitoring Programme), reproduced in Appendix A.

Internal reporting of blasting incidents (blast fume events and overpressure / vibration exceedances of criteria) will be undertaken in accordance with Rio Tinto Coal Australia HSEQ14 – Incident and Action Management.

The Senior Drill and Blast Engineer will report any potential or confirmed blast exceedance to relevant site personnel, including the Site Environmental Co-ordinator, Manager – Mining and Manager – Environmental Specialist. The initial advice will include an in-house assessment of meteorological conditions and the validity of the peak airblast overpressure and ground vibration results. Where the peak results are confirmed to have occurred outside of the calculated arrival time window, no escalation of the possible exceedance will occur, and a theoretical value will be used in place of the measured peak.

Where the in-house assessment is unable to discount the result on the basis of meteorology or arrival time, the result will be referred to a specialist consultant for determination.

If there is a non-compliance with the blast impact assessment criteria an investigation will be undertaken, assessing the circumstances of the non-compliance. Resulting actions will be developed and assigned to the appropriate person, and tracked to completion.

#### 7.1.2 External Reporting

##### 7.1.2.1 Emergency / Non-compliance reporting

The Environmental Specialist – Systems and Monitoring will co-ordinate the reporting of any confirmed non-compliance in writing to the Dept. as soon as practicable

following receipt of information confirming the non-compliance. Airblast Overpressure / Ground vibration non-compliances will also be reported to the EPA as required.

The Environmental Specialist – Operations will co-ordinate the reporting of any confirmed reportable blast fume events (Category 3 which leaves the premises, or any Category 4 or greater fume event) or other blasting related non-compliance to the Dept. as soon as practicable.

In addition, in accordance with the relevant conditions of the Approvals, within seven days of becoming aware of the incident, Coal & Allied will provide the Director-General and any relevant agencies with a detailed report of the incident.

The report will include the following details:

- The date, time and nature of exceedance/incident;
- Identify the likely cause of exceedance/incident;
- Describe the response action that has been undertaken to date; and
- Describe the proposed measures to address the exceedance/incident.

Coal & Allied will implement mitigation measures for future blasts as necessary and will monitor future blasts for effectiveness and improvement opportunities.

In accordance with Condition 3 of Schedule 4 (MTO) and Condition 3 of Schedule 5(WML) of the Approvals, as soon as practicable after obtaining monitoring results showing a non-compliance of the blasting criteria, Coal & Allied will notify the affected landowner and/or tenants in writing of the non-compliance, and provide regular monitoring results to each of these parties until the project is again complying with the relevant criteria.

#### 7.1.2.2 Regular reporting

Blast monitoring data, collected in accordance with this BMP will be made available on the Rio Tinto Coal Australia website ([www.riotintocoalaustralia.com.au](http://www.riotintocoalaustralia.com.au)) via

the Monthly Environmental Management Report, and Annual Review.

Ground Vibration and Airblast Overpressure data will also be presented in the Monthly Meaningful Summary and Obtained Data reports to satisfy the reporting requirements of the PoEO Act.

Coal & Allied will provide up-to-date information regarding the proposed blasting schedule via the process outlined below:

- notify neighbouring mining operations;
- advertisement in the Singleton Argus when a public road is to be closed, as well as identifying proposed blasting times on road signage established in the vicinity of MTW;
- Providing up-to-date information to the blasting hotline 1800 888 733.

## 7.2 Complaints Management

Community Complaints are lodged via the Community Complaints line, 1800 656 892. The hotline number is prominently displayed on the Rio Tinto coal Australia website and regularly advertised in the local newspaper. The Complaints Hotline operates 24 hours per day, seven days a week. Complaints will be recorded and investigated by MTW staff. Complaints lodged via other means (letter, in person, fax etc) will also be recorded and investigated by the Environmental Coordinator.

Where the investigation identifies potential non-compliance with a consent or licence condition, action to mitigate the cause of the complaint will be taken.

The details of all dust complaints, and any mitigating actions taken, will be circulated to senior management and other key personnel. Where requested, follow-up correspondence with the complainant will be provided.

It is a condition of EPL's 1376, 1976 and 24 that MTW maintain a register of pollution complaints. MTW maintains a register of all complaints, recording the following information (at minimum):

- Date and time of the complaint

- Method by which the complaint was made
- Any personal details of the complainant which were provided
- The nature of complaint
- Any action taken in relation to the complaint
- If no action, the reason why no action was taken
- changing environmental requirements;
- improvements in knowledge or technology becoming available;
- changes in legislation;
- identification of a requirement to alter this BMP following a risk assessment; or,
- updating of the Mining Operation Plan.

A record of each complaint will be kept for a minimum of four years, and will be produced on request to any authorised officer of the EPA.

A monthly summary of complaints received will be reported on the Rio Tinto Coal Australia website ([www.riotintocoalaustralia.com.au](http://www.riotintocoalaustralia.com.au)).

### 7.3 Review of this Management Plan

This BMP will be reviewed within three months of the submission of the Annual Review and updated to the satisfaction of the Director-General of the DP&I where necessary.

This BMP will also be reviewed, and revised if necessary, within three months of the completion of an independent environmental audit, any non-compliance of the Approvals' criteria or any modification to the conditions of the Approvals.

Any major amendments to this BMP that affect its application will be undertaken in consultation with the appropriate regulatory authorities and stakeholders. Minor changes such as formatting edits may be made with version control on the Project website.

This BMP may also be revised due to:

- deficiencies being identified;
- introduction of additional mitigation measures or controls;
- results from the monitoring and review programme, including exceedances of criteria;
- recommendations resulting from the monitoring and review programme;

## 7.4 Roles and Responsibilities

**Table 9.1: Roles and Responsibilities<sup>1</sup>**

<b>Manager – Environmental NSW</b>
<ul style="list-style-type: none"> <li>Oversee the implementation of the BMP</li> <li>Regulator liaison</li> <li>Technical oversight</li> </ul>
<b>Manager – Mining</b>
<ul style="list-style-type: none"> <li>Direction and operational oversight</li> </ul>
<b>Dragline Drill and Blast Superintendent</b>
<ul style="list-style-type: none"> <li>Implementation of operational aspects of Blast Management Plan</li> <li>Co-ordination of incident investigations</li> <li>Co-ordination of review of Road Closure Management Plan and Post-blast fume generation mitigation and management plan</li> </ul>
<b>Drill and Blast Engineer</b>
<ul style="list-style-type: none"> <li>Blast design and scheduling</li> <li>Review of blast monitoring data and manual trigger of blast events</li> <li>Investigation into blast exceedance, incidents and complaints</li> <li>Maintain records for blasts initiated</li> </ul>
<b>Mining Supervisor</b>
<ul style="list-style-type: none"> <li>Blasting in accordance with this BMP and site procedures</li> <li>Road closures</li> </ul>
<b>Site Environmental Co-ordinator</b>
<ul style="list-style-type: none"> <li>Involvement in investigations of blasting exceedances, incidents or complaints with the Drill and Blast Engineer</li> <li>Manage blasting related complaints in accordance with complaints management procedure</li> </ul>
<b>Environmental Specialist systems and monitoring</b>
<ul style="list-style-type: none"> <li>Implement and maintain the blast monitoring and real time environmental monitoring network</li> <li>Coordinate periodic review of monitoring data and subsequent reporting</li> <li>Implement and maintain blasting permissions pages and predictive forecast tools</li> </ul>
<b>Shot-firers</b>
<ul style="list-style-type: none"> <li>Notify the Drill and Blast Engineer and Blasting Supervisor of any factors that may lead to non-compliance with this BMP</li> <li>Load and fire blasts in accordance with design supplied by the Drill and Blast Engineer</li> <li>Ensure update of the blasting hotline</li> </ul>

<sup>1</sup> Roles and responsibilities may be changed from time to time outside of the approval process of this BMP

## REFERENCES

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- Mount Thorley Development Consent (DA 34/95);
- Warkworth Mining Limited Development Consent (DA 300\_9\_2002\_i);
- The EIS titled '*Extension of Mining at Mount Thorley Operations*', dated August 1995 and prepared by ERM Mitchell McCotter;
- The Statement of Environmental Effects titled '*Abbey Green Project Alterations*', dated January 2010 and prepared by Environmental Management Group Australia;
- The EIS titled '*Extension of Warkworth Coal Mine*', dated August 2002 and prepared by Environmental Resource Management Australia Pty Ltd;
- The Environmental Assessment titled '*Warkworth Modification 6*', dated November 2013 and prepared by EMGA Mitchell McLennan
- Environmental Management Strategy (Coal & Allied 2013);
- Rio Tinto Environment Performance Standard E6 – Noise and Vibration;
- Rio Tinto Coal Australia (RTCA) integrated Health, Safety, Environment, Quality Management System (HSEQMS) Framework  
MTW Pollution Incident Response Management Plan
- Rio Tinto Coal Australia HSEQ14 – Incident and Action Management
- CNA-09-EWI-SITE-003 (Environmental Complaints Line)
- CNA-09-EWI-SITE-058 (Complaints Database)
- *Environmental Planning and Assessment Act 1979*
- *Workplace Health and Safety Act 2011 (NSW)*
- *Explosives Act 2003 (NSW)*
- *Protection of the Environment Operations Act 1997 (NSW)*
- Australian and New Zealand Environment and Conservation Council ANZECC. 1990. Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration.

## Appendix A - Consultation with EPA

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12 March 2014

Environmental Protection Authority NSW  
PO Box 448G  
NEWCASTLE NSW 2300

**ATTN: Bill George**

Dear Bill

**RE: Coal & Allied Operations – EPA Consultation on Noise, Air Quality,  
Blasting and Water Management Plans**

We refer to relevant conditions in contemporary Approvals granted under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act), requiring Coal and Allied to consult with the EPA during development of Environmental Management Plans for Noise, Air Quality and Greenhouse Gas, Blasting, and Water.

We note that the EPA has previously advised (including letter from the EPA to Hunter Valley Operations, reference DOC13/22620, LIC07/2074-07), that while “*the...EPA encourages the development of such plans... [the] EPA does not review these documents as our role is...not to be directly involved in the development of strategies to achieve those objectives*”.

We therefore write seeking confirmation on whether EPA requires to be consulted on the drafting of such plans for Coal & Allied’s mining operations in the Hunter Valley in future.

We would be grateful if you could please advise of the EPA’s position in this regard by 30 April 2014.

We look forward to hearing from you.

Yours sincerely



**Coal & Allied Operations Pty Ltd**

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Rio Tinto Coal Australia

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[Andrew.Speechly@riotinto.com](mailto:Andrew.Speechly@riotinto.com) <http://www.riotintocoalaustralia.com.au>



Your reference:  
Our reference: DOC14/115042, EF13/2793  
Contact: Bill George (02) 4908 6821  
Electronic correspondence to: [hunter.region@epa.nsw.gov.au](mailto:hunter.region@epa.nsw.gov.au)

Coal & Allied Operations Pty Ltd  
PO Box 315  
Singleton NSW 2330

Attention: Andrew Speechly

Dear Mr Speechly

**RE: COAL & ALLIED OPERATIONS – EPA CONSULTATION ON NOISE, AIR QUALITY  
BLASTING AND WATER MANAGEMENT PLANS**

I refer to your letter to the Environment Protection Authority (EPA) dated 12 March 2014 seeking confirmation that the EPA does not require to be consulted on Management Plans. I apologise for the delay in responding to your letter.

As stated previously, the EPA encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, the EPA does not review these documents as our role is to set environmental objectives for environmental management, not to be directly involved in the development of strategies to achieve those objectives.

The EPA therefore confirms that we do not wish to be consulted on the drafting and/or the review of management plans.

If you wish require any further information regarding this advice please contact me on (02) 4908 6821.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Bill George', followed by the date '2.7.14'.

**BILL GEORGE**  
**Head Regional Operations Unit – Hunter**  
**Environment Protection Authority**

# Appendix B – Examples of Blasting tools

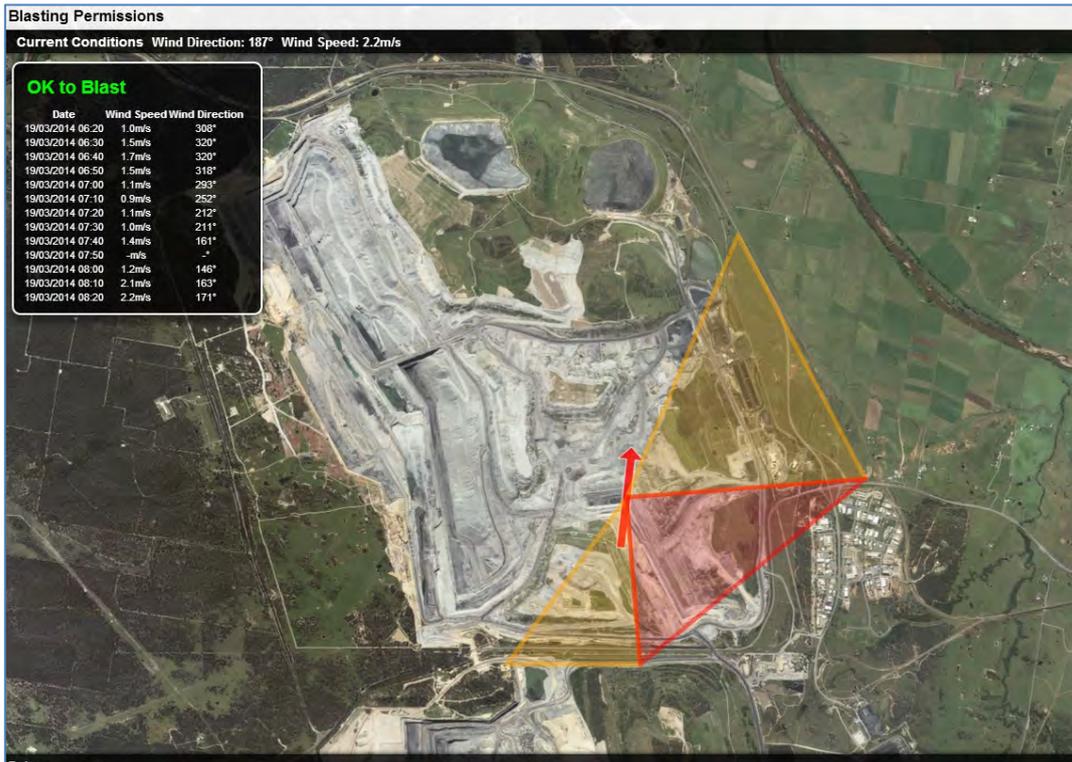


Figure 1 - Example of an MTW Blasting Permissions Page

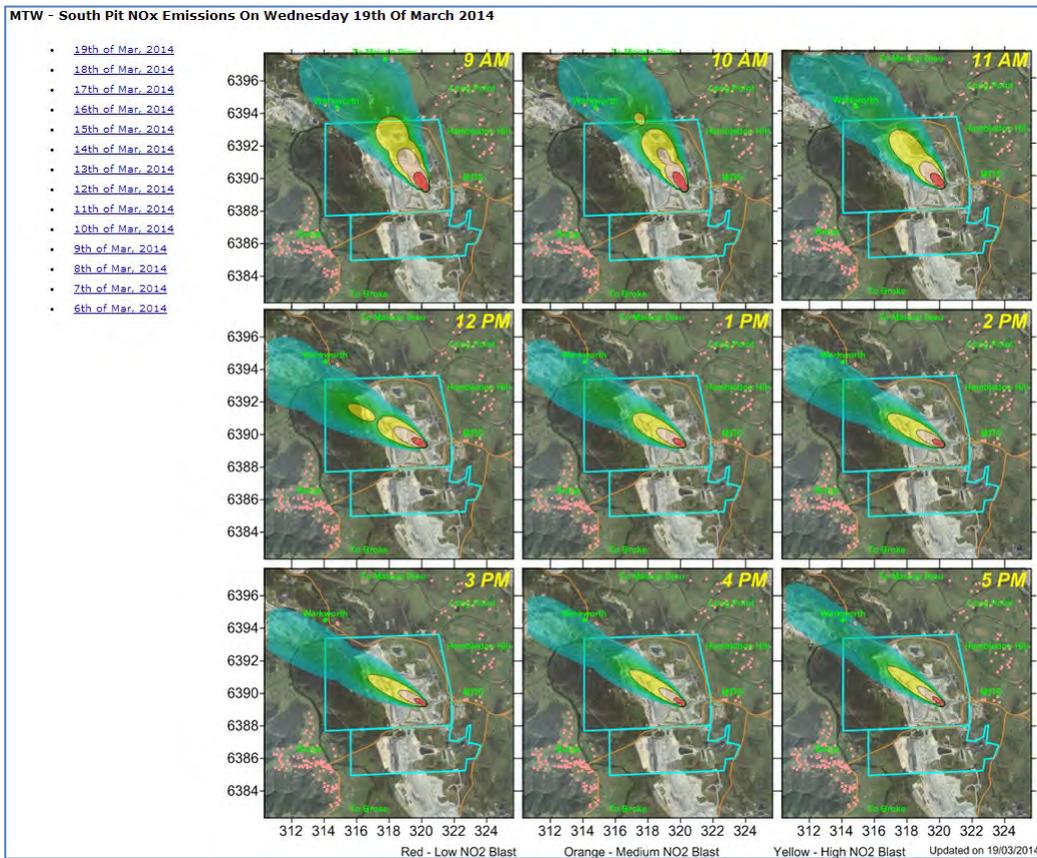


Figure 2 - Example of meteorological forecast information

## Appendix C - Post Blast Fume Generation Mitigation and Management Plan

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# Mount Thorley Warkworth: Post Blast Fume Generation Mitigation and Management Plan

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Edition: Revised  
Date: March 2014

# Table of Contents

Table of Contents .....	2
1. Introduction .....	3
2. NOx Fume .....	4
3. The causes of fume in blasting.....	4
4. Identification of persons to prevent fumes.....	4
5. Causes & Control Matrix.....	9
6. Management of fume .....	16
7. Documentation and records.....	20
8. Glossary .....	21
APPENDIX 1 – GENERALISED FLOWCHART FOR FUME EVENT.....	22
APPENDIX 2 - VISUAL NOx GASES RATING SCALE .....	23
APPENDIX 3 – HEALTH AND SAFETY RISKS OF BLAST FUMES.....	25
APPENDIX 4 - INFORMATION FOR TREATING MEDICAL STAFF.....	28
References.....	30
Document Control .....	32

# 1. Introduction

This document has been prepared to provide a protocol for the mitigation and management of post blast NOx fumes from blasting operations at Mount Thorley Warkworth (MTW) and is based on the AEISG Code of Practice (2011). This provides the basis on which to make blasting decisions to minimise the incident and severity of post blast fume events at MTW.



Figure 1: MTW Operations & local communities

## **2. NO<sub>x</sub> Fume**

All blasting explosives produce large volumes of gas in very short time span (milliseconds).

The application of ammonium nitrate based blasting explosives in the field, under variable conditions, can lead to non-ideal explosive reactions and the production of Nitric oxide (NO) and Nitrogen dioxide (NO<sub>2</sub>). Nitric oxide is unstable in air and readily oxidises to nitrogen dioxide. Nitrogen dioxide is identifiable by the generation of orange/brown clouds.

## **3. The causes of fume in blasting**

Fumes are generated as a result of an explosive not reacting with a full, high order, steady state detonation. The causes of this are many and variable. This protocol groups causes into categories and further identifies controls that are best able to control the variable. The seven main categories that contribute to post blast fume are listed below in the order in which they are encountered in the mining process:

1. Geological conditions
2. Climate/seasonality.
3. Blast design.
4. Explosive product selection.
5. Explosive quality.
6. Contamination of explosive in the blast-hole.
7. On-bench practices.

## **4. Identification of persons to prevent fumes**

This section identifies the persons in the organisation and their role in relation to ensuring post blast fume from blasts is minimised.

- Drill and Blast Superintendent
- Mine Operations Planner
- Geologist
- Drill & Blast Engineer
- Drill Supervisor
- Drill Operator
- Shotfiring and Pumps Supervisor
- Shotfirer
- Traffic Road Runner
- Trainee Shotfirer / Shotfirer Assistant
- MMU Operator
- Explosives Manufacturer/Supplier

Person	Role	Responsibilities/Remarks
Drill and Blast Superintendent	Manage all drill and blast operations for the site.	<p>Incorporation of process steps and hazards related to blast fume into Standard Operating Procedures for drilling, charging, stemming, blast guarding, post blast inspection</p> <p>Adequate resourcing of blasting activities.</p> <p>Reporting on the tracking of fume ratings to mine management</p> <p>Resolve any environmental blast permissions issues</p> <p>Risk review for extended fume management zone</p> <p>Escalate fume events to the appropriate level and team within RTCA.</p>
Mine Operations Planner	Plan the mine/pit operations to extract coal	Design extraction plan to minimise those blasting activities such as box cuts or blast areas that do not have a free face. Designs to consider separate removal of softer weathered horizons
Geologist	Provide data on ground conditions to assist blast designer with shot design	<p>Accurate provision of ground data across the proposed shot.</p> <p>Geology &amp; rock mass conditions.</p>

<p>Drill and Blast Engineer</p>	<p>Design a blast to provide good extraction of material while manage blasting hazards</p>	<p>Maintenance of the site Blast Management Plan</p> <p>Maintain site design matrices, charging rules, procedures and workflow for design</p> <p>Conduct preload risk rating</p> <p>Blast design to consider:</p> <ul style="list-style-type: none"> <li>• Conduct preload risk rating</li> <li>• Explosive product selection appropriate to ground and water conditions.</li> <li>• Geology &amp; rock mass conditions.</li> <li>• Historical blast performance for the current area.</li> <li>• Weather conditions during loading and firing.</li> </ul> <p>Conduct prefire risk rating</p> <p>Assist with risk review for extended fume management zone</p> <p>Capture blast videos; to be kept for at least one year.</p> <p>Measure post blast fume concentrations and refine site fume site-law (under development)</p> <p>Post blast assessment and blast fume records including most likely cause of fume event and potential control measures. Records to be kept for 4 years</p>
<p>Drill Supervisor</p>	<p>Supervise drill activities on the bench.</p>	<p>Conduit between drill activity and Drill &amp; Blast Engineer.</p> <p>Bench preparation prior to drilling.</p>
<p>Drill Operator</p>	<p>To provide drilled holes for the loading of explosives for a shot.</p>	<p>Accurately drill the shot plan and report variations.</p> <p>Report anomalous ground conditions to drill supervisor and/or Drill and Blast Engineer</p> <p>Collar protection of holes.</p>

<p>Shotfiring and Pumps Supervisor</p>	<p>Manage day to day blasting operations and bench dewatering as required</p>	<p>Competence of blast team – including fume management training</p> <p>Review the use of products appropriate to conditions.</p> <p>Review actual loaded condition of blast prior to shot being fired.</p> <p>Compliance check of on bench activity.</p> <p>On bench water management.</p> <p>Notification of blast activities to affected teams</p> <p>Assist with risk review for extended fume management zone</p> <p>Report all fume events to the area Superintendent.</p>
<p>Shotfirer</p>	<p>Manage all explosives activities on bench.</p>	<p>Supervision of Trainee Shotfirer</p> <p>Compliance with design.</p> <p>Notify any variations from design.</p> <p>Recording explosive use data.</p> <p>Supervision of loading technique;</p> <ul style="list-style-type: none"> <li>• Preventing contamination of the explosive column.</li> <li>• Stemming.</li> <li>• Accurate placement of gas bags.</li> <li>• Monitor product usage during loading</li> </ul> <p>Manage MMU's on bench operations;</p> <ul style="list-style-type: none"> <li>• Ensuring QC density checks completed.</li> <li>• Hose handling for pumped products.</li> </ul> <p>Conduit between on-bench and blast supervisor.</p> <p>Identifying and reporting hole slumping.</p> <p>Assist with risk review for extended fume management zone</p> <p>Checking blasting permissions page prior to firing to ensure favourable conditions.</p> <p>Initiate emergency if fume travels beyond fume management zone</p> <p>Blast assessment against blast fume scale rate and record the fume characteristics of all shots using the AESIG fume rating system (even where there is no visible fume).</p>

Traffic Road runner	Manage road closure activities under direction of shotfirer	<p>Measure post blast fume concentrations to ensure roadway safe</p> <p>If fume migrates from the fume management zone, monitor travel path and if possible measure concentration level.</p> <p>In the event of impending fume event assist with distribution of “fume event protocol” for vehicles stopped for road closure</p>
Trainee Shotfirer / Shot firer Assistant	<p>Support Shotfiring activities</p> <p>On bench activities as directed by the Shotfirer</p>	<p>Measuring the depth of holes.</p> <p>Identifying water conditions down hole prior to loading.</p> <p>Positioning of primers in blast holes.</p> <p>Accurate placement of gas bags.</p> <p>Identifying hole slumping.</p>
MMU Operator	<p>Manufacture blasting explosives</p> <p>On bench activities as directed by the Shotfirer</p>	<p>Compliance with Shotfirers loading instructions.</p> <p>MMU Calibration.</p> <p>Adequate and correct process chemicals.</p> <p>Manufacture QC checks.</p> <p>Generate delivery/production records.</p> <p>Comply with system for effective stock rotation of AN prill and emulsion</p>
Explosives manufacturer/ Supplier	Provide explosives fit for purpose	<p>Manufacturing equipment compliance</p> <p>Provision of precursors and formulation to ensure minimum amount of fume.</p> <p>Change management of formulation to ensure fumes are minimised in product.</p> <p>Design, calibration and operation of explosives manufacturing equipment to deliver consistent explosives within specification.</p> <p>Provide recommendations for product use and training as required.</p> <p>Share best practices or learning relating to fume management.</p> <p>Develop, maintain and improve an explosives quality assurance and quality control programme.</p>

## 5. Causes & Control Matrix

The following matrix covers each potential causes and situations that may contribute to fume generation, identified in section 3 of this protocol. For each potential cause, a likely indicator and control measure is outlined.

Primary Cause 1: Geological conditions		
Potential Cause	Likely indicators	Control measures
Blasting in weak/soft strata  (Incorrect Timing and Pattern Design)	<ul style="list-style-type: none"> <li>• Specific areas known to contain weak/soft strata only</li> <li>• Excessive Powder Factor</li> </ul>	Understand geology of each shot and design blast (timing and explosive product) to ensure adequate relief in weak/soft strata, for example incorporation of a free face, reduction of powder factor, modified timing and increased stemming.
Explosive product seeping into cracks	<ul style="list-style-type: none"> <li>• Slumping</li> <li>• Specific areas known to contain a high incidence of faulted/fractured ground only</li> <li>• Not achieving designed collar height when loading as per load sheet</li> </ul>	Consider manufacturer's recommendations on explosive product selection
		Consider use of blast hole liners or bag off above cracking
		Record and monitor blast holes which have slumped or require excessive explosive product to reach stemming height, but where water is not present
Dynamic water in holes	<ul style="list-style-type: none"> <li>• Slumped blast holes</li> <li>• Usually when using non water-resistant explosive products</li> </ul>	Minimise sleep time of shot
		Consider manufacturer's recommendations on explosive product selection
		Understand hydrology of pit and plan blasting to avoid interaction between explosives and dynamic water (either natural or from other pit operations)  Check after pumping to understand recharge rate of the drill hole.

Moisture in clay	<ul style="list-style-type: none"> <li>When clay or clay rich strata present</li> </ul>	If the drill holes are defined as wet, then water resistant explosive products with appropriate energy will be used in the loading of these holes.
Blast hole deterioration between drilling and loading	<ul style="list-style-type: none"> <li>Traceable to specific geological areas</li> <li>Dipped depth inconsistent with drilled depth indicating hole collapse</li> </ul>	Minimise time between drilling and loading
		Use hole savers
		Drill and Blast Engineer to ensure benches are unaffected by backbreak from earlier blasts, for example presplits, buffers etc.
		Optimise drilling practices to minimise hole damage.
Ground movement	<ul style="list-style-type: none"> <li>Horizon offset (bench, etc.)</li> <li>Area previously known for misfires</li> </ul>	Design sequence timing to prevent hole movement and dislocation of explosives columns.

Primary Cause 2: Climate / seasonality		
Potential Cause	Likely indicators	Control measures
Rainfall on a sleeping shot.	<ul style="list-style-type: none"> <li>Excessive rainfall</li> <li>Slumping of holes</li> <li>Ponding of water on pattern</li> </ul>	Review rainfall forecasts for planned sleep time of shot and select explosive products according to manufacturer's recommendations.
		Minimise sleep time for dry blast hole explosive products if rain is predicted. Consider early firing of blast.
		Bench design for water runoff with appropriate bunding & drainage.
		If a large rain event is predicted to impact on a live shot, than the top of blast holes will be protected to prevent water ingress by constructing contour drains to divert water away from hole collars with an excavator.
		Consider removing water affected product.
		Loaded drill holes are to be inspected for slumping prior to initiation after a rainfall event.

Primary Cause 3: Blast Design		
Potential Cause	Likely indicators	Control measures
Explosive desensitisation due to the blast hole depth	<ul style="list-style-type: none"> <li>In deep holes only</li> </ul>	Reduce bench height
		Ensure adequate relief in deep holes
		Consider manufacturer's recommendations on explosive product selection and blast design for deep holes
Inappropriate priming and/or placement	<ul style="list-style-type: none"> <li>Residue product</li> </ul>	Consider manufacturer's recommendations on explosive product initiation, in general, top and bottom priming in holes greater than 15m deep.
Inter-hole explosive desensitisation	<ul style="list-style-type: none"> <li>Blast holes drilled closer together than planned</li> <li>Blast hole deviation differs greatly from planned</li> </ul>	Review the design and adjust for actual drilling
		Review product selection and adjust for new design
Intra-hole explosive desensitisation in decked blast holes	<ul style="list-style-type: none"> <li>When using decks only</li> </ul>	Appropriate separation of explosive decks.  Initiator timing.
Excessive confinement (Incorrect Timing and Pattern Design)	<ul style="list-style-type: none"> <li>Specific to blasts known to be confined</li> <li>No free face present</li> <li>Excessive Powder Factor</li> </ul>	Understand geology of each shot and design blast (timing and explosive product) to ensure adequate relief in all strata. Consider incorporation of a free face, reduction of powder factor, modified timing, depth of blast, etc.

Primary Cause 4: Explosive product selection		
Potential Cause	Likely indicators	Control measures
Non water-resistant explosive products loaded into wet or dewatered holes	<ul style="list-style-type: none"> <li>Blasts containing wet/dewatered blast holes only</li> </ul>	Consider manufacturer's recommendations on explosive product selection
		Education of bench crew on explosive product recommendations from current supplier
		Discipline in on-bench practices Follow load sheet
Excessive energy in strata desensitising adjacent explosive product columns	<ul style="list-style-type: none"> <li>Specific to areas known to contain weak/soft strata only</li> </ul>	Understand geology of each shot and design blast (timing and explosive product) to match, for example reduction of powder factor.
		Consider manufacturer's recommendations on explosive product selection
		Obtain appropriate technical assistance if required to ensure optimal result
Primer of insufficient strength to initiate explosive column	<ul style="list-style-type: none"> <li>For blasts using a particular primer type / size</li> </ul>	Consider manufacturer's recommendations on compatibility of initiating systems with explosives
Desensitisation of explosive column from in-hole detonating cord initiation	In areas where in-hole cord initiation is used	Consider manufacturer's recommendations on compatibility of initiating systems with explosives

Primary Cause 5: Explosive quality		
Potential Cause	Likely indicators	Control measures
Explosive product incorrectly formulated	<ul style="list-style-type: none"> <li>All areas associated with loading from a specific delivery system</li> <li>Product appearance abnormal</li> </ul>	Explosives formulated by supplier to an appropriate oxygen balance to minimise the likelihood of post-blast fume  Development and maintenance of an explosive QA/QC programme.
Inadequate mixing of raw materials	<ul style="list-style-type: none"> <li>In all areas associated with loading from a specific delivery system</li> <li>Product appearance abnormal</li> </ul>	Visual check
		Density check
		MMU Calibration check

Delivery system metering incorrectly  (on bench incorrect manufacture of product)	<ul style="list-style-type: none"> <li>All blasts and all locations utilising explosive product(s) that incorporate a specific precursor</li> </ul>	Regular calibration of MMU
		Quality control of explosive products conducted in accordance with manufacturer's recommendations
Explosive precursors not manufactured or supplied to specification or degradation during transport and storage	<ul style="list-style-type: none"> <li>Traceable to a precursor which has degraded between manufacture and use</li> </ul>	Contractor Management System – Audits of supplier to ensure compliance with QA/QC systems.
Initiation explosives not manufactured to specification or degradation during transport and storage	<ul style="list-style-type: none"> <li>Damaged packing or out-of-date stock</li> <li>Misfire</li> </ul>	<p>MTW-10-WI-MINE-244-002 Conduct Magazine Operations requires</p> <ul style="list-style-type: none"> <li>At time of stock-take or delivery, check manufacturing date of stock and condition of boxes</li> <li>If there are multiple boxes of the same item open, the Magazine Keeper should (where possible) consolidate items into a single box to minimise the number of opened boxes, without exceeding the maximum quantity allowed for each box</li> <li>Rotate stock in a systematic manner that ensures that older stock gets used first</li> </ul>
Raw material changes	<ul style="list-style-type: none"> <li>All areas associated with loading from a specific delivery system</li> <li>Product appearance changed</li> </ul>	Change management procedures in place by suppliers
		Prior notification to suppliers from site change management systems where other raw materials are supplied by the customer, for example diesel fuels
Product Degradation	<ul style="list-style-type: none"> <li>Slumping of holes</li> </ul>	<p>Sleep time of 4 days maximum for all shots.</p> <p>Sleeping a shot more than 4 days requires the approval by the Drill and Blast Superintendent.</p> <p>Any sleeping shot is inspected daily by the shot firer when in attendance.</p>

Primary Cause 6: Contamination of explosives in the blast hole

Potential Cause	Likely indicators	Control measures
Explosive product mixes with mud/sediment at bottom of hole.	<ul style="list-style-type: none"> <li>• Blasts containing wet/dewatered blast holes only</li> <li>• Dipped depth inconsistent with drilled depth indicating hole collapse</li> </ul>	Optimise drilling practices to minimise blast hole damage
		Ensure appropriate loading practices are followed during charging
		Ensure primer is positioned in undamaged explosive product
		Where mud or sediment is identified in a hole from dipping, a gas bag will be used to separate mud/sediment from explosive product.
		Use blast hole savers
Penetration of stemming material into top of explosive column (fluid/pumpable explosive products only)	<ul style="list-style-type: none"> <li>• Blasts charged with fluid/pumpable explosive products only</li> </ul>	Use appropriate stemming material
		Ensure explosive product is gassed to manufacturers specifications before stemming
Water entrainment in explosive product	<ul style="list-style-type: none"> <li>• Blasts containing wet/dewatered blast holes only</li> <li>• Dynamic water present</li> <li>• Historical groundwater information</li> </ul>	Adjust explosive product selection according to manufacturer's recommendations depending on changing conditions.
		Ensure appropriate loading practices are followed during charging
		Eliminate top loading into wet blast holes that cannot be dewatered
		Ensure all primers are positioned in undamaged explosive product
		Use of gas bags in dewatered or contaminated blast holes
		Protect top of explosives column to prevent water ingress

	<p>Reduce excessive hose lubrication during charging</p> <p>Adjust explosive product selection according to manufacturer's recommendations for wet environment.</p>
	<p>Verify correct hose handling practices are in place</p>
	<p>Load low blast holes last where practical</p>
	<p>Minimize sleep time where practical</p>

Primary Cause 7: On bench practices		
Potential Cause	Likely indicators	Control measures
Hole condition incorrectly identified	<ul style="list-style-type: none"> <li>Slumping of holes</li> <li>Unexpected material in drill cuttings</li> </ul>	Assess all holes prior to loading in particular presence and extent of any water
		Use number and location of wet holes as a basis for explosive product selection and determining loading sequence
		Minimise time between drilling and loading, especially in soft and clay strata. Note: Enough time should be allowed for any dynamic water in the hole to be identified
		Assess holes for slumping on any sleeping shots
		Minimise sleep time
Blast not drilled as per plan	<ul style="list-style-type: none"> <li>Can be correlated with incorrectly drilled patterns</li> </ul>	Drillers to report holes not complying with plan. Verify drill hole accuracy in areas considered critical using drill hole positioning and recording system. Adjust design as necessary.
Dewatering of holes diverts water into holes previously loaded with dry hole explosive products	<ul style="list-style-type: none"> <li>Visual inspections of water on bench.</li> <li>Bench setup, understanding gradient of bench for water runoff</li> </ul>	Load wet holes in a sequence that ensures other holes are not impacted. Adjust explosive product selection according to manufacturer's recommendations.

## 6. Management of fume

Due to the close proximity of the Putty Road, Charlton Road, Wallaby Scrub Road and Mount Thorley Industrial Estate to Mount Thorley Warkworth lease boundaries, blasting restrictions detailed in MTW-13-ENVMPR-SITE-E6-013 MTW Blast and Vibration Monitoring Programme such as wind speeds and directions, are strictly observed. Any shot expected to produce fume that is in close proximity to the aforementioned public areas require a road closure as per MTW-Road Closure Management Plan

Within site boundaries, the blasting exclusion zone and sentry procedure takes into account the location of mine personnel on the lease at the time of detonation. A minimum 500 m exclusion zone is the standard for MTW however may be extended to any distance at the shotfirer's discretion. This includes reducing the risk of exposure to personnel downwind of a blast with the potential for fume.

The health and safety risks of blast fumes and information for treating medical staff is outlined in Appendix 3 & 4

In the event that a post-load risk rating indicates the likelihood of fume the following protocol is to apply

Report / Record	Responsibility	Content
Identify factors contributing to potential fume	Drill and Blast Engineer	<ul style="list-style-type: none"> <li>▪ Horizon history</li> <li>▪ Clay / weak material</li> <li>▪ Rain during loading</li> <li>▪ Holes slumping</li> <li>▪ Product selection issues</li> <li>▪ Product delivery issues</li> <li>▪ Excessive sleep time</li> <li>▪ Dynamic water</li> </ul>
Defining Fume Management Zone	Competent group consisting of Superintendent, Supervisor, Engineer and Shotfirer – all persons inside the FMZ to be evacuated and area sentried prior to blast	Extent of zone based on <ul style="list-style-type: none"> <li>• Likely fume level at blast to be assessed by group based on above factors</li> <li>• Wind speed and direction</li> <li>• Inversions</li> <li>• Cloud cover</li> <li>• Time of day</li> <li>• Atmospheric stability</li> <li>• Temperature</li> <li>• Humidity</li> <li>• Dispersion model (Fume dispersion site-law under development)</li> </ul>
Fume management zone notifications	D&B Engineer  Supervisor	A hardcopy plan with FMZ clearly marked on current aerial photo along with any sensitive sites (Roads, Bulga Coal, Industrial Area)  Internal notifications <ul style="list-style-type: none"> <li>▪ Daily blast schedule email, Daily</li> </ul>

	D&B Engineer / Supervisor  Environmental Officer	<ul style="list-style-type: none"> <li>planning meeting</li> <li>▪ Time permitting – TBT fume</li> <li>▪ protocols - windows up, a/c on recirculation</li> <li>▪ ESO to be on standby for high potential events</li> </ul> <p>Bulga Coal where appropriate</p> <p>Road closure notifications - As per Road Closure Management Plan</p> <p>External Stakeholders such as DoP, EPA, Community, etc.</p>
Firing Blast – as per MTW-10-WI-MINE-244-011- FIRING A SHOT & MTW-10-WI-MINE-244-009 Closing Public Roads	Traffic Road runner  All  Shotfirer  D&B Engineer	<p>Fume level measurements as part of road inspection</p> <p>Fume protocol for vehicle occupants – verbal or document - Windows up and a/c on recirculation</p> <p>Fume observation - Warning message to potentially impacted parties if required –</p> <ul style="list-style-type: none"> <li>• Windows up and a/c on recirculation</li> </ul> <p>To utilize fume monitor when conducting post blast inspection</p> <p>Video blast</p> <p>Fume level measurements (monitoring)</p>
Fume Emergency	All	<p>Shot firer, supervisor or sentry or any witness to raise emergency based on observations. ESO and OCE to coordinate response.</p> <p>Advice for anyone potentially affected by fume</p> <ul style="list-style-type: none"> <li>• Get out of the cloud.</li> <li>• Seek fresh air.</li> <li>• Use water to reduce the amount of exposure to wash out eyes and clear nose and throat</li> </ul> <p>See Appendix 3 &amp; 4 for health and safety</p>

		risks of fume and advice for treating medical staff
Reporting	Shotfirer  D&B Engineer  Supervisor	<p>MTW-10-REG-MINE-245-001 Shotfiring Shift Report.</p> <p>Assess FMZ against forecast</p> <p>Update fume dispersion site law based on new measurements</p> <p>Notify Explosives Supplier of fume event to aid in investigation and communication</p> <p>The following fume events shall be raised as incidents:</p> <ul style="list-style-type: none"> <li>• a blast rated 3 when leaving site or 4 or 5 on the blast fume rating scale;</li> <li>• the visible fume cloud travels beyond the blast exclusion zone;</li> <li>• when any person has been directly exposed to fumes</li> </ul> <p>Note that a road closed for the purpose of blasting is considered part of the site</p> <p>The following factors should be considered for inclusion in any post-blast incident report:</p> <ul style="list-style-type: none"> <li>• date and time of blast;</li> <li>• explosives type, quantity, initiation type;</li> <li>• ground geology (soft, faults, wet);</li> <li>• post-blast NOx gas rating, eg 0 – 5 &amp; A-C;</li> <li>• duration of any post-blast NOx gas event (measure of time to disperse);</li> <li>• direction of movement of any post-blast NOx plume;</li> <li>• movement of any post-blast NOx gas plume relative to the established exclusion zone and any established management zone (ie maintained within, exceeded);</li> <li>• climate conditions, including temperature, humidity, wind speed and direction, cloud cover, rain;</li> <li>• results/readings of any NOx monitoring equipment employed for the blast</li> <li>• video results of blast where relevant.</li> </ul>



## 7. Documentation and records

The documentation and records used for the preparation and firing of a blast are retained in the Drill and Blast Office. The records contain:

Report / Record	Responsibility	Content
Blast design and performance record	Drill and Blast Engineer	<ul style="list-style-type: none"> <li>• Blast Design</li> <li>• Drill Pattern Plans</li> <li>• Preload risk rating</li> <li>• Load Sheet</li> <li>• Blasting Schedule               <ul style="list-style-type: none"> <li>○ Location of Blast</li> <li>○ Type of Blast</li> </ul> </li> <li>• Pre-fire risk rating</li> <li>• Video of blast               <ul style="list-style-type: none"> <li>○ Operator is to ensure that filming continues post detonation, to ensure any potential fume or dust clouds are captured.</li> </ul> </li> <li>• Environmental records               <ul style="list-style-type: none"> <li>• Air Blast</li> <li>• Vibration</li> <li>• Fume rating</li> <li>• Measured fume concentration and weather details</li> <li>• Video frame jpegs representative of plume dispersion</li> </ul> </li> <li>• Monthly reconciliation of blasted volumes</li> </ul>
Explosives stock control	Shotfirer	<ul style="list-style-type: none"> <li>• Quantity (weight/numbers of units) of explosives delivered</li> <li>• Quantity (weight/numbers of units) of explosives used on a shot basis</li> </ul>

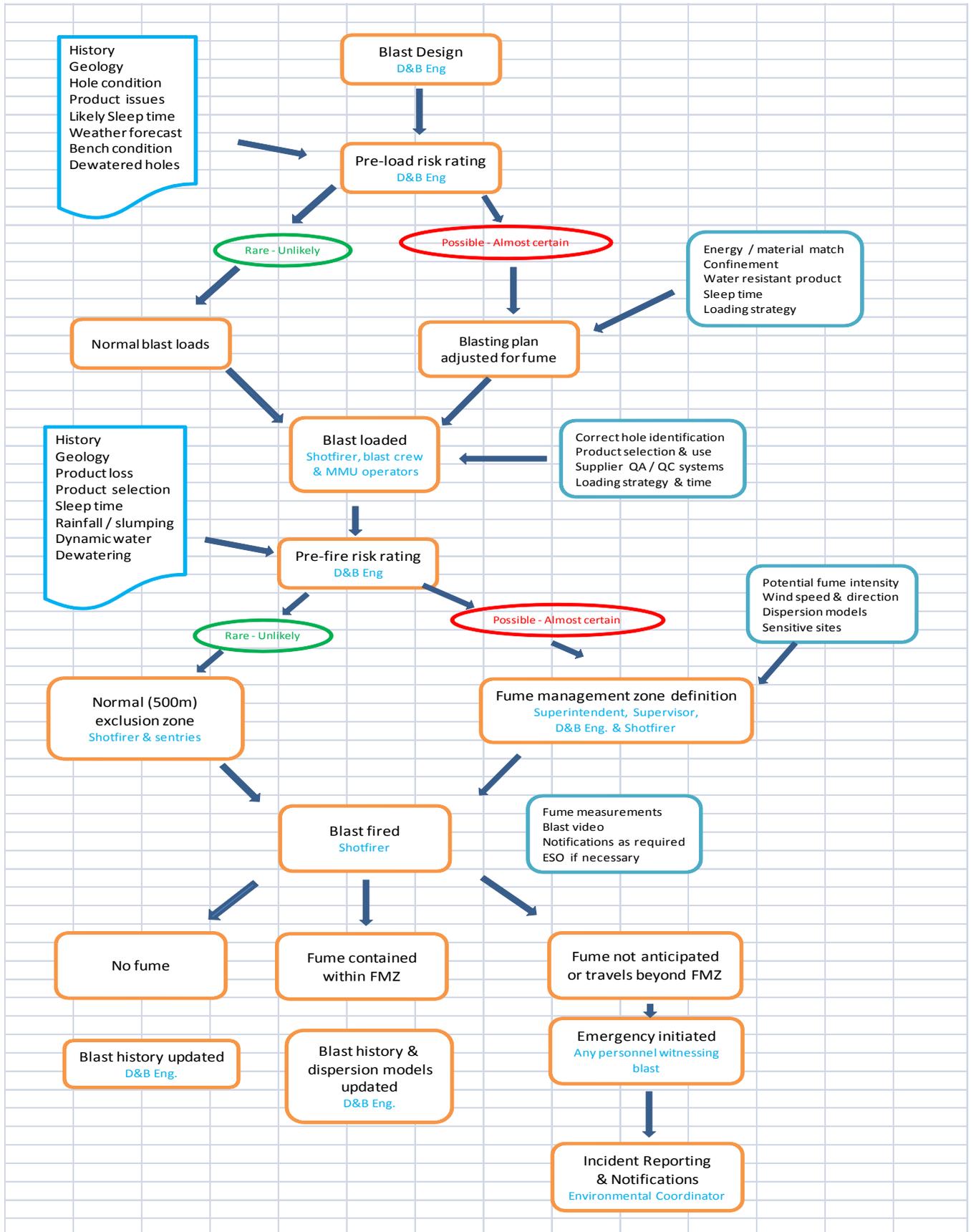
Shotfiring Report	Shotfirer in charge	<ul style="list-style-type: none"> <li>• Date/time of firing</li> <li>• Name, type and location of shot</li> <li>• Explosives type, tonnages delivered of explosives used</li> <li>• Number of holes charged (for day/total)</li> <li>• Pattern Size</li> <li>• Hole Diameter</li> <li>• Average Hole Depth</li> <li>• Numbers of holes fired</li> <li>• General comment on blast loading progress or results.</li> <li>• Environmental comments</li> <li>• Fume Category</li> </ul>
Drill Shift Report	Drill Operator	<ul style="list-style-type: none"> <li>• Drill Number</li> <li>• Location/Pattern No.</li> <li>• Burden &amp; Spacing</li> <li>• Operator Name</li> <li>• Bit Size</li> <li>• Date/Time/Shift</li> <li>• Drilling task by the Hour</li> <li>• Hole Number</li> <li>• Hole Depth</li> <li>• Comments – including where holes are drilled off the designed location by more than 0.5m</li> <li>• Total Summary for shift</li> </ul>

## 8. Glossary

Wet Hole – A wet hole is defined as any drill hole containing more than 1 metre of water at the bottom of the hole and/or having wet sides anywhere down the hole. Any hole that has been dewatered is classified as a wet hole.

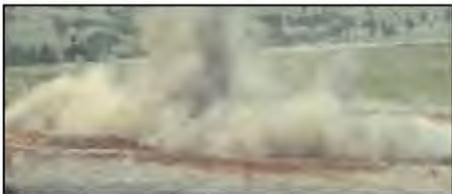
Dry Hole – A dry hole is defined as any drill hole having less than 1 metre of static water at the bottom of the hole. Should water be detected through the dipping process, a gas bag is used to close off the bottom of the hole, prior to the loading of any explosive product.

# APPENDIX 1 – GENERALISED FLOWCHART FOR FUME EVENT



## APPENDIX 2 - VISUAL NO<sub>x</sub> GASES RATING SCALE

The following table, together with the Field Colour Chart on the next page, details how NO<sub>x</sub> gases from a surface blast can be assessed [Ref 6, AESIG].

Level	Typical Appearance
Level 0 No fume	
Level 1 Fume	
Level 2 Minor yellow/orange fume	
Level 3 Moderate orange fume	
Level 4 Significant orange fume	
Level 5 Major red/purple fume	

### Field Colour Chart.

Assessing the amount of NO<sub>x</sub> produced from a blast will depend on the distance the observer is from the blast and the prevailing weather conditions. The Field Colour Chart can be used to assess the level of NO<sub>x</sub> that is produced in a surface blast.

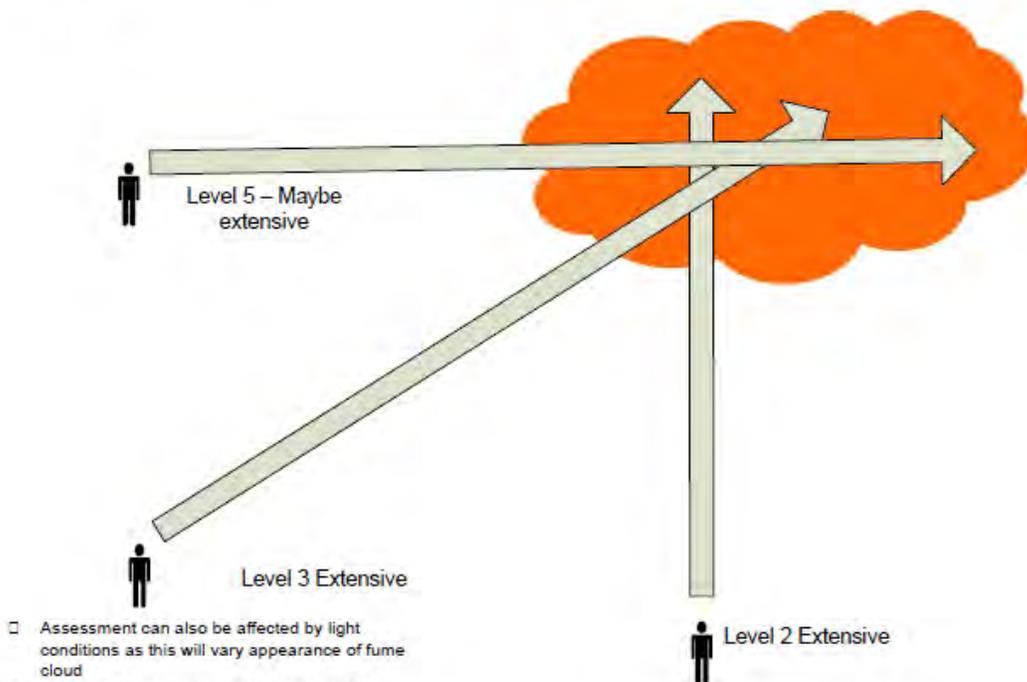
Pantone colour numbers have been included in the Field Colour Chart to ensure colours will always be produced correctly thereby ensuring a reasonable level of standardisation in reporting fume events across the mining industry.

Level	Colour	Pantone Number
Level 0 No Fume		Warm Grey 1C (RGB 244, 222, 217)
Level 1 Fume		Pantone 155C (RGB 244, 219, 170)
Level 2 Minor yellow/orange fume		Pantone 157C (RGB 237, 160, 79)
Level 3 Moderate orange fume		Pantone 158C (RGB 232, 117, 17)
Level 4 Significant orange fume		Pantone 1525C (RGB 181, 84, 0)
Level 5 Major red/purple fume		Pantone 161C (RGB 99, 58, 17)

### Observation Issues

The angle of the person to the fume event will influence the assessment. Where possible and without placing persons in the path of a fume cloud there should be a number of observers to record the level. This can be moderated to give a more accurate indication of the cloud.

The issue is that the observer position and fume cloud orientation may influence the rating given.



**EFFECT OF ANGLE TO FUME CLOUD AFFECTING ASSESSMENT**

## APPENDIX 3 – HEALTH AND SAFETY RISKS OF BLAST FUMES

### NIOSH Pocket Guides

The US National Institute for Occupational Safety and Health (NIOSH) produces the *NIOSH Pocket Guide to Chemical Hazards* (NPG)... “intended as a source of general industrial hygiene information on several hundred chemicals/classes for workers, employers, and occupational health professionals. The NPG does not contain an analysis of all pertinent data, rather it presents key information and data in abbreviated or tabular form for chemicals or substance groupings (e.g. cyanides, fluorides, manganese compounds) that are found in the work environment. The information found in the NPG should help users recognize and control occupational chemical hazards.”

The NIOSH Pocket Guides for NO, NO<sub>2</sub> and CO are reproduced with authority of the US Centers for Disease Control and Prevention, 1600 Clifton Rd, Atlanta, GA 30333, USA.

The guides can be accessed through the NIOSH Pocket Guide to Chemical Hazards homepage: <http://www.cdc.gov/niosh/npg/default.html>

Note that the exposure limits do not necessarily match the Australian STEL and TWA.

### *Health and Safety Risks of Blast Fumes*

#### **Nitrogen Dioxide (NO<sub>2</sub>)**

NO<sub>2</sub> is a toxic gas that irritates the eyes and mucous membranes, primarily by dissolving on contact with moisture and forming a mixture of nitric and nitrous acids.

Inhalation can result in respiratory tract irritation and pulmonary oedema. Onset of pulmonary oedema can be delayed and can cause death, so personnel who have been exposed to NO<sub>2</sub> must be observed in hospital for at least 12 hours. Changes in pulmonary function are evident at exposures levels of 2 to 3 ppm NO<sub>2</sub> [Ref 9]; asthmatics are particularly sensitive, potentially suffering significant broncho-spasm at very low concentrations.

NO<sub>2</sub> varies in colour from light orange through to reddish-brown, depending on the concentration and the light conditions. NO<sub>2</sub> is visible in concentrations above 2.5 ppm [Ref 5], although from a distance (such as viewing a blast) the concentrations may need to be above 30 ppm to be observed [Ref 2].

NO<sub>2</sub> has a sharp, biting odour and can be detected by smell at low concentrations (< 0.5 ppm), but the sense of smell can be subdued above 4 ppm. It has a higher molar mass (46) than air (28.8) and consequently tends to travel across the ground, dispersing over distance.

The STEL for NO<sub>2</sub> is 5 ppm (9.4 mg/m<sup>3</sup>), TWA is 3 ppm (5.6 mg/m<sup>3</sup>), and 20 ppm is considered IDLH (immediately dangerous to life or health).

The US National Institute for Occupational Safety and Health (NIOSH) recommended short term exposure limit is 1 ppm

Concentration	Symptoms
~ 800 ppm	15 seconds exposure lethal by reflex choking if not rescued. Extremely irritating to the eyes, nose and throat.
~ 350 ppm	5 minutes exposure lethal by reflex choking if not rescued. Extremely irritating to the eyes, nose and throat
~ 250 ppm	Lethal to man 15 minutes by reflex choking. Airway reactivity and resistance makes breathing more difficult with time. Less than 5 minutes exposure causes potentially fatal pulmonary oedema
~ 200 ppm	Lethal to man in 30 minutes by reflex choking. Airway reactivity and resistance makes breathing difficult.
150 ppm	For 10 minutes or less causes coughing; eye, nose and throat irritation; headache; nausea and vomiting. Longer exposure can cause permanent eye damage and potentially fatal delayed pulmonary oedema
90 ppm	For 40 minutes has caused moderate irritation to the eyes and mucous membranes and potentially fatal delayed pulmonary oedema. The delay may be up to 70 hours when symptoms of cyanosis (turning blue), shortness of breath, restlessness, headache and frothy yellow or brown sputum appear. If untreated, fluids or froth can flood the lungs (i.e. drowning) or can be infected by viruses or bacteria resulting in bronchitis or pneumonia which may be fatal to a weakened patient.
50 ppm	Moderately irritating to the eyes and mucous membranes within 10 minutes and long exposure can cause permanent eye damage.
4-5 ppm:	For 15 minutes will cause increased airway reactivity (constriction of airways), airway resistance (more effort needed to breathe), and decreased diffusion of gases in the lungs
4 ppm	For 10 minutes anaesthetises the nose so it can no longer smell
0.1 ppm	For 2 hours can result in increased airway reactivity for asthmatics or people with chronic bronchitis.

*Symptoms of nitrogen dioxide exposure [Ref 1]*

## Nitric Oxide (NO)

NO is a colourless gas, with a slightly irritating odour. It is slightly soluble in water and forms nitrous and nitric acid. Mild exposure can cause shortness of breath, coughing and chest pains, but more severe exposure (above 100 ppm) can lead to pulmonary oedema, cyanosis, or respiratory failure [Ref 8].

The TWA is 25 ppm (31 mg/m<sup>3</sup>), and 100 ppm is IDLH (immediately dangerous to life or health).

Concentration	Symptoms
~ 8,000 ppm (0.8%)	Sudden unconsciousness followed by death in 1 minute by chemical asphyxiation. Higher concentrations may be fatal in less time
~ 3,000 ppm (0.3%)	Dizziness or drowsiness in minutes quickly followed by unconsciousness and death in 5 Minutes
~ 1,600 ppm	Muscular tremors, loss of coordination, faster breathing, faster heart rate, drowsiness, dizziness, excess salivation and vomiting may occur in 5 minutes with unconsciousness in 10 minutes and death in 15 minutes
~ 400 ppm	First symptoms, similar to 1,600 ppm above, appear within 2 hours when Methemoglobin concentration reaches 30-40%. Vomiting may cease and unconsciousness may occur within 3 hours. Still has the potential to be fatal if Methemoglobin concentration of blood reaches 70- 90%
0.3 – 0.9 ppm	Pungent odour

*Symptoms of nitric oxide exposure [Ref 1]*

## Carbon Monoxide (CO)

CO is a colourless, odourless and tasteless gas. It is readily absorbed through the lungs, where it displaces oxygen in blood through the formation of CO-haemoglobin, leading to headache, fatigue, dizziness, drowsiness and nausea. Large amounts of CO can lead to rapid loss of consciousness and death.

Atmospheric CO (ppm)	CO-Hb in Blood (%)	Symptoms
1950	80	Rapidly fatal.
800-1220	60-70	Unconsciousness; intermittent convulsions; respiratory failure; death if exposure is prolonged.
350-520	40-50	Headache; confusion; collapse; fainting upon exertion.
220	30	Decided headache; irritability; easy fatigability; disturbed judgment; possible dizziness; dimness of vision.
120	20	Shortness of breath with moderate exertion; occasional headache with throbbing in the temples.
70	10	Shortness of breath upon vigorous exertion; possible tightness across the forehead.

*Symptoms of carbon monoxide exposure. The table gives the levels of COHb in the blood which tend to form at equilibrium with various concentrations of CO in the air and the clinical effects observed [Ref 10].*

The TWA is 30 ppm (34 mg/m<sup>3</sup>). Short-term excursions should never exceed 400 ppm [Ref 12].

## Sulphur Dioxide (SO<sub>2</sub>)

SO<sub>2</sub> is a colourless gas with a characteristic pungent and irritating odour. It is a severe irritant of the eyes, mucous membranes and skin, due to the rapid formation of sulphurous acid on contact with moist membranes. High concentrations can cause respiratory paralysis or pulmonary oedema.

Concentration	Symptoms
80 – 100 ppm	May cause an increased incidence of nasopharyngitis, shortness of breath on exertion (dyspnea), and chronic fatigue
10 – 50 ppm	For 5 to 15 minutes: irritation of the eyes, nose and throat; rhinorrhea (discharge of thin nasal mucus), choking, cough, and in some instances reflex bronchoconstriction with increase pulmonary resistance.
10 ppm	Upper respiratory irritation; nose bleeds
5 ppm	Coughing after 5 minutes
3 ppm	Odour threshold
0.3 – 1 ppm	Detectable by taste

*Symptoms of sulphur dioxide exposure [Ref 15]*

The STEL for SO<sub>2</sub> is 5 ppm (13 mg/m<sup>3</sup>), TWA is 2 ppm (5.2 mg/m<sup>3</sup>), and 100 ppm is considered IDLH (immediately dangerous to life or health) [Ref 15].

## Hydrogen Sulphide (H<sub>2</sub>S)

H<sub>2</sub>S is a colourless gas with a strong 'rotten egg' odour. It is irritating to the eyes and the respiratory tract, and may cause effects on the central nervous system. Inhalation may lead to

pulmonary oedema, and as with NO<sub>2</sub>, the effects may be delayed by several hours.

Concentration	Symptoms
400 – 700 ppm	Loss of consciousness and possible death after 30 – 60 minutes
50 – 200 ppm	Severe respiratory tract irritation; eye irritation
100 ppm	Loss of sense of smell due to olfactory fatigue
20 ppm	Neurological effects including memory loss and dizziness
5 – 10 ppm	Minor metabolic effects
2 ppm	Bronchial restriction in some asthmatics
0.008 ppm	Odour threshold

*Symptoms of hydrogen sulphide exposure [Ref 16, 17]*

The STEL for H<sub>2</sub>S is 15 ppm (21 mg/m<sup>3</sup>), TWA is 10 ppm (14 mg/m<sup>3</sup>), and 100 ppm is considered IDLH (immediately dangerous to life or health).

## **APPENDIX 4 - INFORMATION FOR TREATING MEDICAL STAFF**

Those exposed to NO<sub>x</sub> gases should seek immediate medical treatment and consideration should be given to placing those exposed under observation for at least 24 hours after exposure.

To assist medical staff the following guide should be provided.

### **Advice to Medical Staff in the Treatment of Those Who Have Been Exposed to NO<sub>x</sub> Gases.**

The patient may have been exposed to NO<sub>x</sub>. This is a gas usually produced on mines after the use of explosives. NO<sub>x</sub> consists of multiple combinations of nitrogen and oxygen (N<sub>2</sub>O, NO, NO<sub>2</sub>, N<sub>2</sub>O<sub>4</sub>, N<sub>2</sub>O<sub>3</sub>, N<sub>2</sub>O<sub>5</sub>). Nitrogen dioxide (NO<sub>2</sub>) is the principle hazardous nitrous gas. NO<sub>x</sub> irritates the eyes and mucous membranes primarily by dissolving on contact with moisture and forming a mixture of nitric and nitrous acids. But this is not the only mechanism by which injury may occur. Inhalation results in both respiratory tract irritation and pulmonary oedema. High level exposure can cause methhaemoglobinaemia. Some people, particularly asthmatics, can experience significant broncospasm at very low concentrations.

The following effects are commonly encountered after NO<sub>x</sub> exposure:

#### **ACUTE**

- Cough
- Shortness of breath
- Irritations of the mucous membranes of the eyes, nose and throat

#### **SHORT TERM**

- Pulmonary oedema which may be delayed for up to 4-12 hours

#### **MEDIUM TERM**

- R.A.D.S. (Reactive Airways Dysfunction Syndrome)
- In rare cases bronchiolitis obliterans which may take from 2-6 weeks to appear

## **LONG TERM**

- Chronic respiratory insufficiency

High level exposure particularly associated with methhaemoglobinaemia can cause chest pain, cyanosis, and shortness of breath, tachapnea, and tachycardia. Deaths have been reported after exposure and are usually delayed. Even non irritant concentrations of NOx may cause pulmonary oedema. Symptoms of pulmonary oedema often don't become manifest until a few hours after exposure and are aggravated by physical effort. Prior to transfer to you the patient should have been advised to rest and if any respiratory symptoms were present should have been administered oxygen. The patient will need to be treated symptomatically but as a base line it is suggested that the following investigations are required:

- Spirometry
- Chest x-ray
- Methheamoglobin estimation

Because of the risk of delayed onset pulmonary edema it is recommended that as a precaution the patient be observed for up to 12 hours. As no specific antidote for NOx exists, symptoms will have to be treated on their merits.

## References

- AEISG, 2011, *Code of Practice – Prevention and Management of Blast Generated NO<sub>x</sub> Gases in Surface Blasting*, Edition 1, AESIG Inc.
- Environmental Procedure ATT09-02-11
- Environmental Procedure EP9.2
- MTW-13-ENVMPR-SITE-E6-013 MTW Blast and Vibration Monitoring Programme
- MTW-02-LC-SITE-E10-026 MTW Temporary Closure of Roads for Blasting
- MTW-10-MHMP-241 Explosives Major Hazard Management Plan
- MTW-10-WI-MINE-244-001 Approving and Trialling Explosives and Equipment Work Instruction
- MTW-10-WI-MINE-244-009 Closing Public Roads Work Instruction
- MTW-10-WI-MINE-244-002 Conduct Magazine Operations Work Instruction
- MTW-10-WI-MINE-244-013 Dealing with a Misfire Work Instruction
- MTW-10-WI-MINE-244-016 Dealing with Elevated Temperatures and Reactive Ground Work Instruction
- MTW-10-WI-MINE-244-015 Dealing with Obsolete Explosives Work Instruction
- MTW-10-WI-MINE-244-004 Demarcating and Accessing a Loaded Shot Work Instruction
- MTW-10-WI-MINE-243-002 Drilling a Shot Work Instruction
- MTW-10-WI-MINE-244-011 Firing a Shot Work Instruction
- MTW-10-WI-MINE-244-006 Loading Blast Holes Work Instruction
- MTW-10-WI-MINE-244-010 Postponing Firing of a Tied In Shot Work Instruction
- MTW-10-WI-MINE-244-005 Priming Blast Holes and Distributing IE Work Instruction
- MTW-10-WI-MINE-243-003 Redrilling a Shot Work Instruction
- MTW-10-WI-MINE-244-007 Stemming Blast Holes Work Instruction
- MTW-10-WI-MINE-244-008 Tying in a Shot Work Instruction
- Coal Australia, Mine Operations Improvement - Blast Fume Management Guidelines
- Orica Mining Services, 2010, *Orica Product Selection Guide October 2010*, Orica Australia Pty Ltd.
- Queensland Government, 2011, *Queensland Guidance Note QGN 20 v2 Management of oxides of nitrogen in open cut blasting*. Department of Employment, Economic Development and Innovation, Queensland.
- Safe Work Australia, Exposure Standard for Carbon Monoxide,  
<http://hsis.ascc.gov.au/DocumentationES.aspx?ID=111>
- US National Institute for Occupational Safety and Health (NIOSH), *Pocket Guide to Chemical Hazards – Nitrogen Dioxide*, <http://www.cdc.gov/niosh/npg/npgd0454.html>
- US National Institute for Occupational Safety and Health (NIOSH), *Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs)*, <http://www.cdc.gov/niosh/idlh/idlhintr.html>
- US National Institute for Occupational Safety and Health (NIOSH) and US Occupational Safety and Health Administration, *Occupational Safety and Health Guideline for Sulfur Dioxide*, 1978,  
<http://www.cdc.gov/niosh/docs/81-123/pdfs/0575.pdf>

US Occupational Safety & Health Administration, *Nitric Oxide in Workplace Atmospheres* (ID190), <http://www.osha.gov/dts/sltc/methods/inorganic/id190/id190.html> US Occupational Safety & Health

Administration, *Nitric Dioxide in Workplace Atmospheres* (ID182), <http://www.osha.gov/dts/sltc/methods/inorganic/id182/id182.html>

US Occupational Safety & Health Administration, *Carbon Monoxide in Workplace Atmospheres*, <http://www.osha.gov/dts/sltc/methods/inorganic/id209/id209.html>

National Occupational Health and Safety Commission, *Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment*, (NOHSC:1003), Australian Government Publishing Service, Canberra, 1995.

## Document Control

### Approvals

Name	Role	Signature	Date

### Revision History

This protocol is to be reviewed at least every three years or as otherwise directed by the Director-General of DoPI (Department of Planning and Infrastructure). The review process is to reflect changes in environmental legislation and guidelines, and changes in technology or operational procedures.

Date	Version	Author	Notes

## Appendix D - Road Closure Management Plan

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*A Rio Tinto Group Company*

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## MTW ROAD CLOSURE MANAGEMENT PLAN

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### Document control

Version	Date	Revision Description	Prepared by	Reviewed by
1.0	31/08/2012	Original document as submitted to RMS, SSC and DoPI	Nicola Proctor	Mark Nolan
2.0	26/09/2012	Revised following feedback from RMS	Kelly O'Mullane	Mark Nolan
3.0	24/07/2014	Revised (Warkworth Extension disapproval, Warkworth Modification 6 Approval)	Gerard Gleeson	Andrew Speechly
3.1	08/09/2014	Minor revision of V3.0 following DP&E feedback	Gerard Gleeson	Andrew Speechly

# Table of Contents

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<b>1. PURPOSE</b>	<b>3</b>
<b>2. OBJECTIVE</b>	<b>3</b>
<b>3. DEFINITIONS</b>	<b>3</b>
<b>4. MANAGEMENT OF TEMPORARY ROAD CLOSURES</b>	<b>4</b>
<b>5. PROCEDURES FOR ROAD AND TRAFFIC CLOSURES</b>	<b>4</b>
5.1 Temporary Road Closure	4
5.2 Traffic Control Plan	5
5.3 Personnel involved – roles and responsibilities	5
5.4 Possible hazards	6
5.5 Notification of appropriate parties	6
5.5.1 Notification of appropriate parties	7
5.6 Protocol for management of Emergency Services	8
5.7 Management of dust and fume	8
5.8 Management of flyrock	8
5.9 Evaluation and auditing / reporting procedures	8
5.9.1 Monitoring and Reporting	8
5.9.2 Audit/Review	8
<b>6. REFERENCES</b>	<b>9</b>
<b>7. APPENDICES</b>	<b>9</b>

## 1. PURPOSE

This Road Closure Management Plan outlines practices and processes for blasts that require the closure of roads by Mount Thorley Warkworth Mining Complex (MTW).

## 2. OBJECTIVE

The primary objective of this plan is to safely manage temporary closures of Putty Road, Wallaby Scrub Road, Charlton Road, Golden Highway or combinations thereof for the purposes of blasting.

Fundamental to achieving this objective is to:

- Ensure safety and protection of potentially affected persons and property;
- Minimise road closure periods;
- Minimise inconvenience on road users, local residents and businesses;
- Notify in advance relevant stakeholders, including the public, of blasts that will temporarily close either Putty, Charlton or Wallaby Scrub Roads or Golden Highway or combination thereof; and
- Ensure that emergency service activities are not restricted by road closure events.

There are a number of mitigation strategies that will be implemented to manage the road closures. Road closures are managed according to MTW's internal work instruction - **MTW-10-WI-MINE-244-009 Closing Public Roads** and pursuant to a Traffic Control Plan for each road that has been separately prepared, submitted and approved by the Singleton Council.

Road closures on each road follow protocols identified in the Traffic Control Plan for that road. A separate Traffic Control Plan will be developed for each road closure configuration.

This plan outlines:

- The requirements for blasting within 500m of Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway;
- Singleton Council's requirements for closing a public road for blasting activities;
- Responsibilities for road closure;
- Remedial action measures;
- Flyrock management; and
- Major hazards before controls are implemented

## 3. DEFINITIONS

<b>Blast</b>	An initiation of explosives within the confines of the open cut approval area with the purpose of fragmenting rock or coal.
<b>Flyrock</b>	Rock material that is propelled through the air or along the ground as a result of the detonation of explosives.
<b>Fume</b>	A combination of post blast gases, which are predominately nitrogen dioxide but may also include nitrous oxide, nitric oxide, carbon monoxide and carbon dioxide.
<b>Dust</b>	Airborne particulate matter.

#### 4. MANAGEMENT OF TEMPORARY ROAD CLOSURES

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The key aspects covered include:

- Procedures for road and traffic closures
- Traffic Control Plan
- Personnel involved – roles and responsibilities
- Major hazards
- Notification of appropriate parties
- A protocol for management of emergency vehicles
- Management of dust and fume
- Management of flyrock
- Evaluation and auditing / reporting procedures

#### 5. PROCEDURES FOR ROAD AND TRAFFIC CLOSURES

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##### 5.1 Temporary Road Closure

Roads nominated for temporary road closure consideration: Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway.

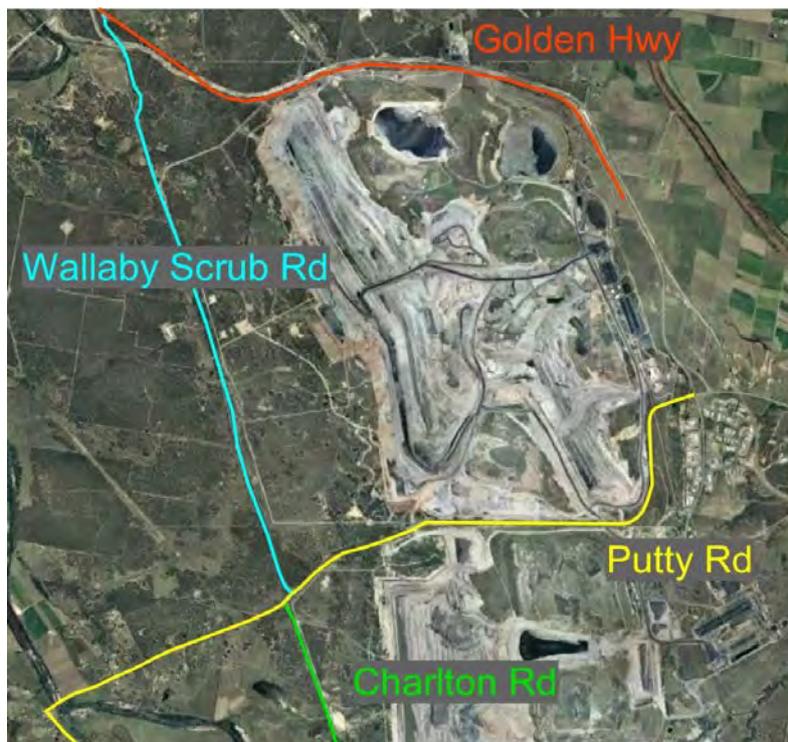


Figure 2: Aerial photo depicting the roads

Roads will be temporarily closed whenever blasting is carried out within 500m of the road or to ensure public safety. These closures will be typically for a period of less than 15 minutes.

Authorised personnel who have received Roads and Marine Services (RMS) approved traffic controller training will manage traffic flow during these closures.

Traffic control signs will be set up in accordance with the approved traffic control plan.

Temporary road closures will be scheduled, where practicable, for outside peak traffic flow periods.

Closures will occur just prior to the blast, and reopening will occur only after a thorough safety inspection has been completed. Closures will occur at strategic locations along the road that are highly visible to oncoming traffic and will seek to minimise potential impacts on road users accessing alternate routes. Closure locations will take into consideration the accumulated traffic volume so as where possible, normal traffic access to side roads is not compromised. Specific locations of the closure points will be determined during preparation of the Traffic Control Plan. Road closures are likely to occur up to four times per week. Blasts requiring road closures will not be conducted when adverse environmental conditions (or other prevailing conditions) make road closures hazardous.

The duration of closure events will be minimised by delaying closures until just prior to blasts and by completing post-blast safety inspections immediately following blasts. Although Mount Thorley Warkworth (MTW) will endeavour to minimise the duration of closures, public safety is the primary objective and will not be compromised by efforts to reduce closure duration. It is envisaged that road closures will occur for a period of approximately 10-15 minutes.

Misfires identified while public roads are closed will be treated as separate blasts to avoid lengthy road closures. In addition to measures to minimise the duration of closures on an event basis, road closures will be minimised on a weekly basis by designing blasts to minimize the number of road closures required and by scheduling blasts requiring road closure to achieve an even distribution among weeks where practicable. Road closures will be scheduled to avoid peak traffic periods as far as practicable and will generally occur Monday-Saturday between the hours of 9am - 5pm. Where possible, school bus times will be avoided.

### **5.2 Traffic Control Plan**

The following procedures will be implemented:

- Both vehicular and pedestrian access will be prevented during blasting activities when a blast occurs within 500m of nominated roads
- Traffic controllers will be utilised to control traffic on Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway to prevent access to the area
- All affected roads will be inspected immediately following the blast to ensure no damage to the road surface has occurred and to remove any flyrock should it occur.
- Traffic will only be permitted to proceed through the area after approval to do so, and approval has been received from the shotfirer in charge of the blast.

### **5.3 Personnel involved – roles and responsibilities**

#### **Drill & Blast Engineer:**

- Notify Singleton Council of planned blasting within 500m of Putty Road and/or Wallaby Scrub Road and/or Charlton Road or Golden Highway one day prior to blast
- Coordinate road closure signage on Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway including updating for delayed blasts
- Coordinate blasting times with neighbouring mines
- Advertise road closure in Singleton Argus
- Notify residents who have driveways affected by road closures

**Blast supervisor:**

- Update phone information to inform callers of road closure details
- Organise traffic controllers for (Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway) as required.
- Co-ordinate inspection of (Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway) pre and post blast, and apply remedial actions as required.

**Shotfirer:**

- Whilst the Shotfirer-in-Charge is ultimately the person accountable for the blast on site, the 'Road Runner' manages operations on the public road itself.

**Road Runner:**

- The 'Road Runner' is an MTW employee who is charged with responsibility of ensuring the public road is secured and cleared.
- Instruct the Traffic Controllers to close and open the road when directed by the Shotfirer-in-Charge.
- Clear the public road between the Traffic Controllers in a systematic manner to ensure that the road is clear of people or vehicles at risk.
- In the event where dust/fume/blast debris are covering the road, inform traffic controllers to maintain closure until notified by Road Runner.

**Traffic Controller:**

- Close and secure open the public road in accordance with the 'Road Runner's' instructions.
- The Traffic Controller shall call up to stop the blasting sequence at any time if a breach of the road closure occurs.
- If a breach has occurred, the public road will require clearing again before recommencing blasting operations.

**5.4 Possible hazards**

- Potential dust and fumes impact
- Potential flyrock impact

**5.5 Notification of appropriate parties**

- The Blasting Schedule Hotline is the primary tool by which members of the public can find information relating to MTW temporary road closures. MTW uses its best endeavours to align the road closure with the advertised time and limit the road closure duration to minimise inconvenience to road users. It should be noted however that the primary concern for MTW is to mitigate safety and environmental impacts from blasting, hence this will take precedence over adherence to road closure scheduling. A number of factors including meteorological conditions, operations impediments and unforeseen circumstances on the public road will often result in road closures being brought forward or delayed from the scheduled time. Advertised road closure times publicised via the methods described herein represent MTW's best assessment of the likely blasting time at the time of publish, and are subject to change.

- Approval will be sought from Singleton Council to temporarily close roads for the purpose of blasting annually; also approval from RMS to temporarily close roads for the purpose of blasting will be sought every six months.
- MTW will also provide RMS a weekly plan of blasting road closures of the Golden Highway or Putty Road.
- Where mandated, notice of temporary road closures will be provided via the posting of signs on the affected road(s) in the 24 hours prior to blasting. Road closure signage will not be updated from the initial advertised time unless the road closure is postponed to another day. Signs will comply with AS 1743-2001 Road Sign Specifications.



**Figure 1 - Typical Road Closure signage**

- Notification of forthcoming road closures will be provided to the local community through advertisements in the Singleton Argus. Advertisements in Tuesday's Argus for a Wednesday, Thursday, Friday or Saturday blast and in Friday's Argus for a Monday or Tuesday blast.
- Singleton Council Operations Management will be notified by email prior to 12pm the day prior to a road closure after 10am.
- The Blasting Hotline is updated on the morning of each day on which there is a scheduled road closure and can be reached on (freecall) **1800 099 669**. The hotline will advise of a one hour window for the proposed road closure (e.g between 10am and 11am);
- In the event that a road closure is to occur outside the blasting window, and once the revised time is understood, MTW will update the hotline for another one hour window; and
- Where necessary, information will be made available to neighbouring mines, relevant authorities and internal contacts prior to blasting.

#### **5.5.1 Notification of appropriate parties**

- MTW will assess the performance of the process detailed in 5.5 above for a six-month period. During this time, to expand the communication method for road closures, MTW will investigate feasibility of systems to notify interested parties via SMS (using the existing blast hotline). MTW will inform DP&E of the outcomes of this investigation by 31 March

2015 to determine whether further improvements to the existing blast notification process are warranted.

### ***5.6 Protocol for management of Emergency Services***

In the event that emergency vehicles require clear and immediate access through (Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway) during a road closure, the Traffic Controller will immediately communicate with Shotfirer to ensure a safe thoroughfare is provided for emergency services vehicles. Where possible, and with the safety of all persons being maintained, blasting will be postponed until emergency services have passed safely.

### ***5.7 Management of dust and fume***

The positioning of Traffic Controllers will be dependent upon the prevailing weather conditions on a given day. The Traffic Controllers will be positioned at selected points to ensure the safety of all road users. The section of the blocked road shall be large enough to contain any potential passing dust and fume.

Following blasting, the decision to re-open the road will be made after a detailed visual inspection of the road conditions, including fume level monitoring. In the event of slow dissipation of dust and/or fume the traffic controllers will ensure that the roadway remains closed. The road will be re-opened when the dust and/or fume have either passed the blocked road or have sufficiently dispersed that they no longer present any risk to passing traffic.

### ***5.8 Management of flyrock***

Following blasting, the affected roads (Putty Road, Wallaby Scrub Road, Charlton Road and Golden Highway) will be visually inspected to determine whether any flyrock or other hazards are present.

In the event that flyrock has impacted upon the road, Traffic Controllers will

- Immediately notify the Blast Supervisor who will initiate a clean-up and repair response with removal of any rock.
- Traffic controllers will continue to keep roads closed and monitor road traffic until authorised to reopen the road by the Blast Supervisor

### ***5.9 Evaluation and auditing / reporting procedures***

#### ***5.9.1 Monitoring and Reporting***

The effectiveness of road closures will be reported annually in the Mount Thorley Warkworth Annual Review, previously referred to as the Annual Environmental Management Report.

#### ***5.9.2 Audit/Review***

This management plan is to be reviewed at least every three years or as otherwise directed by the Director-General of DP&I (Department of Planning and Infrastructure). The review process is to reflect changes in environmental legislation and guidelines, and changes in technology or operational procedures.

This management plan will be reviewed and revised if necessary, including where there are changes to the blast management plan as a result of changes in mine development.

This management plan has been originally prepared and submitted to the Singleton Council and the Roads and Maritime Services for consultation.

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**6. REFERENCES**

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1. Development Consent DA-300-9-2002-i Warkworth Mining Limited, Modification 6, 24 Jan 2014
2. Development Approval 34/95 Mount Thorley Operations, 2 May 2014

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**7. APPENDICES**

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1. Singleton Council Road Closure Approval, RMS Road Occupancy Licences
2. Original Consultation (2012)

**Enquiries to:** Anna Burnheim  
(02) 6578 7303

**Our Ref:** 14/0153 – 09/2014

**Your Ref:** Mount Thorley Warkworth Closure

20 May 2014

Coal and Allied  
Mount Thorley Warkworth  
PO Box 267  
SINGLETON NSW 2330

**TEMPORARY ROAD CLOSURE FOR PURPOSE OF BLASTING – JERRYS PLAINS, PUTTY, WALLABY SCRUB and CHARLTON ROADS SINGLETON 2014/2015**

I refer to your application dated 19<sup>th</sup> of May 2014 and advise that consent is granted for Coal and Allied - Mount Thorley Warkworth to operate short term temporary closures of Jerrys Plains, Wallaby Scrub, Charlton and Putty Roads for the purpose of blasting at areas within the Mount Thorley mining lease, in accordance with the attached authority and guidelines.

Approval is granted from the 1<sup>st</sup> of July 2014 to 30 June 2015 inclusive. The applicant will be required to submit a letter of request for approval beyond this period.

Council acknowledges receipt of the Work Instruction MTW-10-WI-MINE-244-009 and 4 Traffic Control Plans designed by Trent Woods TCP Number WRS 671, WRS 394, WRS 856, WRS 527, and 1 Traffic Control Plan designed by Workforce International DRW No. TCP-TC-Rio Tinto-0005 provided with your application. Should any amendments to the procedures within the Procedures or Traffic Control Plan (endorsed by an accredited person) take place, the new version is to be lodged with Council prior to any blast commencing.

Additionally Council acknowledges receipt of copies of the Roads and Maritime Service Hunter Traffic Operations Unit Road Occupancy License (Application Numbers 11186 and 11187) received with your application and operational until 1/11/2014. On the expiration of these approvals Mount Thorley Warkworth are to provide evidence of valid RTA letters of consent to Council, prior to any blast taking place under this authority

You will note Condition 4; Council's Community and Infrastructure Group must be notified, no later than 12 noon on the previous day for any blast after 10:00am. The approved format for notifying Council's Community and Infrastructure Group is by email and should detail the proposal including the date and time of the blast, advertising having taken place and conditions that may result in deferral of the blast.

Email advice be forwarded to Singleton Council [worksadmin@singleton.nsw.gov.au](mailto:worksadmin@singleton.nsw.gov.au).

ABN 52 877 492 396

Address all  
correspondence to  
the General Manager:  
PO Box 314  
SINGLETON  
NSW 2330

DX 7063  
SINGLETON

Administration Centre  
located at:  
Queen Street  
Singleton

Ph: (02) 6578 7290

Fax: (02) 6572 4197

Email:  
[ssc@singleton.nsw.gov.au](mailto:ssc@singleton.nsw.gov.au)

Website:  
[www.singleton.nsw.gov.au](http://www.singleton.nsw.gov.au)



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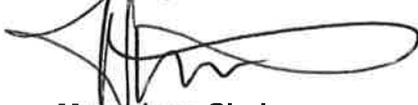
Mount Thorley Warkworth shall advertise the temporary road closure in the local newspaper 'The Singleton Argus', in the paper issued prior to the blasting, provided that the blasting is scheduled for at least the day following the paper issue (outlined in Condition 5).

It is understood that some conditions, beyond the Mine's control will arise from time to time to cause a deferral of a blast (i.e. deferred within twenty four hours) and in these circumstances, Councils approval will be required. In this regard contact Council's Works Administration Officer, Anna Burnheim at [aburnheim@singleton.nsw.gov.au](mailto:aburnheim@singleton.nsw.gov.au) or 6578 7303 with the details of the new blasting arrangements. Public notice signage shall be adjusted immediately in accordance with the approved times.

In the case of a deferral of blasting in excess of twenty four hours, Mount Thorley Warkworth is required to re-advertise the new date and time as indicated in Condition 5.

If you require further information please contact Council's Works Administration Officer, Anna Burnheim at [aburnheim@singleton.nsw.gov.au](mailto:aburnheim@singleton.nsw.gov.au) or 6578 7303.

Kind Regards

A handwritten signature in black ink, appearing to read 'Mursaleen Shah', with a large, sweeping flourish extending to the right.

**Mursaleen Shah**  
Manager Infrastructure and Strategy



I, Mursaleen Shah, Manager - Works of Singleton Council – (a roads authority within the terms of the Roads Act 1993) by authority delegated under Section 377 of the Local Government Act, 1993 and pursuant to Section 378 of the Local Government Act, 1993 and Section 253 of the Roads Act 1993, do hereby grant Mount Thorley Warkworth authority to exercise Singleton Council's powers to regulate traffic by short term temporary closure in accordance with Part 8 Division 1 of the Roads Act 1993 generally and in particular with Section 115(1) and (2) (d) and (e) on Jerrys Plains, Wallaby Scrub, Charlton and Putty Roads, Singleton from time to time as required to allow blasting associated with the mine's operations subject to the limitations listed below:-

1. Mount Thorley Warkworth shall not delegate the authority granted;
2. The authority is valid until 30 June 2015;
3. The authority shall only extend to the temporary closure of Jerrys Plains, Wallaby Scrub, Charlton and Putty Roads, Singleton, for four (4) blasting events per week in the period of Monday to Saturday 9:00am to 5:00pm, subject to notice being given to Council's Community and Infrastructure Group on each occasion, in the approved format;
4. Mount Thorley Warkworth providing notification to Council's Community and Infrastructure Group by email, for any blast after 9:00am, by 12 noon on the previous working day;
5. Mount Thorley Warkworth shall advertise the temporary road closure in the local newspaper 'Singleton Argus' in the paper issue prior to blasting i.e. for blasting on Wednesday, Thursday and Friday, the Tuesday paper issue and for blasting on Saturday, Sunday, Monday and Tuesday the Friday paper issue;
6. Mount Thorley Warkworth shall comply with the requirements of the Roads Act 1993;
7. Prior to re-opening the road, Mount Thorley Warkworth shall inspect and repair any damage thereto and shall not re-open the road until such time as the road has been restored to a safe and trafficable condition;
8. A Management Plan including a Traffic Control Plan shall be lodged and approved by Council's Officers prior to any blasting. Traffic Control is to be in accordance with the RTA Manual "Traffic Control at Worksites". The erection and maintenance by Mount Thorley Warkworth of all necessary traffic signs and barriers.  
  
The provision by Mount Thorley Warkworth of sufficient staff qualified for this purpose together with all equipment necessary for the safe control of the road including the convenience and safety of all persons in and about the affected section of the road during all relevant times;
9. The removal of all signage (or the closing of permanent signs) at the completion of this particular work;
10. The time of closures not to coincide with changes of shift workers from other mines. Blasting times should be co-ordinated such that they are either a maximum of 5 minutes or a minimum of 45 minutes apart. Further each closure is limited to a maximum of 15 minutes. The road shall be closed for periods no longer than is necessary for the purpose;



11. The road not being closed during those times when adverse weather conditions or any other prevailing circumstances make such closure hazardous;
12. Council shall be indemnified by Mount Thorley Warkworth against any claim arising out of or in relation to the temporary road closure for blasting associated with this authority. Mount Thorley Warkworth providing and maintaining a Public Risk insurance of not less than \$10 million and extended to include Council for all risks associated with their proposed closure of Roads and blasting in the vicinity. Policy Number MMI 98162/13/B expiring on 1<sup>st</sup> of November 2014 – a new Certificate of Currency needs to be forwarded to Singleton Council on or prior to this date;
13. The authority from Mount Thorley Warkworth for Council to carry out, at Mount Thorley Warkworth cost, any works of cleaning up etc. at any time should Mount Thorley Warkworth fail to do such work in a timely or satisfactory manner;
14. Other directions as may be given by authorised Council officers, from time to time, in writing;
15. Council reserves the right to revoke this consent at any time, in writing.

A handwritten signature in black ink, appearing to read 'Mursaleen Shah', with a long horizontal flourish extending to the right.

**Mursaleen Shah**  
Manager Infrastructure and Strategy

Road Network Operations



Hunter Traffic Operations Unit  
Road Occupancy License

Application Number: 11186

Status: Issued

Location Details

Road: Golden Highway  
From: 950 metres east of Wallaby Scrub Road  
To: 250 metres west of Long Point Road  
Location: Warkworth  
Council: Singleton  
Work: Blasting

Applicant Details

Date Received: 28/4/2014  
Organisation: Warkworth Mining Limited  
Contacts: Glenn Meyn T: 02 6570 1421 M: 0427 701 101  
Bill Arnold T: 02 6570 1334 M: 0455 864 900  
Richard Taylor: T: 02 6570 1420  
Marty Corrigan: T: 02 6570 1485  
Closure Type: Short Term  
Type of Work: Short term  
Email: Bill.Arnold@riotinto.com  
Traffic Control Implemented: Road Closure – Traffic Stoppage

Traffic Impact Assessment Details

Acceptable

Comments:

\*This road occupancy license has been issued subject to the applicant complying with the special conditions including site specific time restrictions on lane closures stated in Schedule A attached.

Operating Period Details

Approved Period of Operation: From: 1/5/2014 To: 1/11/2014  
Approved Time of Lane Closures: (See Annexure)

Approved Bruce Kimber Traffic Operations Unit  
Date 29/4/2014

For further information contact: Bruce Kimber or David Illingworth Contact No.: 02 887 46802 / 46806

**SCHEDULE A  
ROAD OCCUPANCY LICENCE SPECIAL CONDITIONS**

1)	This licence relates to the use of traffic control devices on the Golden Highway from 950 metres east of Wallaby Scrub Road to 250 metres west of Long Point Road associated with mine blasting operations.
2)	This license refers only to permission for the installation of temporary traffic control on the nominated road work site and does not negate the need for the proponent to have all other necessary development approvals from either Roads and Maritime, the Singleton Shire Council or other relevant authorities. Failure to obtain such approvals and/or meet the conditions of such approvals may result in the cancellation of this road occupancy license.
3)	<p><b><u>Shoulder Closures</u></b></p> <p>Where a road shoulder, not being a traffic lane, normally utilised by through or turning traffic, exists, it may be closed at any time, provided, the licensee ensures that worksite traffic arrangements provide adequate facilities for pedestrians and bicyclists including a route and/or signage through or around the worksite in accordance with the Roads and Maritime Traffic Control at Worksites manual.</p>
4)	<p><b><u>Intermittent Traffic Stoppages</u></b></p> <p>Very short intermittent traffic stoppages may occur. Any traffic stoppage must not ordinarily exceed 2 minutes. Subsequent traffic stoppages must not occur while traffic is generally congested or any traffic delayed, by a preceding stoppage, is still delayed. Traffic stoppages are to be restricted to those required for significant worksite activity, plant or vehicle movements. Ordinary site vehicle movements should utilise existing gaps in traffic flow.</p>
5)	<p>The license allows a full road closure under the following conditions:</p> <ul style="list-style-type: none"> <li>• closures are only to occur between 9.00am and 3.00pm Monday to Saturday,</li> <li>• subsequent road closures must not occur while any traffic is still delayed/queued by a preceding road closure,</li> <li>• this license allows a maximum of two closures per day. Proposed further shots within a day are to be the subject of a separate application,</li> <li>• shots are to be scheduled for consistent time(s) of the day,</li> <li>• the licensee must submit a supplied weekly schedule of anticipated shots to be submitted by <u>Thursday of the week prior to that in which the shots are programmed,</u></li> <li>• the licensee is to have adequate and proximate equipment to expeditiously clear the roadway of any debris or flyrock deposited as a result of the blasting activity,</li> <li>• the licensee is to immediately provide end of queue management should queuing length exceed traffic control advance warning signs and/or exceed the available sight distance to the end of queue for approaching traffic,</li> <li>• the licensee undertakes to immediately telephone the Transport for NSW Transport Management Centre on 1800 679 782 should a closure be extended for any reason,</li> <li>• the licensee undertakes to erect permanent signage consistent with the sign design standards required by the Roads and Maritime. Such signage is to be located in accordance with the requirements of the Roads and Maritime on both approaches to the Golden Highway road closure points. The subject signage must include information that provides the time and day of the next blast, the anticipated delay and a contact telephone number for public inquiries,</li> <li>• the licensee undertakes to notify local emergency services of a closure on the morning of each subject closure,</li> <li>• the licensee undertakes to provide regular media releases to local newspaper and radio services indicating times/days of anticipated mine blasting road closures,</li> </ul>

6)	Traffic Control at this work site must be co-ordinated with Roads and Maritime maintenance activities or those of their contractors and those of other licensed entities to ensure the frequency of traffic delays are minimised through work site coordination.
7)	All temporary traffic control arrangements must be in accordance with the Roads and Maritime "Traffic Control at Work Sites" manual.
8)	Supplementary traffic control arrangements must be implemented at the end of queue locations to enhance safety for approaching traffic, particularly where extended queuing occurs or existing alignment affects approach sight distance to the end of a worksite traffic queue.
9)	Any roadwork speed limit must be installed in accordance with Section 8.2 of the RMS "Traffic Control at Work Sites" manual, and the RMS Traffic Engineering Manual, Part 3 – Speed Zoning. The licensee must have a current worksite speed zone approval permitting a reduction of the existing speed restriction.
10)	The licensee must, if necessary, liaise with the Roads and Maritime Oversize Vehicle Permit Section 1300 656 371 to ensure that site traffic arrangements are not incompatible with oversize vehicle movements.
11)	The Licensee must, on notification, co-operate with and assist with traffic management arrangements to facilitate the movement of traffic generated by special events through or around the worksite.
12)	The removal or alteration of any existing permanent line marking, pavement marking, signage or other traffic control device must not occur without liaison with Roads and Maritime, Network and Safety Services staff, telephone 49 240260.
13)	All pavement, signage, line marking, delineation or other road infrastructure affected by the worksite traffic control arrangements are to be restored to the pre-existing standard or to a standard as required by Roads and Maritime.
14)	Roads and Maritime reserve the right to add further conditions to this license or request further traffic control measures or alter existing traffic control measures in and around the worksite. The licensee must install/remove any such devices or undertake such traffic control measures as requested by Roads and Maritime within a reasonable time.



Road Network Operations

Hunter Traffic Operations Unit  
Road Occupancy License

Application Number: 11187

Status: Issued

Location Details

Road: Putty Road  
From: 600 metres west of Charlton Road  
To: 800 metres west of Mount Thorley Road / Golden Highway interchange  
Location: Mt Thorley / Broke  
Council: Singleton  
Work: Blasting

Applicant Details

Date Received: 28/4/2014  
Organisation: Warkworth Mining Limited  
Contacts: Glenn Meyn T: 02 6570 1421 M: 0427 701 101  
Bill Arnold T: 02 6570 1334 M: 0455 864 900  
Richard Taylor: T: 02 6570 1420  
Marty Corrigan: T: 02 6570 1485  
Closure Type: Short Term  
Type of Work: Short term  
Email: Bill.Arnold@riotinto.com  
Traffic Control Implemented: Road Closure – Traffic Stoppage

Traffic Impact Assessment Details

Acceptable

Comments:

\*This road occupancy license has been issued subject to the applicant complying with the special conditions including site specific time restrictions on lane closures stated in Schedule A attached.

Operating Period Details

Approved Period of Operation: From: 1/5/2014 To: 1/11/2014  
Approved Time of Lane Closures: (See Annexure)

Approved Bruce Kimber Traffic Operations Unit

Date 29/4/2014

For further information contact: Bruce Kimber or David Illingworth Contact No.: 02 887 46802 / 46806

**SCHEDULE A  
ROAD OCCUPANCY LICENCE SPECIAL CONDITIONS**

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4 June 2012

General Manager  
Singleton Council  
PO Box 314  
SINGLETON NSW 2330

**Attention: Mr Mark Ilhein**

Dear Madam

**Warkworth Extension Project – Consultation for Road Closure Management  
Plan in Relation to Blasting (Schedule 3, Condition 20(d))**

We refer to Schedule 3, condition 20(d) of the Warkworth Extension Project Approval which was granted by the Minister for Planning on 3 February 2012.

Under that condition, it is a requirement that we consult with Singleton Council in the preparation of a "road closure management plan for blasting within 500 metres of a public road".

We **enclose** a draft 'road closure management plan' for your consideration and comment.

On 18 June 2012 Coal & Allied will be submitting the draft plan to the Department of Planning and Infrastructure as an appendix to the 'Blast Management Plan' which we are also required to prepare and implement under Schedule 3, condition 20.

Would you please provide us with any comments Singleton Council may have on the draft plan by close of business on 15 June 2012.

Please note that this is not Mount Thorley Warkworth's official application for temporary road closures that is applied for annually, however, this Road Closure Management Plan will be included in the upcoming application.

**Coal and Allied Operations Pty Ltd**

ABN 16 000 023 656

Lemington Road, Ravensworth via Singleton NSW 2330 Australia  
PO Box 315 Singleton NSW 2330 Australia  
Telephone +61 2 6570 0300 Facsimile +61 2 6570 0399

Please contact us if you have any questions or require clarification on any component of the draft plan.

We look forward to hearing from you.

Yours sincerely



Mark Nolan  
Manager Project Approvals NSW  
Approvals, Environment and Land, Coal Australia

PO Box 315 Singleton 2330  
T: +61 (0) 2 65700 301 M: +61 (0)428 885 301  
mark.nolan2@riotinto.com <http://www.riotintocoalaustralia.com.au>

**encl:** draft 'road closure management plan'



4 June 2012

David Young  
Land Use Development Impacts  
Roads and Maritime Services  
Locked Bag 30  
NEWCASTLE NSW 2300

Dear Mr Young

**Warkworth Extension Project – Consultation for Road Closure Management  
Plan in Relation to Blasting (Schedule 3, Condition 20(d))**

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Please contact us if you have any questions or require clarification on any component of the draft plan.

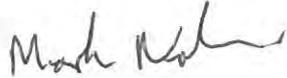
We look forward to hearing from you.

**Coal and Allied Operations Pty Ltd**

ABN 16 000 023 656

Lemington Road, Ravensworth via Singleton NSW 2330 Australia  
PO Box 315 Singleton NSW 2330 Australia  
Telephone +61 2 6570 0300 Facsimile +61 2 6570 0399

Yours sincerely



Mark Nolan  
Manager Project Approvals NSW  
Approvals, Environment and Land, Coal Australia

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T: +61 (0) 2 65700 301 M: +61 (0)428 885 301  
mark.nolan2@riotinto.com <http://www.riotintocoalaustralia.com.au>

**encl:** draft 'road closure management plan'



9 July 2012

CR2012/005994  
SF2012/012643/1  
MD

Mr Mark Nolan  
Manager Project Approvals NSW  
Coal and Allied  
PO Box 315  
SINGLETON NSW 2330

**GOLDEN HIGHWAY (HW27): WARKWORTH EXTENSION PROJECT – CONSULTATION FOR ROAD CLOSURE MANAGEMENT PLAN IN RELATION TO BLASTING**

Dear Mr Nolan,

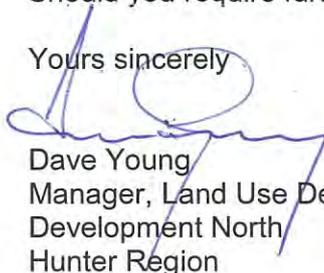
I refer to your letter dated 4 June 2012, received on 7 June 2012, requesting comments from Roads and Maritime Services (RMS) on the Road Closure Management Plan to be used when undertaking blasting within 500 metres of public roads. This was included as Condition 20(d) in Schedule 3 of the Notice of Modification dated 2 May 2012 for the subject project.

RMS has reviewed the plan and requires that the following comments be incorporated into the plan:

- A weekly plan showing dates and times of blasting to take place within 500 metres of Putty Road or the Golden Highway must be submitted to RMS for approval at least seven (7) days prior to blasting.
- Any blasting activities that require temporary closure of Putty Road or the Golden Highway will require a Road Occupancy Licence application to be submitted to RMS and subsequent approval to be granted by the Traffic Commander (Hunter).

Should you require further advice please contact me on (02) 4924 0688.

Yours sincerely



Dave Young  
Manager, Land Use Development  
Development North  
Hunter Region

Cc Ms Felicity Greenway, Department of Planning & Infrastructure  
General Manager, Singleton Council

**Roads & Maritime Services**

## Appendix E - Blast Monitoring Programme

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# MOUNT THORLEY WARKWORTH

## BLAST MONITORING PROGRAMME

### 1 Purpose

This document provides a summary of the blast monitoring programme for Mount Thorley Warkworth Operations. The monitoring locations are subject to change and will be updated periodically to align with management needs and to accommodate progression of mining.

### 2 Project Approval Requirements

Condition 29(d) in Schedule 4 of the Warkworth Approval (DA 300-9-2002-i) requires that the Blast Management Plan include:

- A monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions.

Similarly, Condition 20 (e) in Schedule 3 of the Mount Thorley Approval (DA 34/95) requires that the Blast Management Plan include a monitoring program for evaluating the performance of the development, including:

- Compliance with the applicable criteria;
- Any blasting impacts on the heritage items specified in condition 12 above; and
- Minimising the fume emissions from the site.

### 3 Programme

MTW maintains a network of version (6) Dynamaster blast monitors located at offsite locations representative of privately-owned land (detailed below).

Parameter	Frequency	Monitor Location	Limit/Guideline	Sampling Method
Airblast Overpressure	All blasts	Abbey Green Bulga Village Putty Road – MTIE South Bulga Warkworth Wambo Road Bulga (Shared)	>115 dB (Lin Peak) (5% of blasts over 12 months)  >120 dB (Lin Peak) (no allowable exceedance at any time)	Datamasters V6 blast monitor.  AS2187.2-2006
Ground Vibration			>5 mm/s (ppv) (5% of blasts over 12 months)  >10 mm/s (ppv) (no allowable exceedance at any time)	

Title Document No. MTW-13-ENVMPR-SITE-E6-013 MTW Blast Monitoring Programme	Version number 2.3	Revision status FINAL	Date released 10/09/2014	Date approved by authority 10/09/2014	Page 5 of 5
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Blast Monitoring Location Plan



Title	Version number	Revision status	Date released	Date approved by authority	Page
Document No. MTW-13-ENVMPR-SITE-E6-013 MTW Blast Monitoring Programme	2.3	FINAL	10/09/2014	10/09/2014	5 of 5

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## 4 Protocol for Evaluating Compliance

### 4.1 Blast Descriptors & measurement

#### Ground Vibration

When an explosive detonates, it creates a compression wave that spherically radiates out into the rock mass. When used in a mining context, the compression wave, in conjunction with several other factors, fragments the rock mass while the high pressure gases fluidize and heave the rock mass to its final resting place ready for excavation by mining equipment.

The ground vibration resulting from the blast has components in 3 planes – longitudinal (L), transverse (T) and vertical (V). The vibration waves in these planes are termed the Compression wave, Horizontal Shear wave and Vertical Shear wave respectively (Figure 1).

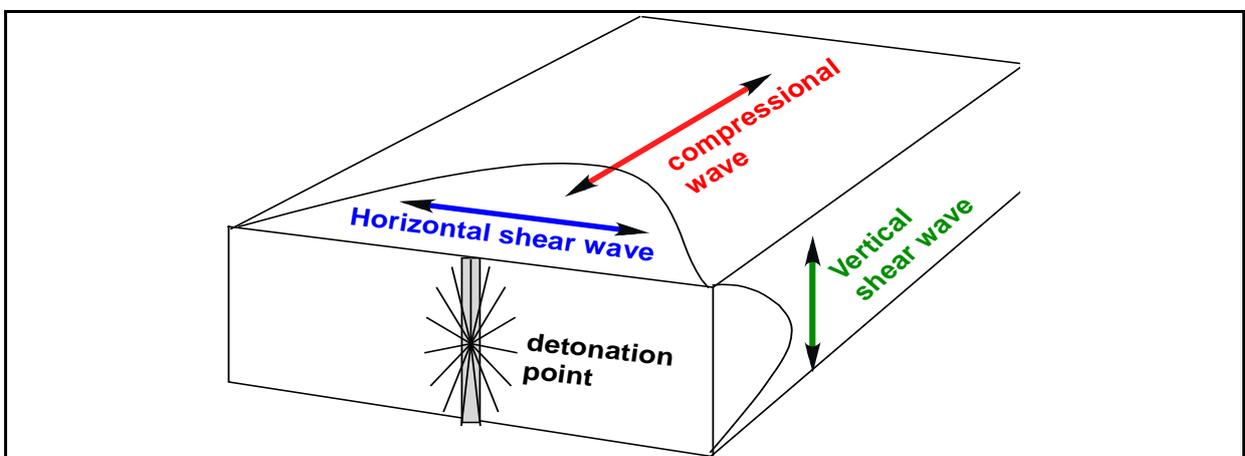


Figure 1: Ground vibration components showing Compression wave, Horizontal Shear wave and Vertical Shear wave.

The velocities in each plane are combined mathematically to produce a single term that represents the total ground velocity. This term is known as the 'Peak Particle Velocity' 'PPV' or 'Resultant'. PPV is measured in millimetres per second.

The PPV measure of blast induced ground vibration is universally used in the context of measurement, reporting, and compliance. The Resultant measure is expressed in millimetres per second.

#### Airblast

Airblast is an airborne shock wave resulting from the detonation of explosives. It may be caused by burden movement or the release of expanding gas into the air. Airblast may or may not be audible. Airblast can contain frequencies from below 2Hz to beyond 20KHz. Frequencies above approximately 20Hz are audible whilst those below 20 Hz are sub-audible. Generally, it is the sub-audible component of the airblast that causes effects such as rattling of windows, and shaking of ornaments on shelves.

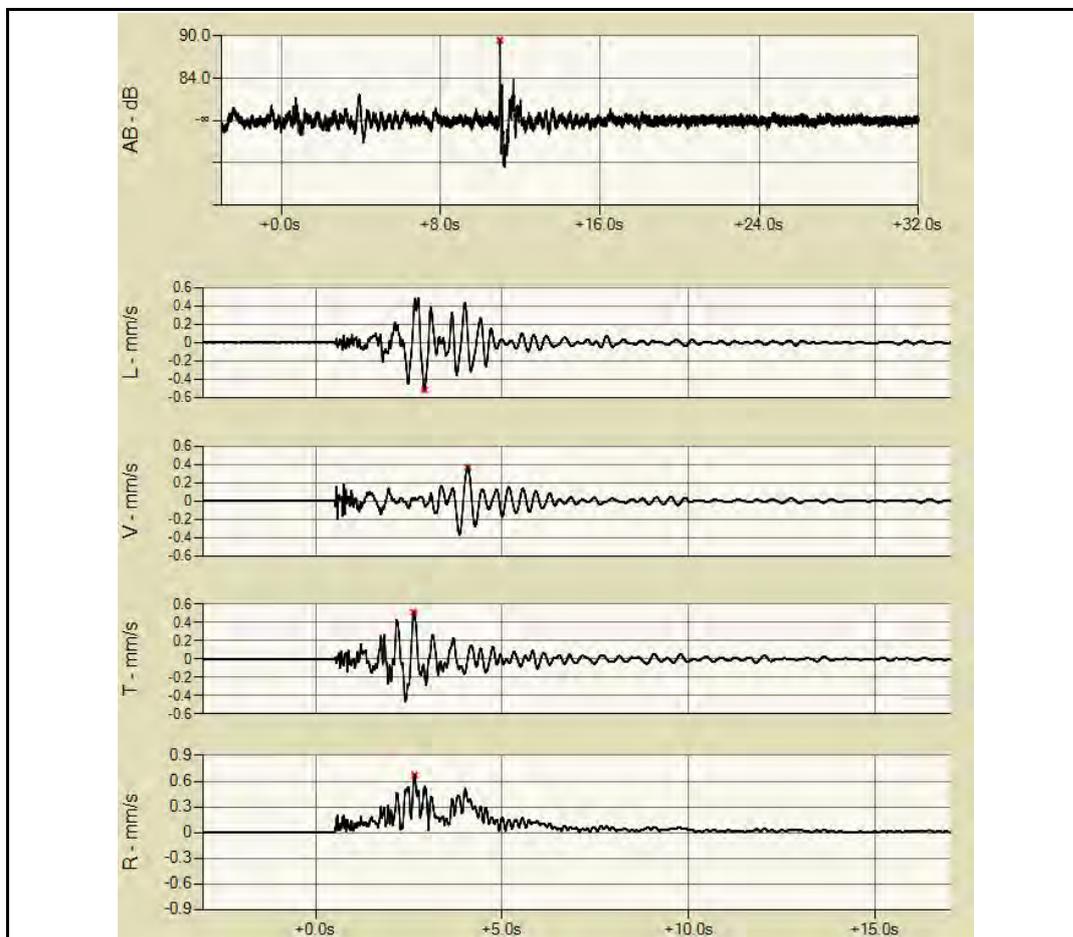
#### Air Overpressure

Air overpressure is the pressure in excess (either above or below) of ambient atmospheric pressure that occurs when an air blast wave passes a given position. The maximum excess pressure is known as the peak overpressure.

Noise and air overpressure results are both measured in decibels (dB). However there is no frequency weighting applied to air overpressure measurements, which allows for assessment of the response of structures to air overpressure. Air overpressure is therefore measured in the linear weighting expressed as dB(L).

Title	Version number	Revision status	Date released	Date approved by authority	Page
Document No. MTW-13-ENVMPR-SITE-E6-013 MTW Blast Monitoring Programme	2.3	FINAL	10/09/2014	10/09/2014	5 of 5

When air overpressure is presented graphically as a function of time, it is usual to present it in terms of absolute pressure or Pascals (Pa) rather than dB(L) because the physical dynamics of the air overpressure is more readily apparent when presented on a linear (Pa) rather than a logarithmic (dB) scale (Figure 2).



**Figure 2:** Typical Blast Vibration and Air Overpressure Trace. Air overpressure is plotted in absolute pressure (Pascals). Vibration in L, V, T planes together with the calculated Resultant (PPV) are plotted in mm/sec.

## 4.2 Monitoring

Blasts are monitored using the Dynamaster Blast Monitoring System. This system consists of blast monitoring stations in the field that are connected by wireless technology to an automated management system based at a central, remote location.

Blast results are automatically retrieved from the field stations, collated, reviewed and published to a web site where they are accessed by Coal & Allied users.

The monitoring stations are designed, operated, maintained and calibrated by a third party consultant in accordance with the manufacturer's requirements and the requirements of AS 2187.2- 2006 'Storage and Use of Explosives'.

Real-time meteorological data will be collected in relation to blast monitoring data. This information shall include wind speed, direction and temperature inversions (where applicable at the site).

Title	Version number	Revision status	Date released	Date approved by authority	Page
Document No. MTW-13-ENVMPR-SITE-E6-013 MTW Blast Monitoring Programme	2.3	FINAL	10/09/2014	10/09/2014	5 of 5

Air overpressure and vibration associated with blasting shall be recorded for each blast. Monitoring data shall be reviewed by the Drill and Blast Engineer as soon as practicable after each blast.

The Senior Drill and Blast Engineer will report any potential or confirmed blast exceedance to relevant site personnel, including the Site Environmental Co-ordinator, Manager – Mining and Manager – Environmental Specialist. The initial advice will include an in-house assessment of meteorological conditions and the validity of the peak airblast overpressure and ground vibration results. Where the peak results are confirmed to have occurred outside of the calculated arrival time window, no escalation of the possible exceedance will occur, and a theoretical value will be used in place of the measured peak.

Where the in-house assessment is unable to discount the result on the basis of meteorology or arrival time, the result will be referred to a specialist consultant for determination. An external report shall be issued as soon as practicable. This investigation will review blast monitoring results, blast parameters, location and prevailing weather conditions. The investigation analysis is specific to each individual exceedance but may include wavetrace inspection, wavefront pattern analysis, regression analysis, meteorological effect analysis etc.

The results of any blast exceeding the impact assessment criteria (0% Criteria) will be reported to the Director-General as soon as practicable following confirmation of the non-compliance.

## 5 Blasting impacts on heritage items

The MTO Approval lists four grinding groove sites in the vicinity of MTW, which (as per the condition) cannot be damaged by blasting operations.

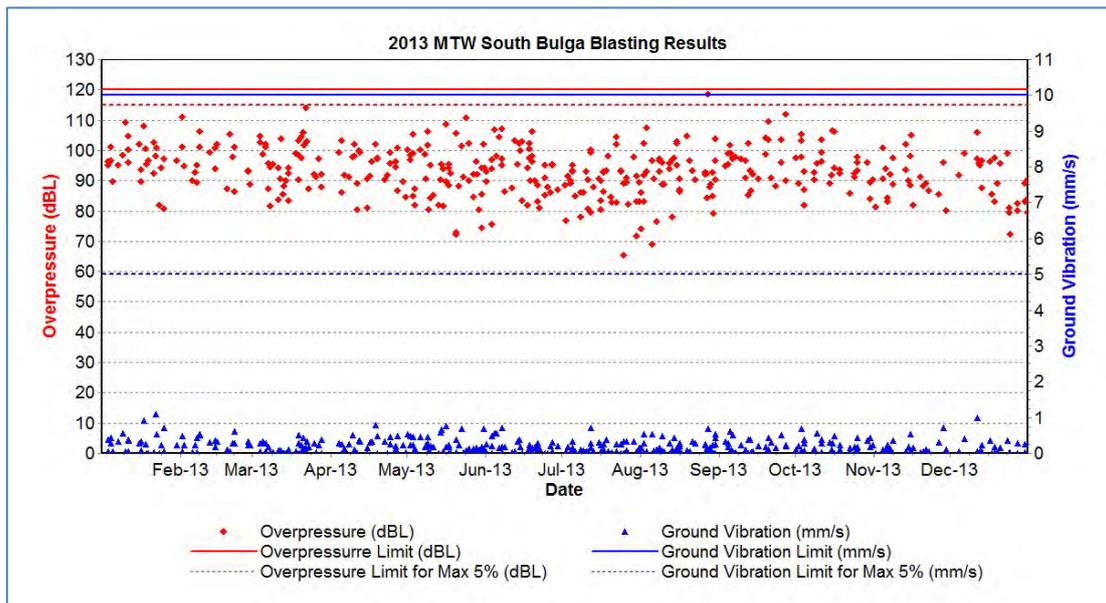
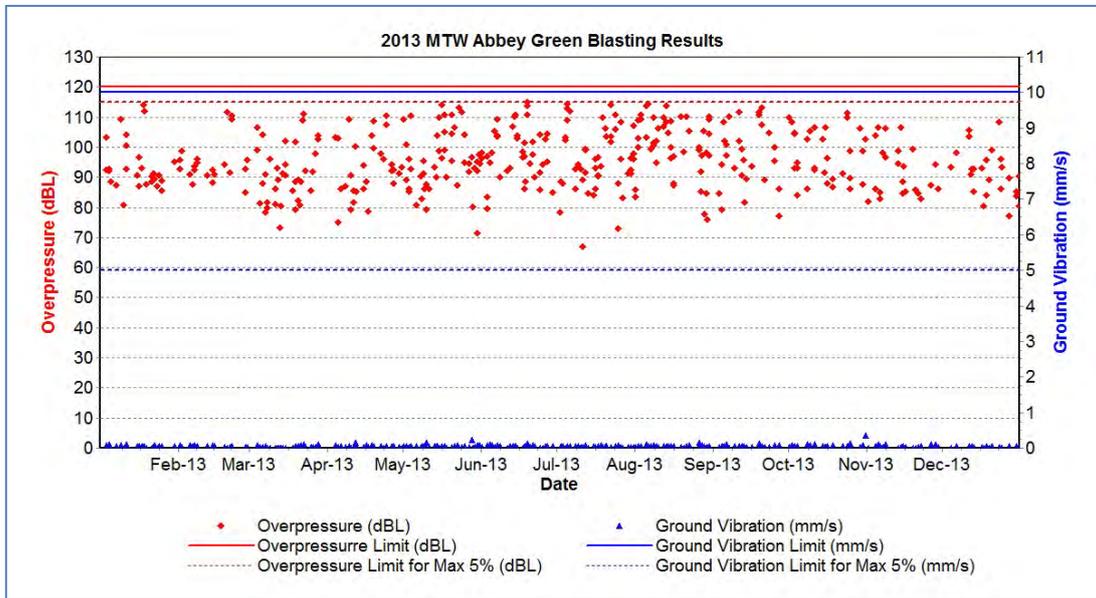
This condition was included in the Approval so as to align the MTO Approval with the conditions of the (then approved) Warkworth Extension Project (PA 09\_0202).

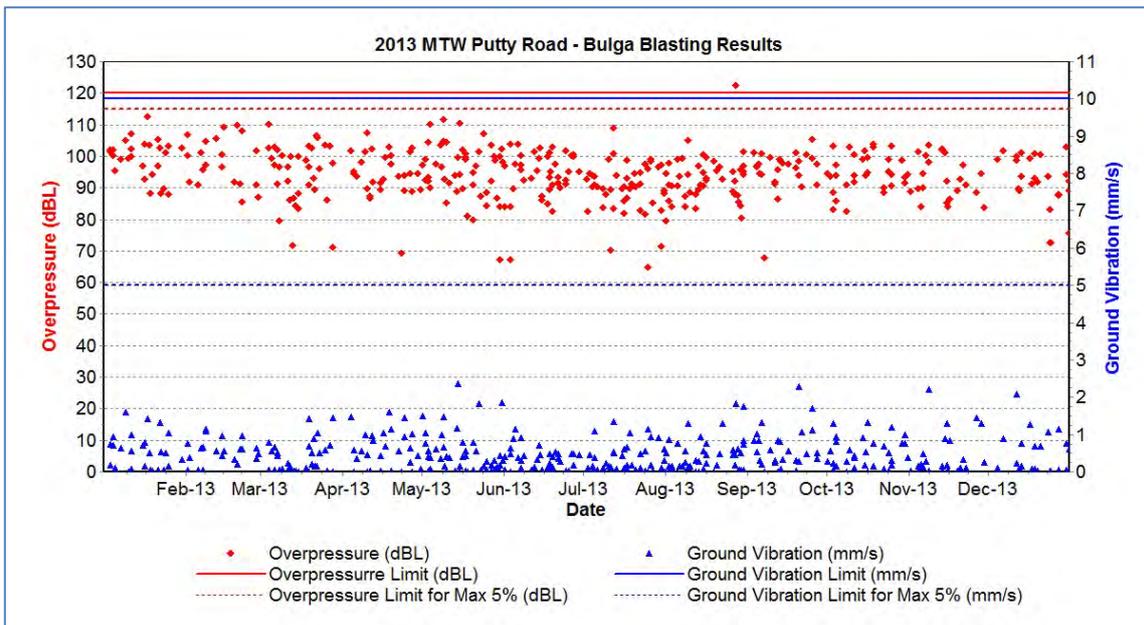
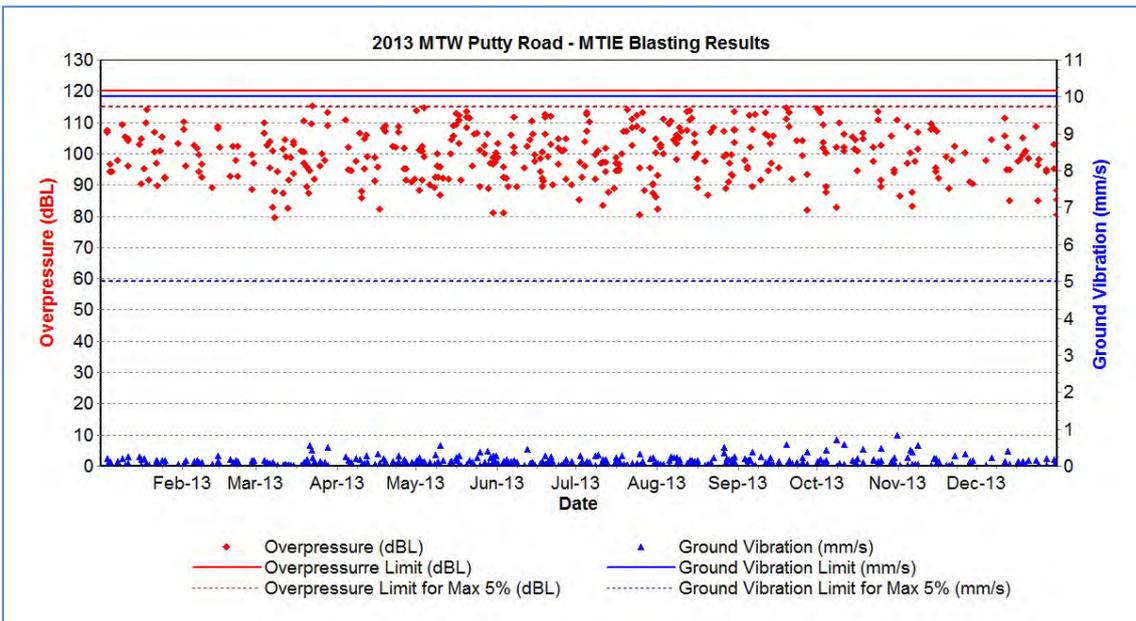
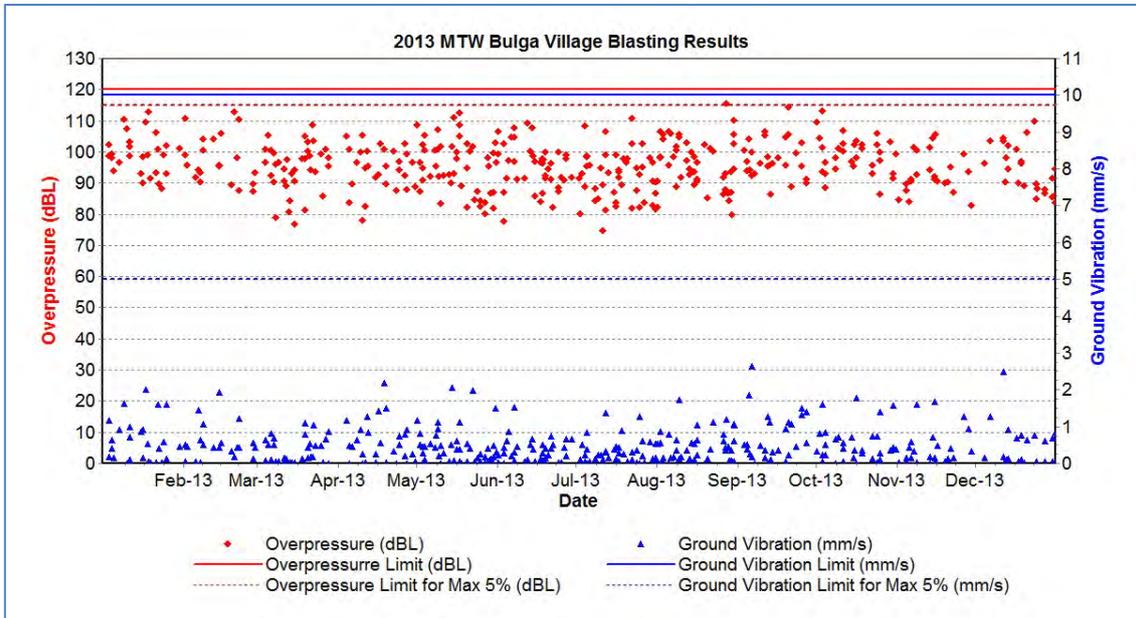
Following the Land & Environment Court Judgment to repeal the Warkworth Extension Approval, MTW no longer has consent to mine in the areas containing these grinding groove sites. As such, the condition is considered Not Applicable under the current terms of Approval.

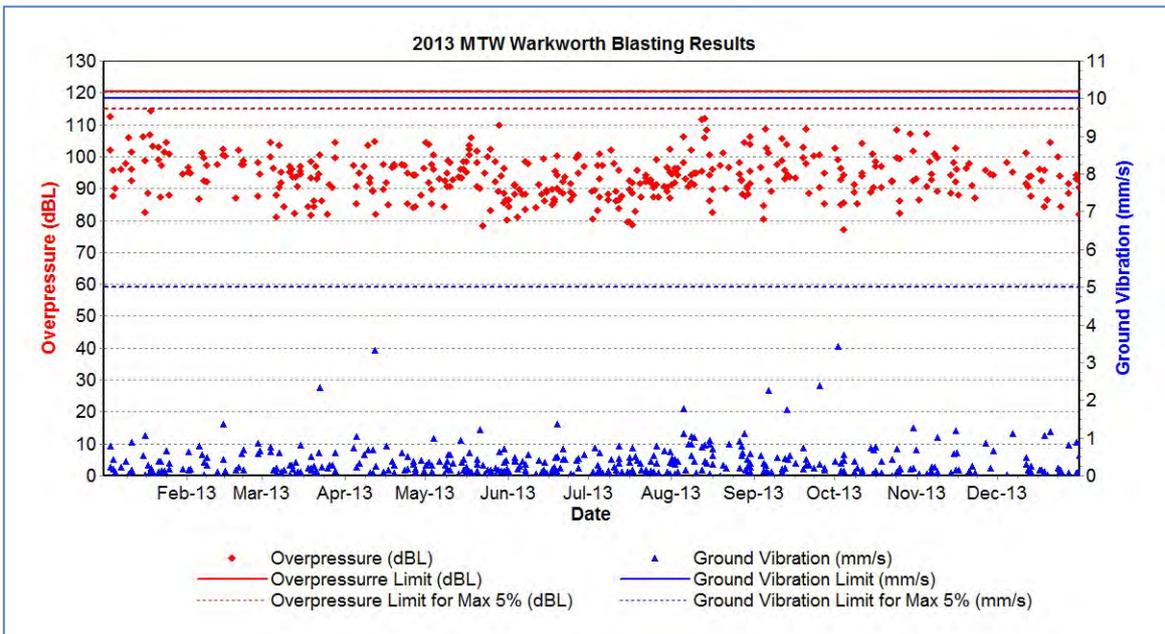
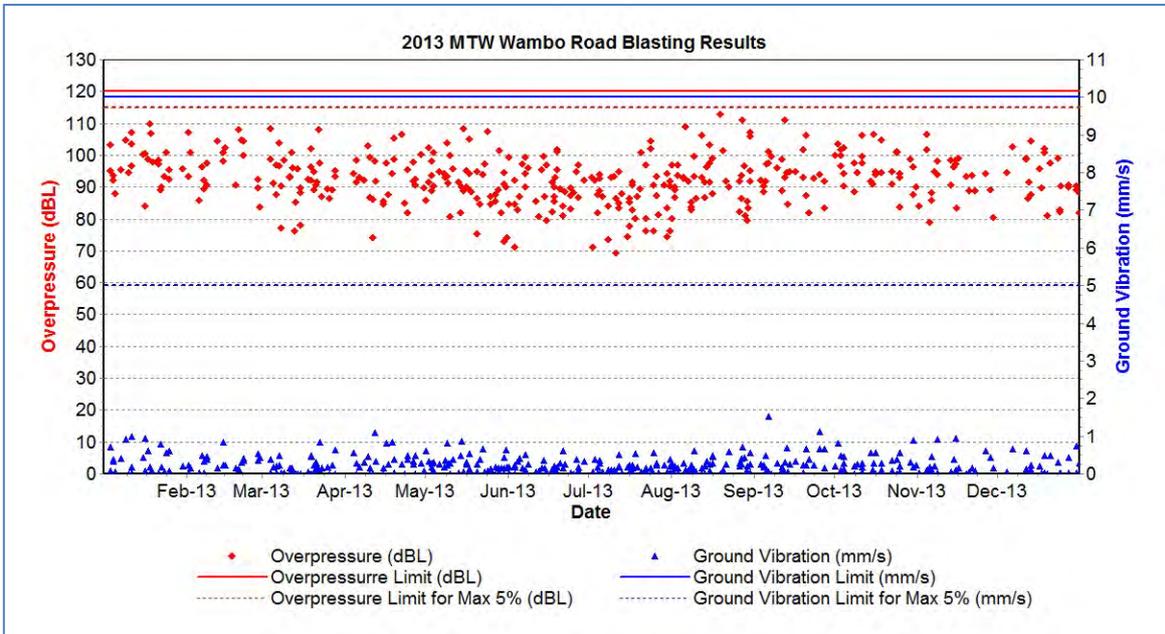
Title	Version number	Revision status	Date released	Date approved by authority	Page
Document No. MTW-13-ENVMPR-SITE-E6-013 MTW Blast Monitoring Programme	2.3	FINAL	10/09/2014	10/09/2014	5 of 5

# Appendix F - Detailed Baseline Data

Baseline data presented is sourced from MTW's Blast Monitoring network for all blasts initiated in 2013. Measurements are presented on a per monitor basis for the calendar year, and include both airblast overpressure (dB(L)), and ground vibration (mm/sec).









## Appendix E

Rio Tinto letter dated 10 February 2015



Appendix E — Rio Tinto letter dated 10 February 2015

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E

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10 February 2015

Mr Mike Young  
Manager Mining Projects  
Department of Planning ND Environment  
GPO Box 39  
Sydney NSW 2001

Dear Mr Young

### **Warkworth Continuation Project (SSD 6464) & Mt Thorley Continuation Project (SSD 6465) – Information Request**

The Department of Planning and Environment (DPE) requested further information on the above projects by emails dated 6 and 9 February 2015 to assist the Department in responding to requests from the Planning Assessment Commission.

This letter provides a response to the matters raised.

#### **1.0 Noise**

The DPE requested:

*More detailed justification as to why it is not possible from a practical and economic perspective (i.e. not reasonable and/or feasible) to accelerate the haul truck noise attenuation program (i.e. before the end of 2016 as currently proposed).*

As Mount Thorley Operations and Warkworth Mine (MTW) are existing mines, the ongoing operation relies upon the use of the existing fleet, particularly trucks, to maintain viable production. To retrofit the existing fleet with noise attenuation packages requires the item of fleet to be taken out of service, stripped down, fitted and tested before returning the item back into production. It therefore requires careful planning and logistics.

The noise attenuation packages are not available off the shelf and have required considerable research, development and ongoing testing and refinements. The packages are retrofitted at the Mount Thorley Operations workshop whereas the Warkworth Mine workshop is used for operational servicing of the fleet.

The Mount Thorley workshop has a total of four bays. To strip down and install the attenuation packages requires the use of two bays for each item. Therefore at any one time a maximum of two trucks can be retrofitted. It takes between two to four weeks to retrofit each item of equipment on average, depending on condition and age. Some items are returned to the workshop after installation for refinement. The programme also includes the use of off-site facilities where cost effective to expedite the programme.

The attenuation programme is scheduled progressively, prioritising attenuation on the loudest trucks first and ensuring operations are managed using fleet that has been attenuated in more exposed areas.

Based on the above factors, **Table 1** provides an estimated fleet attenuation schedule. The investment in the attenuation programme is considerable at in excess of \$30M.

**Table 1 – Estimated Fleet Attenuation Schedule**

Schedule	Truck	Dozer	Drill	Excavator
Completed as of Feb 2015	27	17	3	4
Mar-15	2	1	-	-
Apr-15	3	-	-	-
May-15	3	-	1	-
Jun-15	3	1	-	-
Jul-15	3	-	-	1
Aug-15	2	-	1	-
Sep-15	3	-	-	-
Oct-15	3	2	-	-
Nov-15	3	-	-	-
Dec-15	3	-	-	-
Jan-16	4	-	-	1
Feb-16	3	-	-	-
Mar-16	2	-	-	-
Apr-16	2	1	1	-
May-16	2	1	-	-
Jun-16	2	1	1	-
Jul-16	2	-	-	-
Aug-16	2	1	-	-
Sep-16	2	-	-	-
Oct-16	2	1	-	-
Nov-16	2	1	-	-
Dec-16	-	-	-	-
<b>Total</b>	<b>80</b>	<b>27</b>	<b>7</b>	<b>6</b>

## 2.0 EPBC Act Approval and Offsets

The DPE requested:

*Provide any confirmation received from the Commonwealth that additional approval is not required for the project/s under the EPBC Act.*

AND

*A summary table of offsets required, offsets proposed and 2003 offsets and any associated mapping. (E Donnelley, pers. comm., 9 February 2015).*

### 2.1 EPBC Act Approval

Section 8.8.3 of the Warkworth Environmental Impact Statement (EIS) indicated that further approvals under the EPBC Act are not required as the development the subject of this proposal already has EPBC Act approval (EPBC 2009/5081).

### 2.2 Offsets

The 2002 Green Offsets package for Warkworth Mine was one of the first projects in NSW to provide an offset package. Table A.4 of the 2002 Green Offset Strategy provides a summary of vegetation disturbed and offset for the 2003 extension which is summarised in **Table 2**.

The offsets included Non Disturbance Areas (NDAs) and Habitat Management Areas (HMAs), as shown in Figure 12.1 of the EIS. The NDAs were dedicated as areas of protection and enhancement and the HMAs were areas to be managed until required for mining.

**Table 2: Offsets - 2003 Development Consent**

Component	Disturbance Area (ha)	Land Based Offsets* (ha)		On-site Rehabilitation (ha)
		NDA	HMA	
Warkworth Sands Woodland (WSW)	36.5	20.2	82.5	71.8
Non-WSW	529.4	650.4	782.8	2226.7

\* This includes protection and re-establishment of WSW as set out in the 2002 Green Offset Strategy

Conditions 2 and 3 to Schedule 4 of the 2003 development consent required the protection of WSW at a ratio of 2:1 and commitment to re-establish a further 2:1 prior to clearing WSW east of Wallaby Scrub Road. The DPE approved the clearing and offsets for clearing the WSW east of Wallaby Scrub Road under cover of a letter dated 21 November 2013.

The areas of WSW dedicated as offsets under the 2003 development consent area shown as yellow and black hatching in Figure 12.7 and 12.8 of the Environmental Impact Statement (EIS).

The 2014 EIS considered a biodiversity offset strategy for the proposal based on three components, including:

- Component 1 – WSW impacted by the proposals (west of Wallaby Scrub Road);
- Component 2 – non-WSW impacted by the proposal; and
- Component 3 – non-WSW impacted by the 2003 extension.

A summary of each component is provided in **Table 3**.

**Table 3: Offsets – Warkworth Continuation 2014**

Component	Disturbance Area (ha)	Offsets			Supplementary Measures
		Land Based (ha)	Re-establishment (ha)	Credit Based (ha) via UHSA	
WSW (component 1)	72	75.5  This is from 19.5ha in the NBA and 56ha in the SBA	160	308	<ul style="list-style-type: none"> <li>• Integrated management plan</li> <li>• Contribution of \$1M to Regent Honeyeater SOS</li> <li>• Implementation bond</li> <li>• Conservation of WSG under 2003 consent</li> <li>• Completion criteria for WSW</li> <li>• \$500,000 used for WSW research under the now rescinded 2012 Warkworth approval</li> <li>• Secure and manage land based offset of equal or greater value of 72ha of WSW to be impacted by continuation (Hanwood Estate, 41.6ha). The OEH have confirmed that the Hanwood Estate's inclusion in the BOS fully satisfies the recommendation to the consent authority for the additional land based offset</li> </ul>
Non-WSW (component 2)	611	1673  This is within the Goulburn River and Bowditch offset	1227.5	3278.7	-
Non-WSW from 2003 extension (component 3)	477.5 <sup>***</sup>	721  This is entirely in the SBA	872.5 <sup>**</sup>	730.2	-

<sup>\*</sup> Area is deduced by dividing the BBAM credits by 9.8, as per the Upper Hunter Strategic Assessment (UHSA)

<sup>\*\*</sup> On-site Mine rehabilitation

<sup>\*\*\*</sup> This area has decreased since the 2003 approval due to a change in mapping criteria of several vegetation communities. The mapping aligns to contemporary mapping, *The Vegetation of the Central Hunter Valley, NSW, Peake 2006*.

The Biodiversity Offset Strategy (BOS) outlined above in **Table 3** was certified by the Office of Environment and Heritage (OEH) in accordance with clause 14(3) of the Mining SEPP which requires the consent authority to consider any certification by the Chief Executive of the OEH that measures to mitigate or offset the biodiversity impact of the proposal will be adequate.

### 3.0 Air Quality

The DPE requested:

*Provide a succinct summary of the compliance of the project/s against the applicable 24-hour PM<sub>10</sub> criteria in the gazetted version of the Voluntary Land Acquisition and Mitigation Policy for all privately-owned residential properties and vacant land in the study area.*

A summary of PM<sub>10</sub>, 24 hr monitoring against the criteria in the gazetted version of the *Voluntary Land Acquisition and Mitigation Policy* is provided in **Table 4** from the MTW monitoring network. As can be seen by the results there have not been any exceedances of the criteria by five days or more.

**Table 4: Analysis of PM<sub>10</sub> 24hr Exceedances**

Year	Criteria (µg/m <sup>3</sup> )	Monitoring location				
		Warkworth PM10 (formerly LEM)	MTO	Loders Creek (formerly MTIE)	WML	Long Point
2009	50	0	0	1	N/A	N/A
2010	50	0	0	0	N/A	N/A
2011	50	0	0	0	N/A	N/A
2012	50	0	0	0	0	N/A
2013	50	0	0	0	0	N/A
2014	50	0	0	0	0	0

## 4.0 Final Void

The DPE requested further information in relation to the final void, including:

- clarification of the size of the final void;
- completely or partially filling the void to reduce its size, depth and slopes;
- comparative cost estimates based on industry benchmarks for these options, including consideration of deploying alternative (less costly) equipment during final rehabilitation of the site;
- measures to minimise the impacts of the final void from a community, environmental and land use perspective, having regard to the relative value of the current land use on the subject land; and
- a detailed justification for the void as proposed, including a comparison of the size of final voids in NSW and QLD for mines of a similar size, and with similar mining methods and strip ratios.

Further consideration to each of the matters raised is provided below.

### 4.1 Clarification of the size of the final void

Reference to a final void size of 445 ha is the in-pit lake based on the groundwater recovery level at a relative level (RL) of -10 m Australian Height Data (AHD) which is predicted to occur 350 years after mining. Reference to a final void size of 950 ha is measured at the pre-mining natural surface level of RL 80 m AHD.

The groundwater studies predict that it would take up to 1,000 years to reach an equilibrium water level of RL 20m AHD, which equates to a surface area of 576 ha.

A schematic diagram illustrating the various reference levels is provided in **Figure 1**.

### 4.2 Completely or partially filling the void to reduce its size, depth and slopes

An assessment has been undertaken on the volume of fill required to completely or partially fill the void. These options include:

- Base case – Current proposal;
- Option 1 - Fill to natural surface, RL 80 m AHD;
- Option 2 - Fill to 350 year water level, RL -10 m AHD;
- Option 3 - Fill to 1,000 year water level, RL 20 m AHD;
- Option 4 – Reduce highwall and endwall slopes; and
- Option 5 – Reshape low-wall.

A reduction in the depth of mining would require sterilisation of economic coal and has not been considered further.

The change in void area and fill volumes for each option is included in **Table 5**. The change in void area is based on the reference level for the particular option. Each option is provided relative (and in addition to) the base case. To compare each option in lieu of the base case requires the addition of the base case to that option.

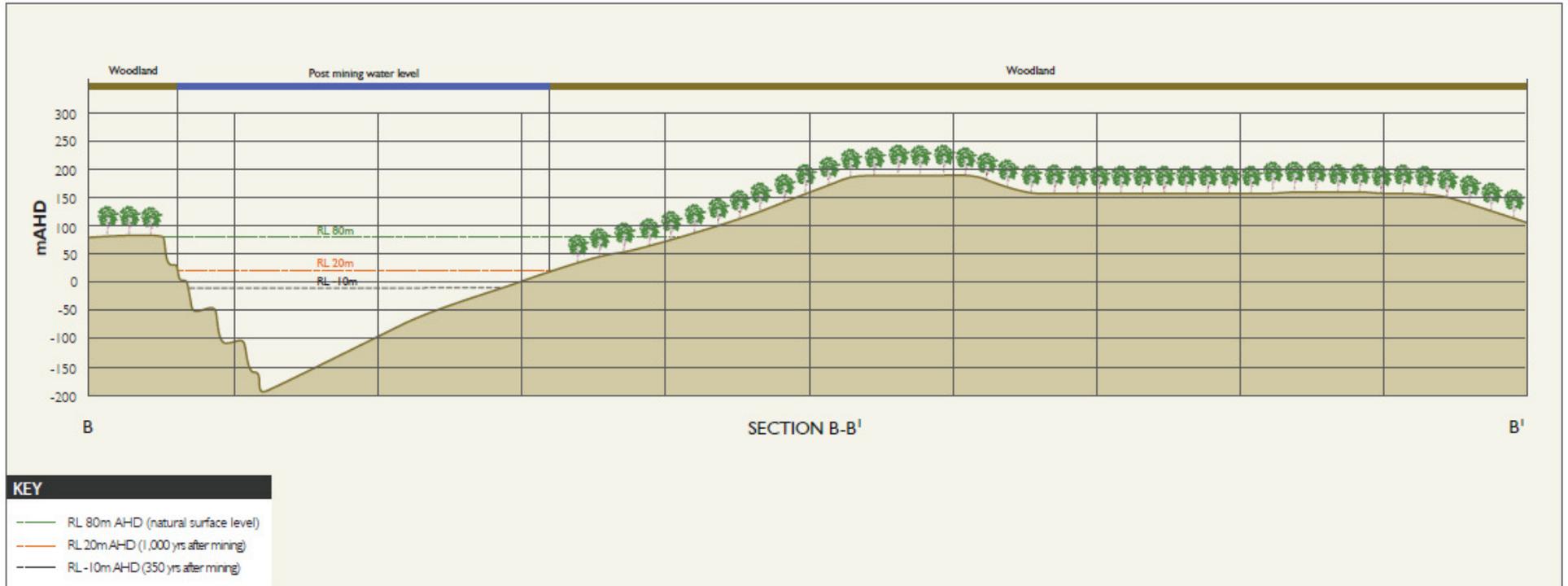


Figure 1 - Final Void Cross Section Schematic (Illustrative Only)

As the table illustrates, a large volume of material would be required to fill the void for each of the options considered. A reduction in slope while accessing the same volume of coal would require an increase in surface area. To reduce the void area by changing slopes whilst not sterilising economic coal would require an increase in slope gradient greater than acceptable slope angles.

#### **4.3 Comparative cost estimates based on industry benchmarks for these options, including consideration of deploying alternative (less costly) equipment during final rehabilitation of the site**

A cost estimate for each of the options was considered based on industry benchmarks in **Table 5**. An industry benchmark rate of \$2.53/bank cubic metre (bcm) for carting material was derived from the Department of Trade and Investment, Regional Infrastructure and Services (DRE) Rehabilitation Cost Calculation Tool (November 2012). The actual cost for this activity is likely to be higher deploying MTW equipment and higher again if an external contractor was used. The unit rate excludes costs associated with shaping and rehabilitation which would be significantly higher.

Notwithstanding the above, the DRE rate has been used for comparative purposes. As can be seen from **Table 5** the costs for each option above the base case are cost prohibitive using the conservative DRE rate.

#### **4.4 Measures to minimise the impacts of the final void from a community, environmental and land use perspective, having regard to the relative value of the current land use on the subject land**

MTW is a Rio Tinto managed operation and falls under Rio Tinto's Closure Standard which sets out the minimum requirements for planning for closure over the whole life cycle of operations. Closure plans will be developed through the life of the operations taking account of regulatory requirements and stakeholder expectations. Rio Tinto is committed to maintain a positive legacy after mining as a key measure of our contribution to sustainable development, and fundamental to maintaining Rio Tinto's social licence to operate.

The current proposal incorporates reasonable and feasible measures to reduce the size of the final void at an estimated cost of \$127m.

**Table 5** also includes an assessment of the cost of filling the void per hectare of reduced void area. These costs range from \$1,900,000/ha to \$14,000,000/ha. Rural land values in the region range from \$2,000/ha to \$10,000/ha. The cost to reclaim land by filling the voids is over 190 times more expensive than rural land values.

**Table 5 - Final Void Option Summary**

Option	Description	Surface Level (m AHD)	Pre-fill Area at Surface Level (ha)	Void after Filling (ha)	Change in Area (ha)	Fill Required (Mbcm)	Estimated Fill Cost (\$M)*	Fill Cost/Change in Area	Comments
Base case	Current Proposal	-10	454	445	9	50	\$127	\$14.1M/ha	Utilises Warkworth overburden to fill Mount Thorley void. Void acts as groundwater sink.
1	Fill to natural surface	80	950	0	950	824 (+50)	\$2,085 (+\$127)	\$2.2M/ha	Requires considerable volumes of material with no convenience source from an operating mine. Potential for void to be a groundwater source rather than a sink.
2	Fill to 350 year water level	-10	445	0	445	335 (+50)	\$848 (+\$127)	\$1.9M/ha	Requires considerable volumes of material with no convenience source from an operating mine. Potential for void to be a groundwater source rather than a sink.
3	Fill to 1,000 year water level	20	576	0	576	476 (+50)	\$1,204 (+\$127)	\$2.1m/ha	Requires considerable volumes of material with no convenience source from an operating mine. Potential for void to be a groundwater source rather than a sink.
4	Reduce highwall and endwall slopes	-10	445	487	-42	170 (+50)	\$430 (+\$127)	N/A (increase)	Using material from the highwall and endwalls would increase the surface area of the void. Void acts as groundwater sink.
5	Reshaping North and West Pit Final Landform	-10	445	391	54	106 (+50)	\$143 (+\$127)	\$2.6M/ha	Require removal of 150 ha rehabilitation. Void acts as groundwater sink.

\* Estimated fill cost based on DRE costs calculator of \$2.53/bcm for carting material. Actual costs likely to be significantly higher to shape and rehabilitate.

## **4.5 A detailed justification for the void as proposed, including a comparison of the size of final voids in NSW and QLD for mines of a similar size, and with similar mining methods and strip ratios**

### **4.5.1 Comparison of final void with other NSW and Qld Mines**

A comparison of a final void at one mine to another requires careful consideration of the factors that determine the size of the final void. These factors include the characteristics of the resource and geology for each mine, such as depth of coal seams, number of seams, seam thickness, strip ratio, seam angle and pit length. The main factors that influence size are depth and length.

A comparison is also dependant on the information available in the public domain and the reference levels. From our review there does not appear to be any consistent policy or regulatory basis for the reporting the void size and the various factors that influence its size and the information available requires interpretation.

Notwithstanding this, a review has been undertaken of a number of open cut coal mines in New South Wales (NSW) and Queensland (Qld) using depth and strip ratio (where available) as a relative comparison between mines. Details relating to pit length and numbers of seams were not readily available.

**Table 6** provides a summary of the information that could be obtained from the public domain. The limitations of the available data restrict direct comparisons, however, it is noted that while the strip ratio is similar between Warkworth, the approved Mount Arthur operations and those in Queensland, the final void surface area is smaller despite the void being deeper.

### **4.5.2 Justification**

The justification for the final void as proposed is as follows:

- The current proposal results in a net reduction in the current total area and number of approved voids across the MTW whilst recovering a significant economic resource. Removing the Mount Thorley Operations void is only possible under this proposal while Warkworth Mine operates to cost-effectively provide a source of fill material.
- The options of filling the void to the water level occurring 350 years after mining, 1,000 years after mining or to natural surface level respectively are cost prohibitive.
- Reducing the void by reshaping the final landform would add additional costs with little reduction in void area and is therefore not considered reasonable or feasible.
- The cost of reclaiming land by filling the void is over 190 times that of the underlying rural land value.

**Table 6 - Other Mine Final Void**

Mine	State	Max Depth	Average Strip Ratio*	Final void – water level (ha)	Final void – ground surface level (ha)	Comment
Warkworth Continuation 2014	NSW	310m	6.5:1	445	950	
Mount Pleasant Project	NSW	160m	4:1	471	510	
Mount Arthur Mine	NSW	180m	5:1	N/A	1,420	Reference to catchment area rather than ground surface level. Depth estimation.
Bengalla Continuation Project	NSW	240m	3.5:1	N/A	324	Final void water level predicted to reach up to RL 37m AHD but also states that the water level would vary between RL64m and 71m at 1000 years.
Bulga Coal Mine	NSW	350m	N/A	N/A	500	
Hail Creek Mine	Qld	210m	8:1	N/A	1,540	Internal estimation at crest.
Wandoan Coal Project	Qld	N/A	3 to 5:1	N/A	1,450	Made of up to nine pits.
Caval Ridge Mine	Qld	220m	unknown	N/A	2,000	Estimation– final void size to be confirmed through closure planning and depth estimation based on cross sections.

\*Prime overburden divided by run of mine (ROM) coal.  
N/A – details not readily available.

We trust that above information will assist with the DPE and Planning Assessment Commission's review of the proposal.

By all means, should you require any further information or clarification, please do not hesitate to contact Nicola Proctor on 02 6575 5825 or the undersigned.

Yours sincerely



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## Appendix F

### Final void options



Appendix F — Final void options

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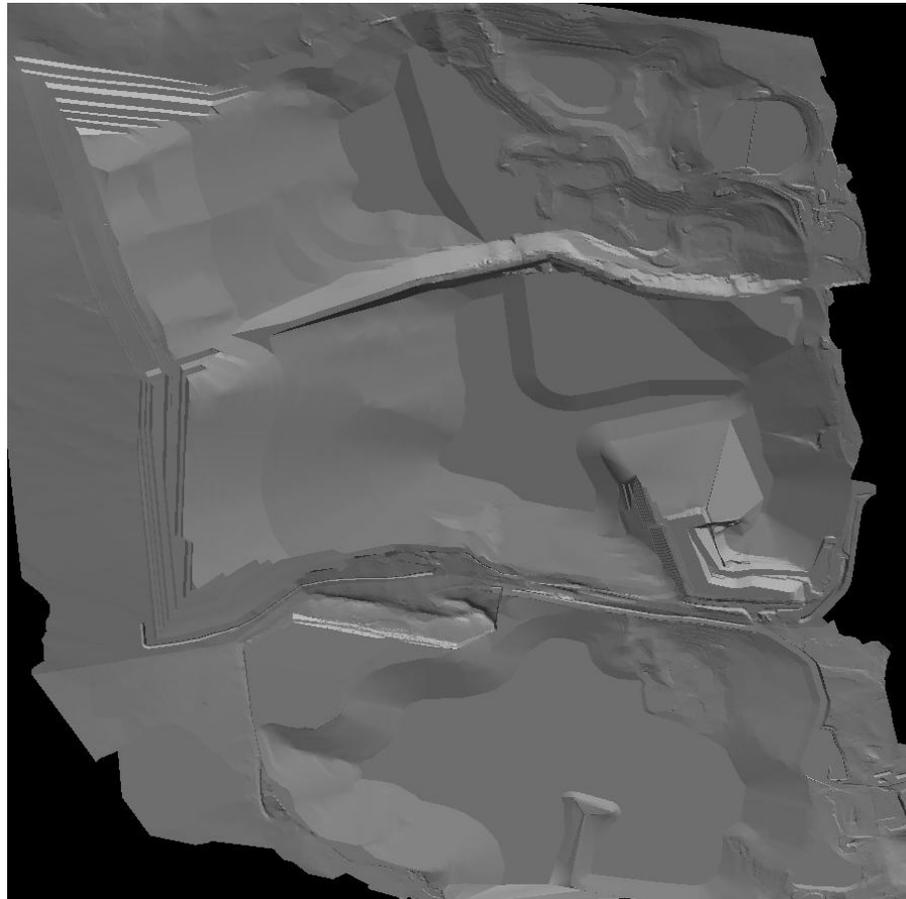
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# Final Void Options Warkworth Continuation 2014

As at 17 March 2015

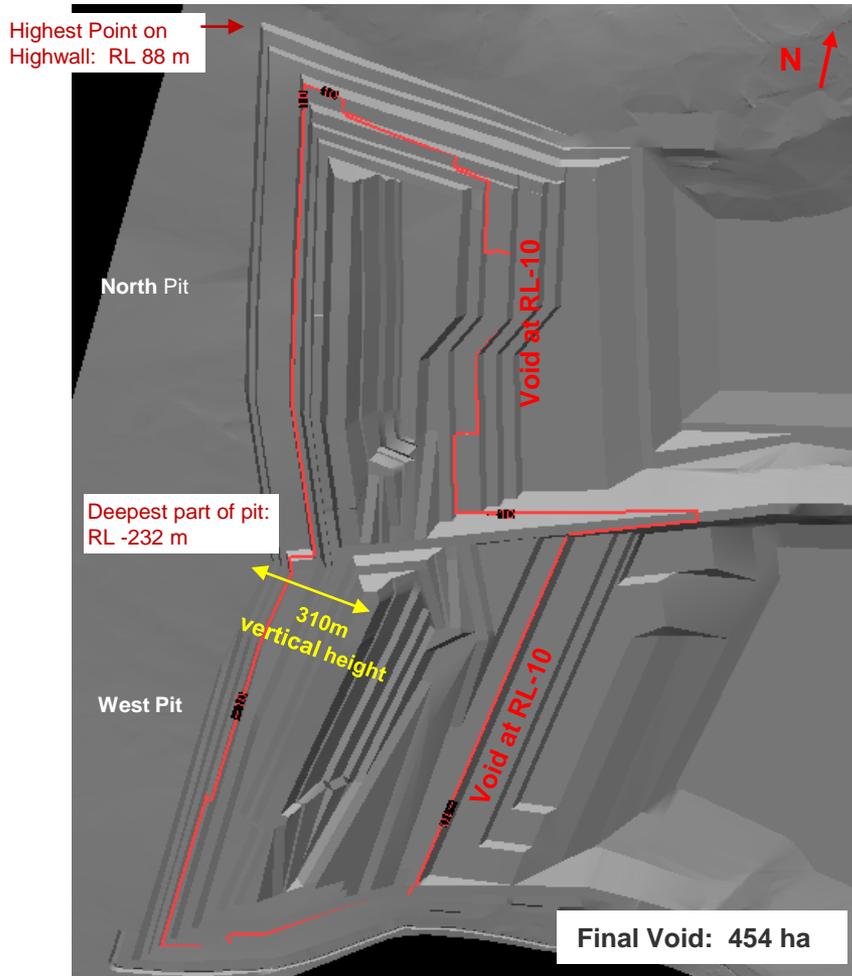
Zara Boyce

Senior Mining Engineer - Approvals and Strategy

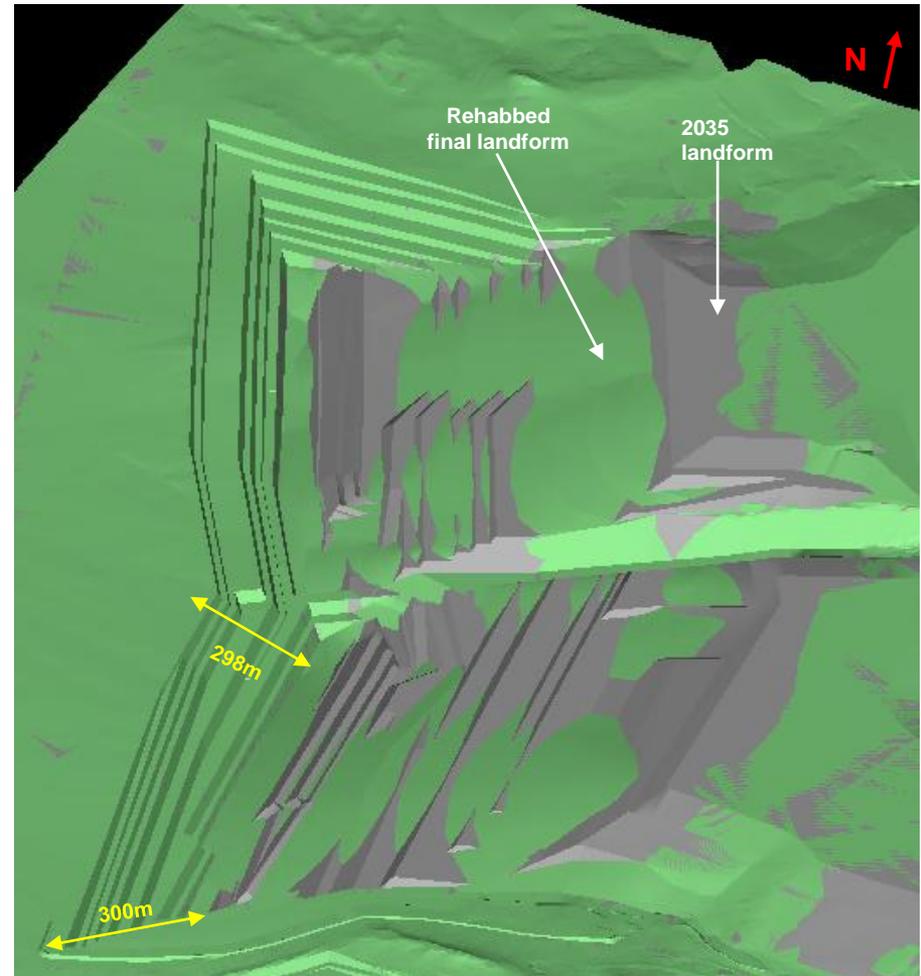


# Final Landform: Base Case

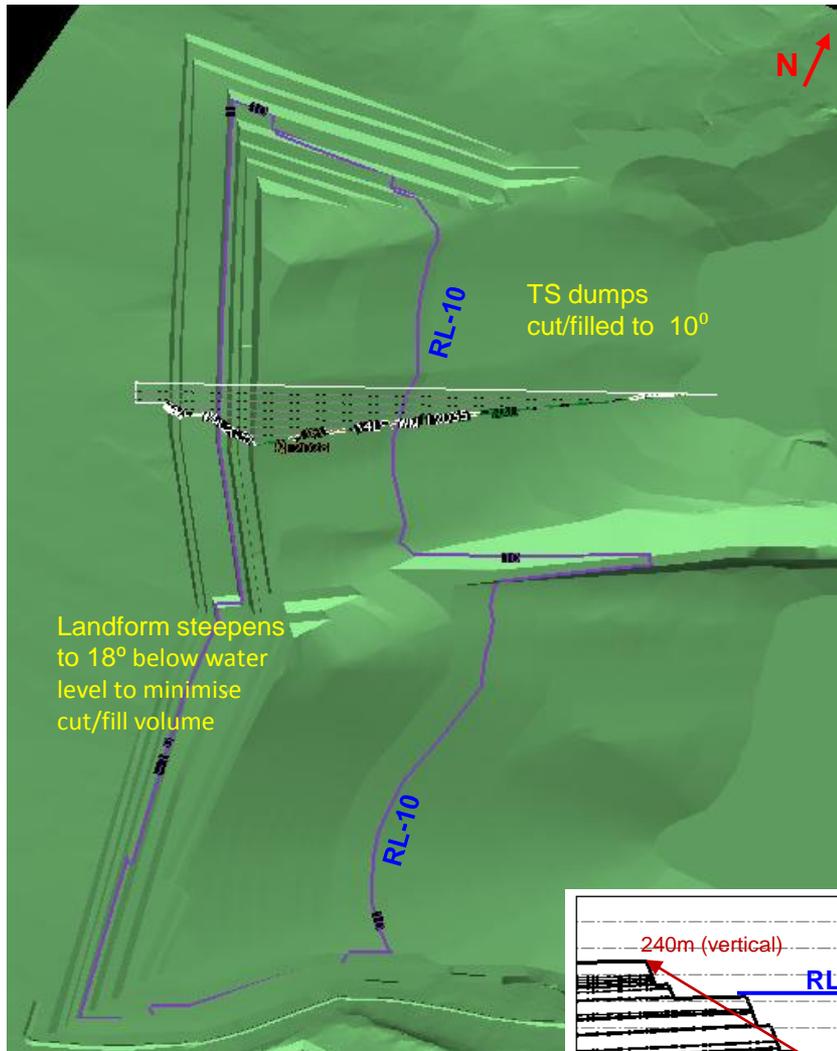
Mined out pit at 2035



Reshaping of mined out pit

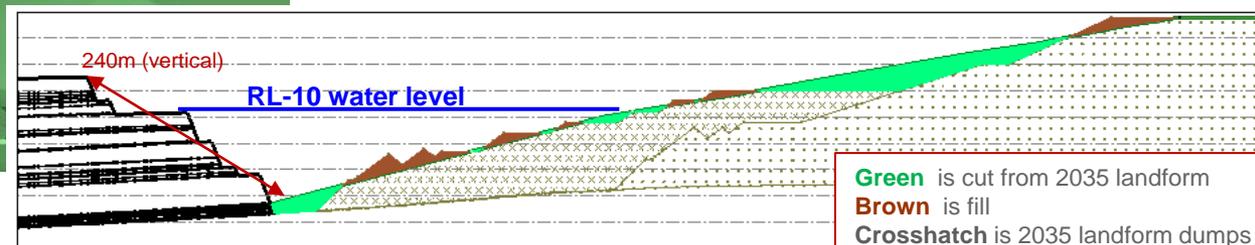


# Final Landform: Base Case

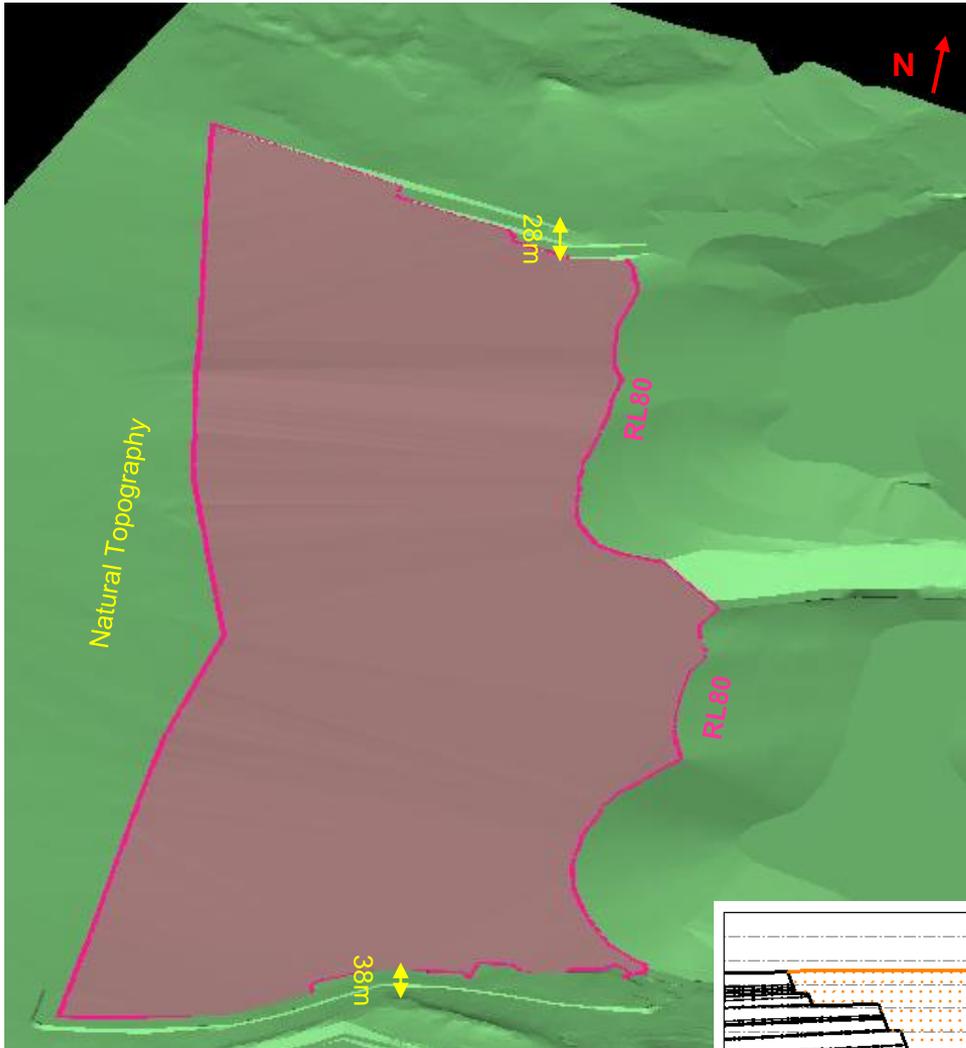


- RL -10 is the 350 year water level.
- Pre-fill Void: 454 ha
- Final Void: 445 ha
- Cut/fill: 48 Mbcm
- Estimated cost<sup>^</sup>: \$127M
- Fill cost/change in area: \$14.1M/ha

<sup>^</sup> based on DRE cost calculator of \$2.53/bcm

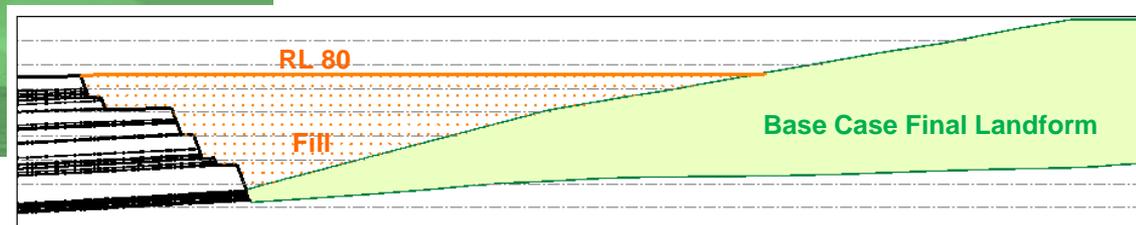


# Option 1: Fill to Natural Surface



- RL 80 approximates natural topography
- Pre-fill Void: 950 ha
- Final Void: 0 ha
- Fill\*: 824 Mbcm
- Estimated cost\*: \$2,085M
- Fill cost/change in area: \$2.2M/ha

*\* additional to base case*

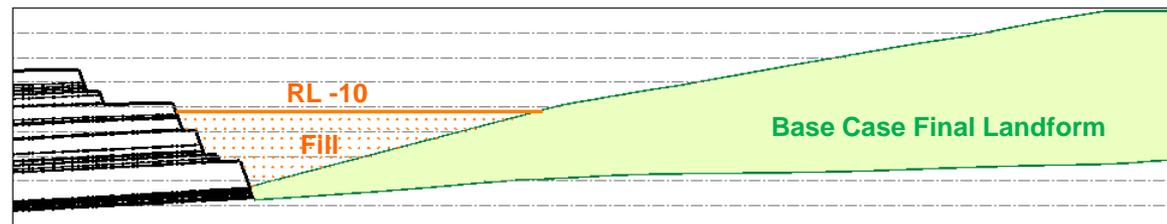


# Option 2: Fill to 350 Year Water Level



- RL -10 is the 350 year water level
- Pre-fill Void: 445 ha
- Final Void: 0 ha
- Fill\*: 335 Mbcm
- Estimated cost\*: \$848M
- Fill cost/change in area: \$1.9M/ha

*\* additional to base case*

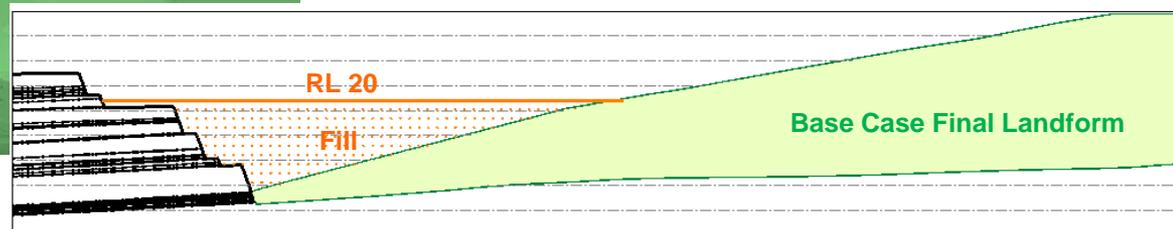


# Option 3: Fill to 1,000 Year Water Level

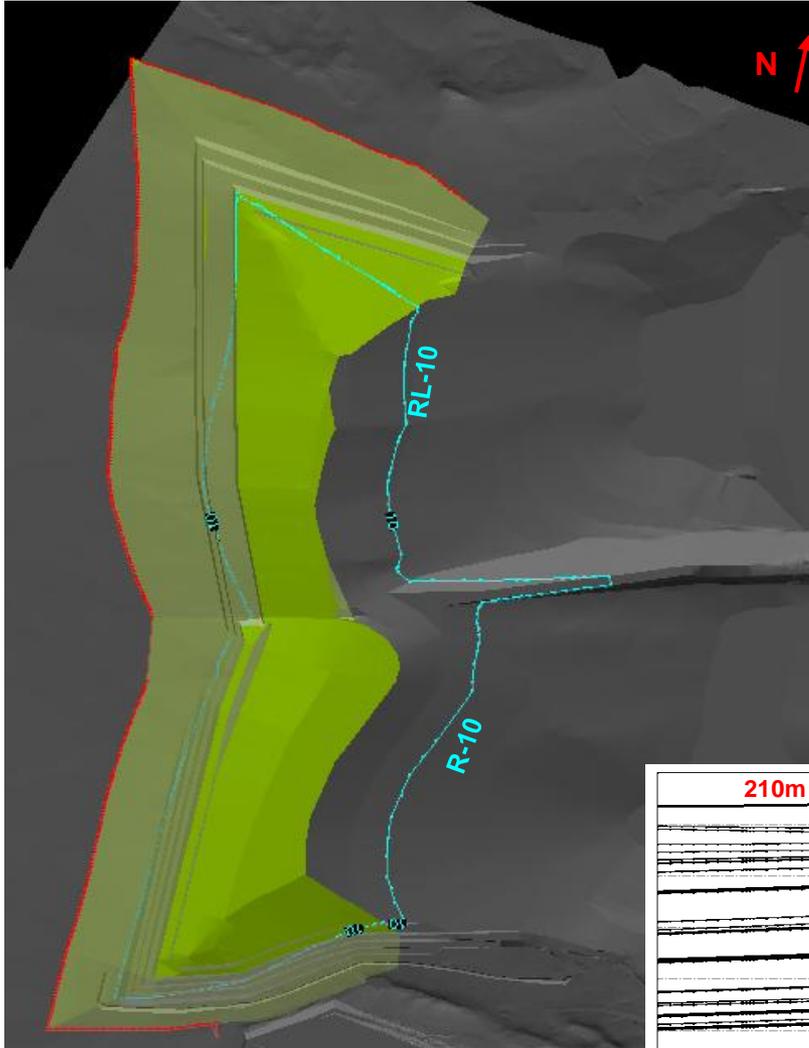


- RL 20 is the 1,000 year water level
- Pre-fill Void: 576 ha
- Final Void: 0 ha
- Fill\*: 476 Mbcm
- Estimated cost\*: \$1,204M
- Fill cost/change in area: \$2.1M/ha

*\* additional to base case*

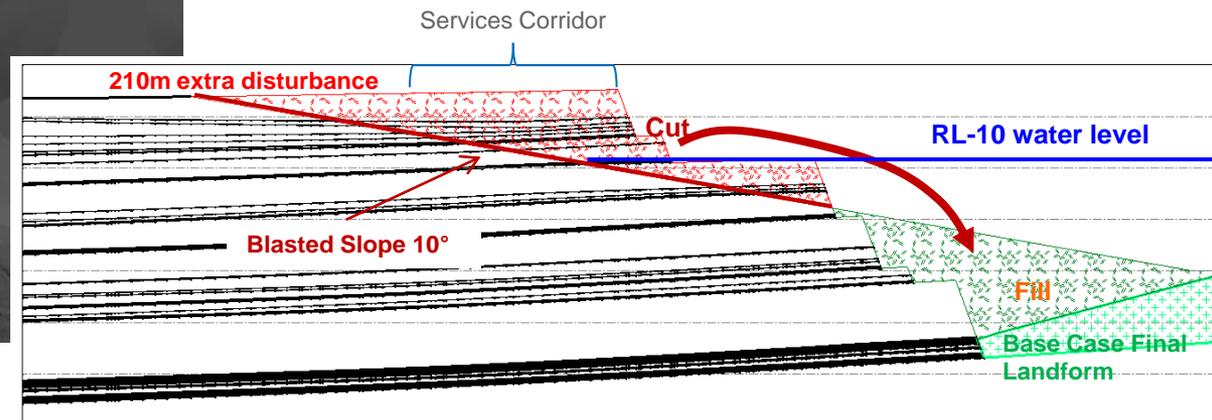


# Option 4: Reduce slope of HW and EW



- Blast highwalls and endwalls to 10° slope
- Pre-fill Void: 445 ha
- Final Void: 487 ha
- Cut/Fill\*: 430 Mbcm
- Estimated cost\*: \$430M
- Fill cost/change in area: increases void area
- Increases disturbance footprint by 109 ha

\* additional to base case

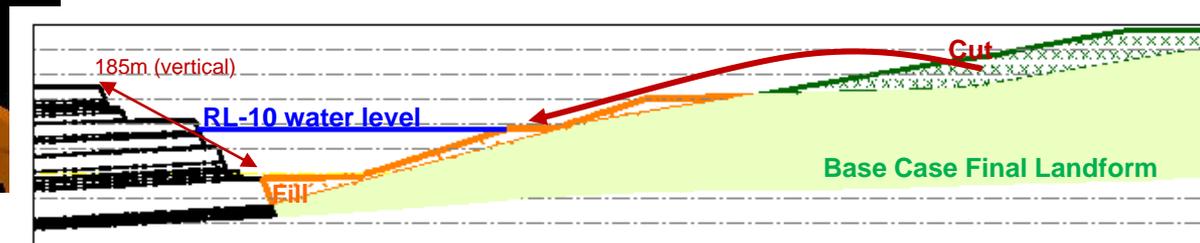


# Option 5: Reshape Final Landform

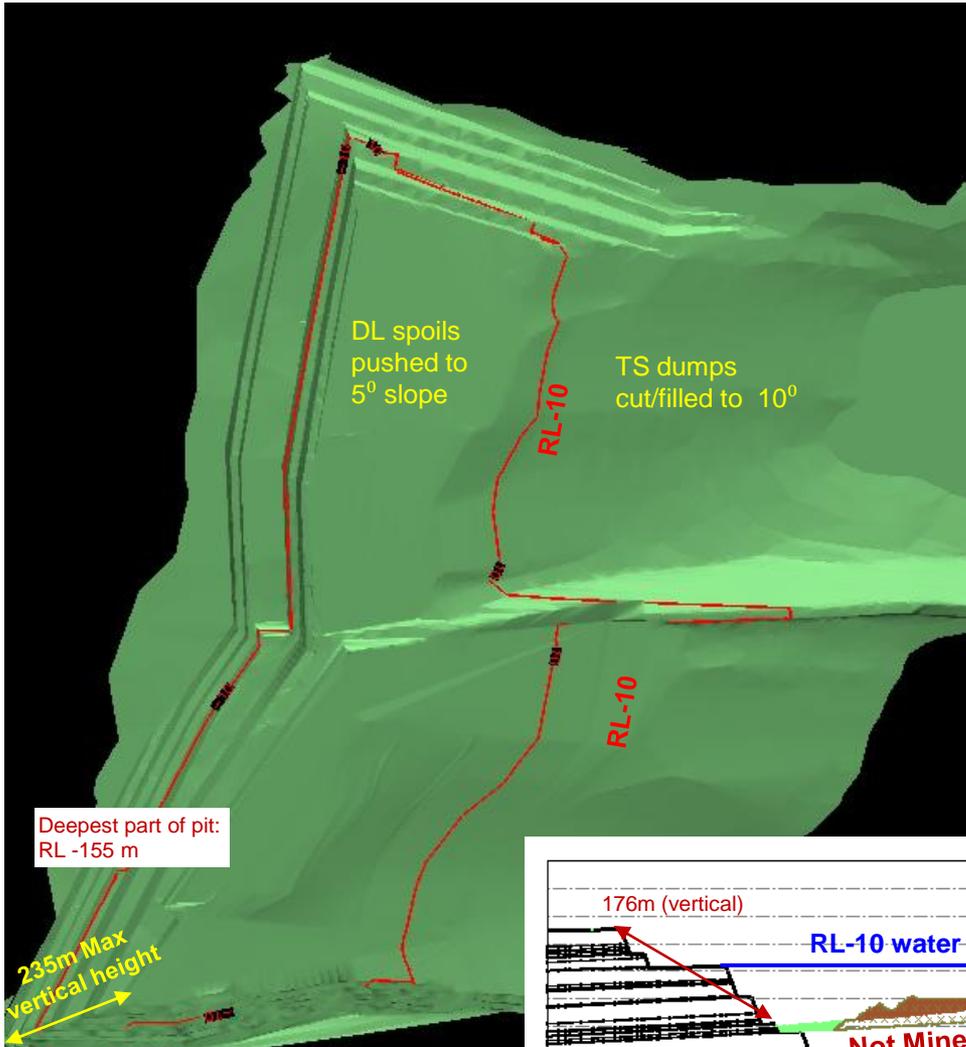


- An example of digging up more spoils to fill void
- Pre-fill Void: 445 ha
- Final Void: 391 ha
- Cut/fill\*: 106 Mbcm
- Estimated cost\*: \$143M
- Fill cost/change in area: \$2.6M/ha
- Dehab 150 ha of land rehabilitated prior to 2035

\* additional to base case

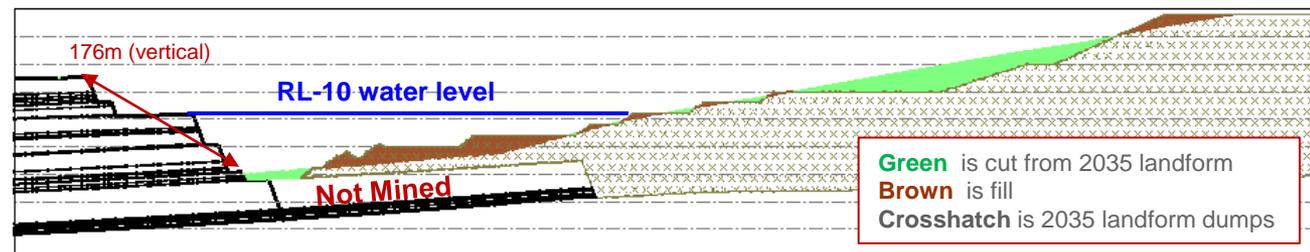


# Option 6: Raise Base of Pit Post 2028



- Stopped mining basal dragline seams post 2028 in order to reduce the depth of the void.
- Pre-fill Void: 445 ha
- Final Void: 434 ha
- Cut/fill\*: 50 Mbcm
- Estimated cost<sup>\*^</sup>: \$1,427M
- Fill cost/change in area: \$14.1M/ha
- Sterilises 30Mt coal
- Reduces void depth by 65m

- *additional to base case*
- <sup>^</sup> includes loss of coal revenue









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