



RIX'S CREEK NORTH MINE MODIFICATION 9

LANDFORM AMENDMENT EXPLORATION AND BLASTING FREQUENCY RESPONSE TO SUBMISSIONS

for

BLOOMFIELD COLLIERIES PTY LIMITED

September 2020

RIX'S CREEK NORTH MINE

MODIFICATION 9

LANDFORM AMENDMENT EXPLORATION AND BLASTING FREQUENCY

RESPONSE TO SUBMISSIONS

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September 2020

For:

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1 INTRODUCTION

1.1 BACKGROUND

Bloomfield Collieries Pty Limited (Bloomfield) owns and operates Rix's Creek Mine (RCM) located in the Hunter Valley of NSW. RCM is an open cut coal mining operation located approximately 5 km north of Singleton straddling the New England Highway.

RCM is the collective name for Rix's Creek North (RCN) (previously Integra Open Cut) and Rix's Creek South (RCS) (the original Rix's Creek Mine).

RCN operates under Project Approval (PA) 08_0102 granted under the *Environmental Planning and Assessment Act 1979* (EP&A Act). PA 08_0102 has been modified on eight occasions. Under PA 08_0102, Bloomfield can conduct open cut mining operations on site until 31 December 2035.

Bloomfield is seeking to modify PA 08_0102 to facilitate overburden emplacement above the currently approved final landform height in a discrete area within the Camberwell Pit, increase the number of blast events per day to up to three (consistent with the RCS Planning Approval) and to undertake exploration activities (MOD9).

1.2 DOCUMENT PURPOSE

The public exhibition of the Statement of Environmental Effects (Hansen Bailey, 2020) (SEE) which supports MOD9 concluded on Wednesday, 5 August 2020.

This Response to Submissions (RTS) has been prepared by Hansen Bailey on behalf of Bloomfield and responds to Department of Planning, Industry and the Environment (DPIE) correspondence dated 19 August 2020 requesting a response to the issues raised in submissions and agency advice in accordance with clause 82(2) of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

1.3 DOCUMENT STRUCTURE

This RTS is structured as follows:

- **Section 2** summarises the submissions received from stakeholders;
- **Section 3** provides a response to the issues raised by stakeholders;
- **Section 4** provides a conclusion; and
- **Section 5** includes a list of reference documents.

2 SUBMISSIONS SUMMARY

In response to the exhibition, the Department received 18 submissions of which 13 were from community members, one from a special interest group and four from public authorities.

Of the 14 community submissions received, 13 expressed support for the Project and one objected to it. The four public authority submissions provided constructive commentary on the Project.

The submissions received by DPIE are available at: www.planningportal.nsw.gov.au/major-projects/projects.

The following regulatory agencies provided a submission:

- Singleton Shire Council (SSC);
- Resources Regulator (RR);
- Environment Protection Authority (EPA); and
- Mining, Exploration and Geoscience (MEG).

Of the 13 submissions in support, the submissions noted that MOD9, if approved would:

- Improve drainage and vegetation development and grazing potential for the final land use;
- Create benefits from the incorporation of micro-relief into the final landform;
- Allow flexibility in blasting to take advantage of the times when environmental conditions are in an optimal state to minimise the impacts on the surrounding community;
- Via the proposed final landform, provide a more natural design that will blend into the existing landscape better than the flat plateau of the original design;
- Reduce the amount of runoff water “lost” to the final mining void;
- Not increase the disturbance area at RCN;
- Continue to contribute to the Singleton community in the form of sponsorship and direct and indirect employment and training, by an Australian-owned mining company; and
- Facilitate exploration activities to be undertaken more efficiently, which is a benefit to the mine and the community as it encourages more exploration and helps stimulate the local economy.

Regulatory submissions and the single objection are responded to in **Section 3**.

3 RESPONSE TO SUBMISSIONS

A response to issues identified by each regulatory agency is provided below.

3.1 SINGLETON SHIRE COUNCIL

Singleton Shire Council (SSC) noted that the Proposed Project is predicted to result in amenity impacts (air quality and visual) and would alter the final landform.

3.1.1 Amenity Impacts

Issue

SSC raised the following concerns in relation to amenity impacts:

- Impacts on village communities such as Camberwell;
- Predicted air quality impacts, specifically at properties N234 to N239 and N240.

SSC noted that properties N234 to N239 and N240 are located within the rural/urban zone with zoning ranging from RU1 to R1. SSC stated that the SEE was not clear on the extent to which amenity impacts would be felt by potential development within these zones, and had not taken into consideration the potential land uses for these zones and the impacts that may be experienced as a result of the proposed modification.

Response

The air quality assessment indicates that best practice fugitive dust emission management will continue to ensure that air quality impacts to near neighbours will be minimised and as such no new receptors will experience impacts above the relevant government criteria due to MOD9. In particular, the findings have been that no additional acquisition or mitigation conditions of approval are required to be implemented for properties located in Camberwell Village.

The *Air Quality Impact Assessment Rix's Creek North Modification 9* (TAS, 2020) has confirmed that impacts which are predicted above *Voluntary Land Acquisition and Mitigation Policy* (NSW Government 2018) (VLAMP) criteria for receivers N240 and N234 – 239 are due to the introduction of more stringent planning criteria, and not increased impacts from MOD9. Actual impacts will not increase as a result of MOD9.

Access to DPIE's spatial viewer on 8 September 2020 indicates that properties N240 and N234 – 239 all occur within RU1 Primary Production under the *Singleton Local Environmental Plan 2013* (LEP). None of the properties occur within R1 General Residential.

The objectives of zone RU1 are reproduced below.

"Zone RU1 Primary Production

Objectives of zone

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*

- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

Permitted without consent

Extensive agriculture; Forestry; Home occupations; Intensive plant agriculture

Permitted with consent

Agriculture; Airstrips; Animal boarding or training establishments; Aquaculture; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Dual occupancies; Dwelling houses; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Hazardous industries; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Information and education facilities; Intensive livestock agriculture; Jetties; Moorings; Offensive industries; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (outdoor); Roads; Roadside stalls; Rural industries; Rural workers' dwellings; Service stations; Sewerage systems; Truck depots; Turf farming; Veterinary hospitals; Water supply systems."

MOD9 will neither restrict nor affect any of the above objectives additional to existing approved operations. Neither property currently has a residence within the predicted impact contour for PM10. Each is currently used for rural agricultural activities.

3.1.2 Mine Closure

Issue

SSC raised concerns regarding the timing of mine closure planning for Rix's Creek North and recommended a condition to be added to the consent for the Applicant to develop a Final Land Use Strategy within the next five years, incorporating a consideration of the effects of climate change.

SSC also stated that the SEE did not include how the proposed landform changes will take into consideration integration with surrounding land uses, any changes necessary to the approved final land uses for the operation, or how the amended landform will be long term stable.

Response

Bloomfield will undertake closure planning for RCM in accordance with conditions of development consent and the requirements of MEG in consultation with SSC and other interested stakeholders.

MOD9 does not intend to change the land use currently approved in the Mining Operations Plan (MOP) and described in the *Environmental Assessment: Integra Open Cut Project* (URS, 2009). The amended landform will be reshaped in accordance with a revised MOP to provide a long term stable final landform in varying climate conditions.

3.2 RESOURCES REGULATOR

3.2.1 Risk Based Approach

Issue

The Resources Regulator noted that a risk-based approach to achieving the specified rehabilitation outcomes will be required and that the Resources Regulator has the power to implement further risk control measures should they be required to achieve effective rehabilitation outcomes.

Response

Noted. Bloomfield will consult closely with the Resources Regulator through the MOP process when determining appropriate rehabilitation outcomes.

3.2.2 Development Consent

Issue

The Resources Regulator requested a review of the draft development consent conditions prior to finalisation and any granting of development consent.

Response

Noted.

3.3 EPA

The EPA raised four issues in relation to the air quality assessment and the predicted air quality impacts, including:

- Consideration of all reasonable and feasible mitigation measures until compliance with the EPA's impact assessment criterion is demonstrated;
- Adopted ambient air monitoring data is not appropriate;
- Blasting has not been appropriately assessed; and
- Changed approach to modelling emissions has not been justified.

Todoroski Air Sciences has provided a detailed response to these queries which is provided in **Appendix A**.

3.4 MINING, EXPLORATION & GEOSCIENCE

Issue

MEG has reviewed the information supplied and notes there are no changes proposed to resource recovery and as such had no further comment to make at this time. MEG would appreciate the opportunity to review draft conditions of consent at the appropriate time.

Response

Noted.

3.5 COMMUNITY SUBMISSIONS

3.5.1 Issue

An objection was received by one adjacent property owner based on three main points:

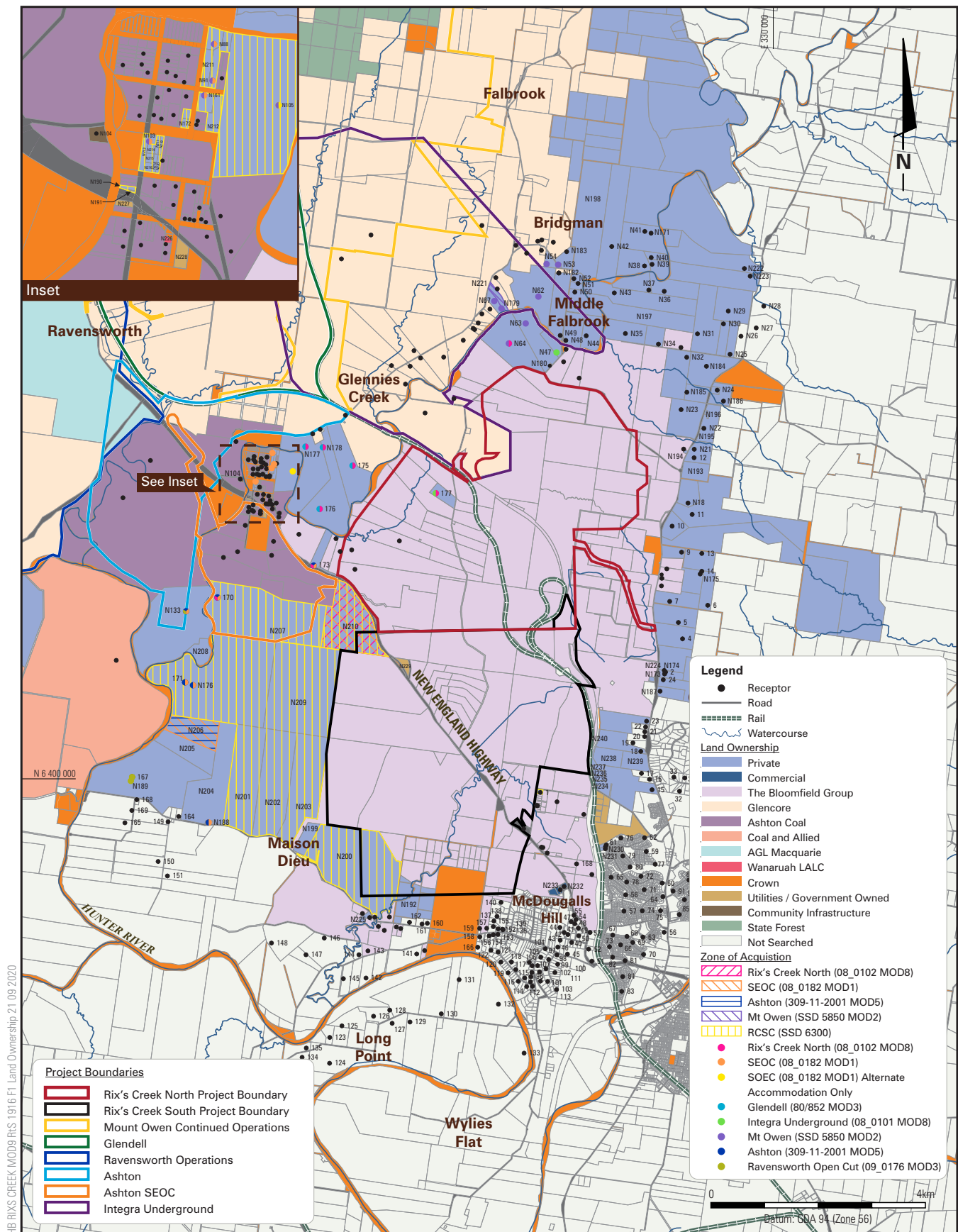
- The height of the overburden emplacement area and its potential to increase dust;
- The impacts of blasting; and
- Further exploration potentially causing the mine to further encroach on lifestyle.

3.5.2 Response

This property contains residences N11 and N18 as shown on **Figure 1** and is located generally east of RCN. No exceedances of noise, blast or air quality criteria is predicted by the relevant SEE specialist assessments. Further, a ridge (which runs northwest to southeast between these two residences and the overburden emplacement area proposed to be modified) obscures any views.

N11 and N18 are not included in an existing zone with rights to acquisition or mitigation for any mining operation in accordance with the VLAMP.

Bloomfield will continue to engage with all directly impacted neighbours and the Community Consultative Committee in relation to its exploration activities and mining plans as they are developed in the future.



RIXS CREEK COAL MINE

Land Ownership

FIGURE 1

4 CONCLUSION

We trust this RTS responds to your request of 20 August 2020. The support for the modification application received and the manageable nature of the limited number of issues raised confirms that the application is in the public interest and in our view should be approved in a timely manner with appropriate conditioning.

Please do not hesitate to contact me on 02 6575 2000 should you require anything further.

* * *

for

HANSEN BAILEY



Dianne Munro
Principal Environmental Scientist

5 REFERENCES

- Hansen Bailey (2020), *Rix's Creek North Mine Landform Amendment, Exploration and Blasting Frequency Modification Statement of Environmental Effects*
- NSW Government (2018), *Voluntary Land Acquisition and Mitigation Policy*
- Todoroski Air Sciences (2019), *Air Quality Impact Assessment Rix's Creek North Modification 9*
- Todoroski Air Sciences (2020), *Response to Submissions for Rix's Creek North Modification 9*
- URS (2009), *Environmental Assessment: Integra Open Cut Project*

APPENDIX A
Response to EPA Submissions

21 September 2020

Dianne Munro
Principal
Hansen Bailey
Via email: DMunro@hansenbailey.com.au

RE: Response to Submissions for Rix's Creek North Modification 9

Dear Dianne,

The following outlines additional information and clarification to address the New South Wales (NSW) Environment Protection Authority (EPA) Further Information Request relating to the *Air Quality Impact Assessment Rix's Creek North Modification* (AQIA) (**Todoroski Air Sciences, 2020**).

The key comments are shown in grey italics, and each is followed by a response to the comment.

1) Predicted dust impacts on privately-owned land

Consideration of all reasonable and feasible mitigation measures until compliance with the EPA's impact assessment criterion is demonstrated.

The mine applies all reasonable and feasible control measures and when the proactive and reactive of these measures (which are not reasonably able to be modelled) are applied, the AQIA finds that no impacts are predicted to arise.

Table 6-4 of the AQIA specifically presents only the predicted maximum number of additional days in a year above the EPA cumulative 24-hour average criterion at several receptor locations. The results indicate three additional days are predicted at receptor N180 which is a community hall and not a place of residence and one additional day at receptor N181 which is a Rural Fire Service Shed and not a place of residence. One additional day is presented in the table for receptor N18 in 2023 and one additional day at receptor N187 in Year 2020 and Year 2023.

However, in its review comments, the EPA only refers to the text above Table 6-1 of the AQIA, (which presents incremental 24-hour average impacts, and cumulative annual average impacts) thus it appears that the EPA may not have considered the text immediately above Table 6.4 which outlines that the proactive and reactive mitigation measures would prevent any impacts occurring.

Whilst the EPA points to the Approved Methods when it says "*...if the EPA's impact assessment criteria are exceeded, the dispersion modelling must be revised to include various pollution control strategies until*

compliance is achieved...." , it does not appear to have considered that the Approved Methods also include specific guidance for dealing with elevated background pollutant levels, which may prevent compliance with the criteria, even if best practice is achieved. This is set out in Section 11.2 of the Approved Methods, and in the worked example in that section.

This aspect of the Approved Methods is important, (especially for any project with scope to generate dust), as for example if this guidance is not recognised, development cannot meet the EPA criteria in almost any part of NSW given that it is commonplace for the existing background PM₁₀ and PM_{2.5} levels to already be above or very close to the EPA criteria. The worked example in Section 11.2 of the Approved Methods gives specific details as to what to do in such cases. The process is to ensure best practice will be achieved through applying *"...more effective mitigation measures or emission controls that reduce emissions..."* or where that is insufficient, to mitigate the impact through agreement or acquisition *"...if emissions and impacts have been reduced as far as they can, consider whether there are opportunities to mitigate the impacts through other measures such as negotiated agreements and/or acquisition..."*.

The Voluntary Land Acquisition and Mitigation Policy (VLAMP) is then applied as an extension of the EPA policy and in essence provides more detailed guidance as to what degree of impact warrants the implementation of mitigation at the receiver, or acquisition of the receiver.

The conservatively modelled maximum 24-hour average PM₁₀ impacts of 7.9 or 11.2µg/m³ are not significant. For example, the impacts referred to by the EPA do not occur on the days when there is an additional day above the criteria, nor are these impacts any higher than the impacts from many common occurrences in daily life, or the normal variability in daily background PM₁₀ levels away from industry. The levels in question are conservatively modelled maximums (in practice likely to be lower), and only occur on the one most impacted day of a year, during the most impacting period of the mine life for that receptor. In any case, these maximum levels are not directly relevant, as the predicted additional impact days arise when the background levels are elevated/ significant and the mine contribution is not large.

As a point of reference, the predicted incremental contributions at receptor N187 which result in an additional day above the criterion are 3.3µg/m³ and 3µg/m³ during Year 2020 and Year 2023, respectively. The impact occurs on the same modelling day in each scenario, when the corresponding background level on that day is 48µg/m³ and leads to cumulative levels of 51.3µg/m³ and 51µg/m³ respectively in each of the two mine plan scenarios.

Similarly, the predicted incremental mine dust contribution for receptor N18 at which the only additional day above the criterion was predicted (see Table E-23 of the AQIA) is 7.4µg/m³ with a corresponding background level of 44µg/m³, resulting in a predicted cumulative level of 51.4µg/m³.

The predicted levels at these locations marginally exceed the 24-hour average criterion of 50µg/m³, by between 1 and 1.4µg/m³, and on only one day of the year. As such, the existing proactive and reactive operational dust mitigation strategies would be effective for managing the excess predicted mine contribution on these occasions. The proactive system provides a forecast of the conditions for the day ahead and is primarily used as an alert of possible elevated dust levels allowing time to prepare and respond to any actual issues. The reactive system uses trigger levels applied to the real-time monitoring data to manage dust levels in real-time through scheduling of operations, modifying activity and temporarily ceasing operations. These mitigation measures are discussed in Section 7 of the AQIA. The design and operation of the mine is

commensurate with best practice, as are the proactive and reactive strategies which are expected to ameliorate any potential predicted impacts.

The EPA comments relating to Table 6-1 and Table 6.4 of the AQIA are incorrect. There is no inconsistency or error in the AQIA. EPA appears to be incorrectly applying the text relating to incremental 24-hour average impacts immediately above Table 6.1 to cumulative 24-hour average impacts shown in Table 6.4, which is in a different section and contains different data for evaluation per different criteria. It is clear in the AQIA that the text above Table 6.1 relates only to Table 6.1, and this text is correct. Similarly, the text immediately above Table 6.4 relates only to Table 6.4 and is also correct.

In regard to the comments in the EIS at Section 7.1.3, as noted in the text immediately above Table 6.4 (and detailed further in Section 7 of the AQIA), the predicted additional days above the criterion are not significant and would be mitigated with the implementation of the proactive and reactive operational dust mitigation strategies. The excerpt from Section 7.1.3 of the EIS is correct and is consistent with the AQIA.

It is correct to note that the AQIA identifies two landholdings predicted to exceed the Voluntary Land Acquisition and Mitigation Policy (VLAMP) criteria for annual average PM₁₀ and that up to 16 ZOA receptors are predicted to exceed the relevant criteria for the assessed dust metrics in 2021 and up to 19 ZOA receptors in 2024. It is expected that the relevant agency administering the VLAMP will apply the appropriate planning conditions for these landholdings and receptors.

2) Adopted ambient air monitoring data is not appropriate

All available continuous ambient air monitoring data, collected at locations nearby the premises should be included. A detailed discussion of the methodology used to calculate the background concentrations for each pollutant must also be included. Negative values in the modelling (either as corrected incremental or corrected background) should not be used.

The purpose of the AQIA is to quantify the additional minor effect of a relatively small modification to the height of an overburden dump for an approved project, and to respond to a request to contemporise the assessment by applying the more stringent new EPA criteria for annual average PM₁₀ (and PM_{2.5}), the VLAMP Policy, and to include the additional effects caused by changes at neighbouring mines.

The contemporaneous modelling period for the approved adjacent Rix's Creek South project was used in the AQIA to enable a like-for like comparison befitting the core purpose of the AQIA. This period is for the 2012 calendar year. During this period, continuous ambient monitoring data were not available for all locations surrounding the Project, (as is the case in general for virtually any mining project). However, all of the available continuous ambient monitoring data was applied in the AQIA, and in addition the ambient High Volume Air Sampling (HVAS) data which was all that was available for the south eastern location was also applied in the assessment.

The NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods) (**NSW EPA, 2017**) does not provide any guidance on situations where continuous monitoring data are not readily available. For this situation, the 70th percentile of the available data has been used for periods of missing data at some of the receptors. This approach is per long-established Victorian EPA guidance and regulations. The 70th percentile approach was used and accepted by NSW EPA for the assessment for the approved project and other approved projects including the Continuation of Bengalla

Mine (**Todoroski Air Sciences, 2013**), Mount Pleasant Mine Optimisation Modification (**Todoroski Air Sciences, 2017**) and Rix's Creek Continuation of Mining Project (**Todoroski Air Sciences, 2015**).

Referring back to the primary purpose of the assessment, it would not be possible to make a reasonable evaluation of the small effect of the proposed modification to the approval without adopting the same approach used for the approval. The air dispersion model was thus setup using the same methodology and the same modelled meteorological year applied to the *Air Quality and Greenhouse Gas Assessment Rix's Creek South Continuation of Mining Project* (Rix's Creek South Assessment) (**Todoroski Air Sciences, 2015**). This approach was also selected to provide consistency with the recently approved assessment for the neighbouring RCS mine. Since the writing of the Rix's Creek South Assessment some of the nearby mining operations have sought modifications to their approved operations while other approved operations have yet to commence. The changes to the existing and future nearby mining operations have been factored into this assessment.

In regard to the EPA comment that the 70th percentile approach is used for over 86% of the data, this simply means that for these periods, the background level used in the assessment is sustainably higher than the average background level, making the overall assessment more conservative, and more likely to show impacts. Note that the value should be 83.3% as the HVAS data are available for 1 in 6 days, furthermore these data are only used in some locations where there are no continuous ambient monitoring data that are representative of the receptor location. (Note that the available DPIE monitors with continuous data are used at the receptors they are near to because they are representative of that location.

In regard to the comment that the Approved Methods requires that *"...the existing background concentrations of particles should be established using one year of continuous ambient monitoring data, collected in the vicinity of the premises..."* It is pointed out that multiple years of continuous ambient monitoring data are used in the assessment, and in addition to this, further reference method (HVAS) data are used where it is the nearest and only available data to the receptor(s) in question.

In regard to the EPA comment that the 2012 data are inappropriate because they are 8 years old, and unlikely to account for changed activities around the mine that have occurred since 2012, **Figure 1** plots the annual average PM₁₀ concentrations from nearby ambient monitoring stations in the Upper Hunter Air Quality Monitoring Network (UHAQMN) taken from Table 4-3 of the AQIA. The data show that in 2012, the measurements at every monitor are higher than the average dust level at that monitor from 2012 to 2018. This indicates that the 2012 data will overestimate the average dust levels, and that the assessment overall is conservative. This suggests the more contemporary data do not indicate any significant change associated with activities around the mine since 2012, other than the normal inter-annual variability. However, any changes to the dust in the ambient air due to changed activities at the other mining operations are directly reflected in the actual modelling of these operations and shown in the predicted cumulative impacts. As the actual background data are higher than average, and as we have explicitly added the modelling of existing and future changes in dust from the other mines since 2012, there will be further conservatism in the assessment.

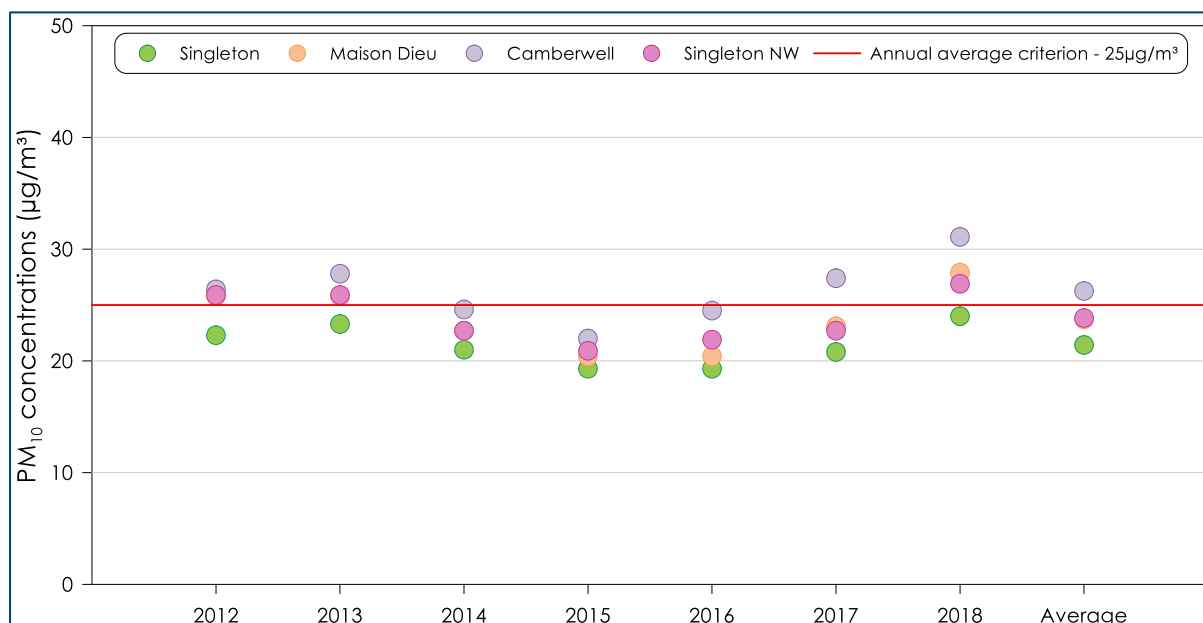


Figure 1: Annual average PM₁₀ concentrations

The EPA comment to remove negative data is incorrect. It appears that the EPA has not considered that when mines progressively move away from a receptor their impacts will progressively reduce. This situation does arise in practice and is explicitly shown as negative values in the AQIA as a means to quantify the benefit that will occur as the mine moves further away relative to a receptor. For example, during 2012 mining activity was occurring in the northern section of the mine and would have contributed to the dust levels at receptors to the east of the site (e.g. N23). For the Year 2020 no mining activity occurs in this location and the mine contribution is reduced at these locations (via an explicitly presented negative value) correctly resulting in a net reduction in the predicted cumulative impact. Whilst others may choose to not present this negative value in their assessments, to remove the negative data will distort the modelling and make it invalid and incorrect. Valid results will therefore not be removed from the modelling as to do so would make the assessment incorrect or invalid.

A detailed description of the methodology used is set out in Section 5 Dispersion Modelling Approach. At paragraph 3 of this section the AQIA states that "The air dispersion model was setup using the same methodology and modelled meteorological year applied to the *Air Quality and Greenhouse Gas Assessment Rix's Creek South Continuation of Mining Project* (Rix's Creek South Assessment) (**Todoroski Air Sciences, 2015**). This approach was selected to provide consistency with the recently approved assessment for the neighbouring RCS mine. Full details regarding the model setup can be found in the Rix's Creek South Assessment, see;

[https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6300%2120191023T032428.362%20GMT ...](https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-6300%2120191023T032428.362%20GMT...)"

3) Blasting has not been adequately assessed

Provide a robust justification for the values adopted for estimating emissions from blasting activities including the number of blasts per year and the adopted emission factors. Where these values vary significantly from the adopted 2015 values, it must be adequately justified.

The EPA are incorrectly comparing variables applied in a different mine (Rix's Creek South) (the Rix's Creek Continuation of Mining Project (**Todoroski Air Sciences, 2015**)) with those applied in the AQIA (Rix's Creek North). It needs to be noted that even though both mining operations are now owned by the Bloomfield Group, these are two different mining operations that have different operating circumstances.

The applied emission factor equation for blasting activity is identical in both assessments and has been sourced from United States Environmental Protection Agency (US EPA) AP42 Emission Factors (**US EPA, 1985 and Updates**). The emission factor equation for blasting activity is presented below:

$$\text{Emission Factor} = 0.00022 \times A^{1.5} \text{ kg/blast}$$

where the variable A is the blast area in square metres (m²).

The emissions factor per blast is set out in the two assessments and varies according to the 1.5th power of the blast area, as set out in the emission factor equation above. The EPA does not appear to have considered that the actual emission factor will differ with differing blast areas in different mines.

The difference identified by the EPA thus does not arise due to any change in how the emissions are calculated, but due to the differences in blast area. The Rix's Creek South mine operates with larger blast areas (15,000m²) compared with the Rix's Creek North blast areas (10,000m²). The different blast area to the power of 1.5 is what governs the amount of dust generated per blast, per the default emission factor equation. Thus there is no variation in the adopted approach or in how the estimated emissions are calculated.

As stated in the AQIA, Bloomfield is also seeking to increase the maximum potential number of blasts in a day at Rix's Creek North from two to three per day, however the approved total number of blasts per week will remain at ten. Air quality impacts from blast fume emissions are rare but possible when there are unforeseeable complications with a blast that causes high levels of NO₂ or dust emission during unfavourable air dispersion conditions.

The change in the number of approved blasts per day provides an increased opportunity to blast during the most favourable weather conditions and thus to more fully utilise the predictive blast system that Rix's Creek first implemented with TAS and is now a widely used best practice industry benchmark. This can reduce rather than increase the overall magnitude of impacts that may arise from blasting, for example having scope to schedule up to three blast times per day instead of only two, but not have any more actual blasts per week, provides 50% more opportunities in any week to reduce impacts by scheduling the blast to the most favourable time in any day. It is not correct to view this as having potential for a 50% greater impact, for reasons including that the key risk relates to 10-minute or 1-hour NO₂ impacts which are affected by one blast, and not the number of blasts in a day. (Dust impact criteria relate to 24-hour periods, but the most dusty blasts occur when the wind speed is elevated and thus the period of any significant dust from a blast is too brief at a receptor to cause a significant impact per the criteria. In order to actually have three blasts in a single day, the conditions would generally tend be favourable for blasting, and relative to the current case, this is likely to more than counter any effect that may arise by having the extra blast on a favourable day.) The proposal should thus be viewed as a positive measure which would assist with the overall management of blasting impacts, and one that is likely to improve or at least not affect the overall impacts relative to the currently approved number of blasts per week.

The BMP outlines a range of management measures including (but not limited to) preventive measures, consideration of current weather conditions and predictive forecast models to minimise potential dust and fume impacts from blasting.

4) Changed approach to modelling emissions has not been justified.

Provide suitable justification for all estimated emission rates and adopted emission factors. Where a significant discrepancy is found between the 2015 AQIA and the 2020 assessment, this should be adequately discussed and supported.

The AQIA provides full details of the calculations, inputs to them and also the equations used. There is no inconsistency, omission or error in the assessment. However, the following may provide greater clarification.

Regarding the wind erosion calculations, this was previously raised by EPA in response to the Rix's Creek South Assessment and was previously addressed and understood and accepted by EPA in the *Response to Agency Submission for Rix's Creek Continuation of Mining Project (Todoroski Air Sciences, 2016)*. The response outlines that the wind erosion emissions are equivalent when applying a four times larger emissions factor to a freshly exposed area that is approximately four times smaller than the overall, not freshly exposed area.

The wind erosion factor used in the Rix's Creek South and Rix's Creek North projects are different, however they are also applied differently, to differing areas according to the size of the area with greatest wind erosion potential (i.e. the most freshly exposed areas). The higher factor is applied to smaller, more recently exposed areas, whereas the lower factor is applied to much larger, less recently exposed areas. The net resulting emissions are similar.

Whilst using the higher factor for smaller areas does tend to be more accurate, previously EPA was most concerned that insufficient areas were being modelled. To satisfy this concern, for this project we adopted the emission factor of 0.1 kg/ha/hour (equates to 850 kg/ha/yr) (as set out in the Katestone document *NSW Coal Mining Benchmarking Study: International Best Practise Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (Katestone, 2011)*), but have applied this across a much larger exposed area, not all of which would be recently and freshly exposed.

For the emission factor for blasting, there is no difference in the approach between the two assessments, only normal differences due to different mines having differing blast areas. The emission factor equation for blasting is identical in both assessments. Please refer to the previous response above.

For haul roads, similar to blasting the applied emission factor equation is identical in both the Rix's Creek South AQIA and the AQIA, and has been sourced from United States Environmental Protection Agency (US EPA) AP42 Emission Factors (**US EPA, 1985 and Updates**). The emission factor equation for hauling is presented below:

$$\text{Emission Factor} = \left(\frac{0.4536}{1.6093} \right) \times 4.9 \times \left(\frac{s}{12} \right)^{0.7} \times \left(1.1023 \times \frac{M}{3} \right)^{0.45} \text{ kg/VKT}$$

Where s is the silt content of the road surface and M is the average vehicle weight.

Both assessments have adopted the same silt content of 2.1%. The average vehicle weight for these mines is different, and as set out in the AQIA's is 275 tonnes for Rix's Creek South and 229 tonnes for Rix's Creek North. The different vehicle weight varies the amount of dust generated per kilometre.

In this case and in general, emission factor equations are used to develop project emissions based on site specific variables, and this will of course result in site-specific emissions which differ from one project to another.

Please feel free to contact us if you would like to clarify any aspect of this letter.

Yours faithfully,
Todoroski Air Sciences



Aleks Todoroski



Philip Henschke



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