Peer Review – Air Quality Impact Assessment

Mount Pleasant Optimisation Project

11 October 2021

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The business of sustainability

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11 October 2021

Peer Review – Air Quality Impact Assessment

Mount Pleasant Optimisation Project

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1. INTRODUCTION

The NSW Department of Planning Industry and Environment (DPIE) has engaged ERM to provide an independent technical review of the Air Quality Impact Assessment (AQIA) for the Mount Pleasant Optimisation Project (the Project), prepared by Todoroski Air Sciences (TAS).

For the purposes of this review, we have considered the following documents regarding the Project:

- Secretary's Environmental Assessment Requirements (SEARs) for the Mount Pleasant Optimisation Project (SSD 10418) State Significant development, October 2020;
- Relevant sections of the Mount Pleasant Optimisation Project EIS, prepared by MACH and Resource Strategies Pty Ltd
- Air Quality Impact Assessment, prepared by Todoroski Air Sciences, dated 16 December 2020
- Peer Review of the Air Quality Impact Assessment, prepared by Simon Welchman (Katestone Environmental), dated 13 January 2021
- Relevant sections of the Submissions Report, prepared by MACH and Resource Strategies Pty Ltd, relevant sections
- The advice provided by the EPA, NSW Health and Muswellbrook Shire Council during the exhibition period
- Relevant sections of MACH's response to the Request for Information, 9 September 2021.

2. SCOPE OF THIS TECHNICAL REVIEW

This scope of this technical peer review is summarised as follows:

- to review the published documents relating to the requirements for, assessment of and submissions relating to the AQIA;
- to consider the methodology and approach of the AQIA, with regard to the characterisation of the existing environment, accuracy of emissions estimation and the suitability of models used, their inputs and outputs;
- to ensure the latest information regarding dust mitigation has been considered and to provide any recommendations with regard to additional measures that could be included;
- to identify any data gaps, errors or inconsistencies in the AQIA; and
- to advise the DPIE as to the adequacy and accuracy of the assessment of likely impacts due to the Project, and so to inform decisions going forward.

3. OVERVIEW

The approved Mount Pleasant Operation includes the construction and operation of an open cut coal mine and associated rail spur and product coal loading infrastructure located approximately three kilometres (km) north-west of Muswellbrook, in the Upper Hunter Valley of NSW. Mount Pleasant is currently approved to produce up to 10.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) thermal coal, transported by rail to the Port of Newcastle for export or for domestic use in electricity generation.

The Mount Pleasant Optimisation Project (the Project) proposal is to extract additional coal reserves within Mount Pleasant Operational Mining Leases, increasing the rate of extraction, handling and processing from 10.5 Mtpa to 21 Mtpa. The AQIA assesses the potential impacts associated with this increased production.

The assessment has been carried out broadly in accordance with the NSW EPA's '*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*' (Approved Methods) (NSW EPA, 2016).

The exception to this is the methodology for estimating background concentrations in the receiving environment. The AQIA presents an alternative method but fails to justify this fully. The assessment lacks clarity with regard to the methods used to determine these background concentrations, in particular for annual average PM_{10} and $PM_{2.5}$.

It is considered that the appropriate air quality issues have been identified and the analysis of the existing environment is reasonably thorough with respect to meteorology. However, the assessment does lack detail as to why the particular operational years 4, 6, 9, 12, 19 and 22 were chosen for assessment.

The meteorological and dispersion models used are considered appropriate for use in an assessment such as this. Emission factors used are generally considered appropriate for use, however some of the assumptions for parameters in these calculations are not justified sufficiently. Most of the mitigation measures applied to the emissions are suitable and applied appropriately, with the possible exception of the controls on wheel generated dust.

The assessment is considered adequate in some areas, but not in others. The following provides commentary on the individual sections of the assessment in more detail, with regard to both these requirements and the subsequent issues raised following public exhibition.

4. REQUIREMENTS AND SUBMISSIONS

4.1 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements (SEARs) and inputs from relevant departments (EPA and Muswellbrook Council) are listed in Tables 4-1, 4-2 and 4-3 of the AQIA.

The SEARs note the requirement for an assessment of air quality impacts due to both construction and operation. While the AQIA is very detailed regarding operational impacts, it is qualitative in its discussion around impacts during construction. The AQIA notes the reasons for this and it is agreed that these are valid. The activities required during construction are similar in nature to those assessed during operation, that is, earthworks, wheel generated dust and wind erosion. There is little to be gained from assessing these quantitatively using dispersion modelling as any impacts would be very localised and relatively short-lived. The better option, as suggested in the AQIA (Section 6.4.3), is to manage and monitor these during the construction period to reduce the nuisance impacts that can occur during these activities.

It is considered that the intended requirement of the SEARs pertaining to construction is addressed adequately in the AQIA.

4.2 EPA Submissions

The NSW EPA provided a submission, requiring clarification on four main areas of the air quality impact assessment. These were:

1. Insufficient description of mitigation measures
2. Incomplete assessment of impacts for receptors not subject to acquisition rights
3. Inadequate discussion of background air quality
4. PM_{10} incremental exceedances for receptors subject to acquisition rights

The information provided in the Response to Submissions document helps address some of these. However, there is further detail required to address background air quality, and additional comments are provided in Section 5 of this report.

4.3 Muswellbrook Shire Council Submissions

The submissions from Muswellbrook Shire Council were not of a technical adequacy nature, but rather questions regarding specific results and comment on policy such as air quality criteria. Todoroski Air Sciences (TAS) has provided responses to these remarks and observations, and these are sufficient. ERM provides no further comment on these.

4.4 NSW Health

The main concern from NSW Health relates to changes in annual average $PM_{2.5}$ concentrations at Muswellbrook. Health notes increases of up to 23%, however, it was demonstrated by TAS that these are much higher than reported in the assessment due to a misinterpretation of the data that included other mine contributions. This review provides no further comment on this.

5. DETAILED REVIEW

5.1 Methodology and approach

This assessment has generally followed the EPA's Approved Methods, which specifies how assessments such as these should be undertaken. The exception to this is the way background concentrations have been accounted for in the cumulative assessment, and this is discussed further in Section 5.4.

The impact assessment criteria that are used are considered appropriate for use for this Project. Section 3 in the AQIA notes both the EPA air quality assessment criteria as well as the NSW Voluntary Land Acquisition and Mitigation Policy (VLAMP). The report adequately outlines how these different criteria are applied.

There is also no mention of the recently released NEPM standards for NO_2 which have seen a reduction in the maximum 1-hour average NO_2 considerably from 246 µg/m^3 down to 164 µg/m^3. While it is understood that this new standard is not yet included in the Approved Methods as an impact assessment criterion, it should be noted. Likewise, the reduced annual average $PM_{2.5}$ standard to 7 µg/m^3.

There is limited detail given as to how the individual operational years for assessment purposes were selected. Section 6.4 of the AQIA states that the six years chosen to represent potential worst-case impacts with consideration of the quantity of material, location of activity and proximity to receptors. Table 6.3 provides an indication of the magnitude of dust generation for each scenario and Figures 6-4 to 6-9 provide an indication of those activities relative to receptors. However, it is not clear whether a year incorporating maximum overburden excavation / movement has been considered, as this will not necessarily coincide with maximum ROM production. In other words, it is not clear if a year which incorporates the maximum material (overburden + ROM) excavation and movement has been assessed. A simple chart showing the relative overburden and ROM rates for each year during the life of the mine would help confirm this.

5.2 Model selection

The assessment uses the CALMET/CALPUFF modelling suite, and is considered appropriate for assessing a project of this nature.

Meteorological model settings were summarised and are confirmed as appropriate for CALMET. However, it is unclear whether or not pit terrain has been incorporated into the model, and if so whether this has been updated for each scenario as the pit and local terrain changes. This should be confirmed as there is potential for a large pit to have an impact on the airflow and dispersion.

Predictions were made across the modelling domain using the CALPUFF dispersion model. Results were presented as contour plots and also specific values are presented for discrete sensitive receptors. This is appropriate for an assessment of this kind.

5.3 Selection of representative modelling year

5.3.1 Meteorology

The year 2015 was chosen as the year of primary focus for both meteorology and existing particulate matter concentrations in the vicinity of the Project. Seven years of meteorological data from Scone Airport were analysed in Appendix B of the AQIA, which presents the rationale for 2015 being identified as representative. Table B-2 presents the final scores and weightings for the various parameters, however it is not clear how these weightings and scores have been calculated. Further clarity should be provided as to on what basis these weightings for each parameter were derived and how these were used to calculate the score using the deviation values. It is also not clear why PM_{10} and $PM_{2.5}$ have different weightings, or where the deviation values are from. Further explanation is required on this.

ERM has carried out an independent analysis of the wind speed and direction data for the area and found that the wind speed and direction patterns were relatively consistent from year to year for Scone. These wind roses are presented in Appendix A.

It was also demonstrated that the meteorology extracted from the CALMET model at the Project site, was generally consistent with what is presented in the AQIA. However, the annual and autumn wind roses presented in Figure 6-2 of the AQIA appear to be cut off, to the southeast. Each of these wind roses should be presented at the same scale so as to be able to compare properly between seasons. An example of best practice is provided for comparison in Figure 1.

While the analysis of the Scone data demonstrates reasonable consistency at that location, there is no five year analysis presented for the project area of Muswellbrook. Given this is where the project is located and where the CALMET data (noted above) is extracted, there should be a five year analysis of meteorological data for these stations. Figure 5-2 in the AQIA shows that there is potential for considerable spatial variation in the three stations around Muswellbrook, so this temporal analysis should be carried out to determine if 2015 is representative.

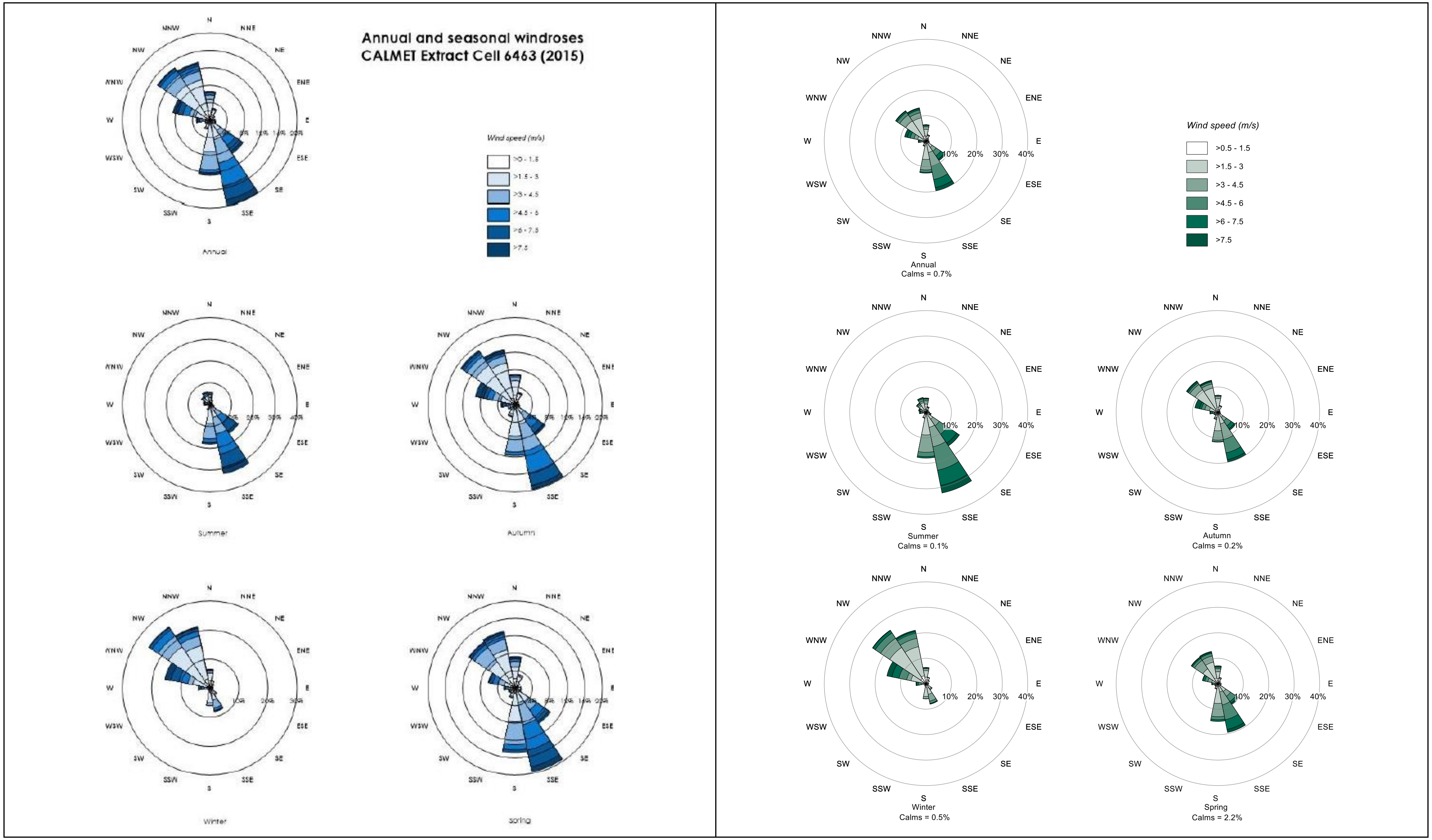


Figure 1: Annual and seasonal wind roses for the Project site 2015 as presented in the AQIA (left) and best practice (right)

5.3.2 Air Quality

Regardless of whether 2015 is representative in terms of meteorology, this is not the case for the background data, in particular PM_{10}. There is concern that the significant increase in rainfall in 2015 has skewed the measured concentrations, meaning that the background values chosen for the assessment are not representative, leading to an underestimation of cumulative impacts. While Appendix B states that there is no clear correlation between annual dust levels and annual rainfall, it would appear the data presented in Tables 5-2, 5-3 and Figure 5-5 contradict this. These data show a very noticeable drop in annual average PM_{10} concentrations for 2015 and 2016, which were considerably wetter years.

Figure 2 shows the annual average PM_{10} concentrations measured at a number of Upper Hunter sites. This is the same information presented in Figure 5-5 of the AQIA, with 2019 removed as it is clearly an anomaly due to the unprecedented bushfire activity, and the latter stages of severe drought conditions. This figure shows that 2015 is the lowest value in the seven year period across the range of sites, and therefore clearly not representative. These data are also presented in Table 1, and includes the average over the seven year period. This seven year average is almost 3 µg/m³ higher than the 2015 annual average at Muswellbrook.

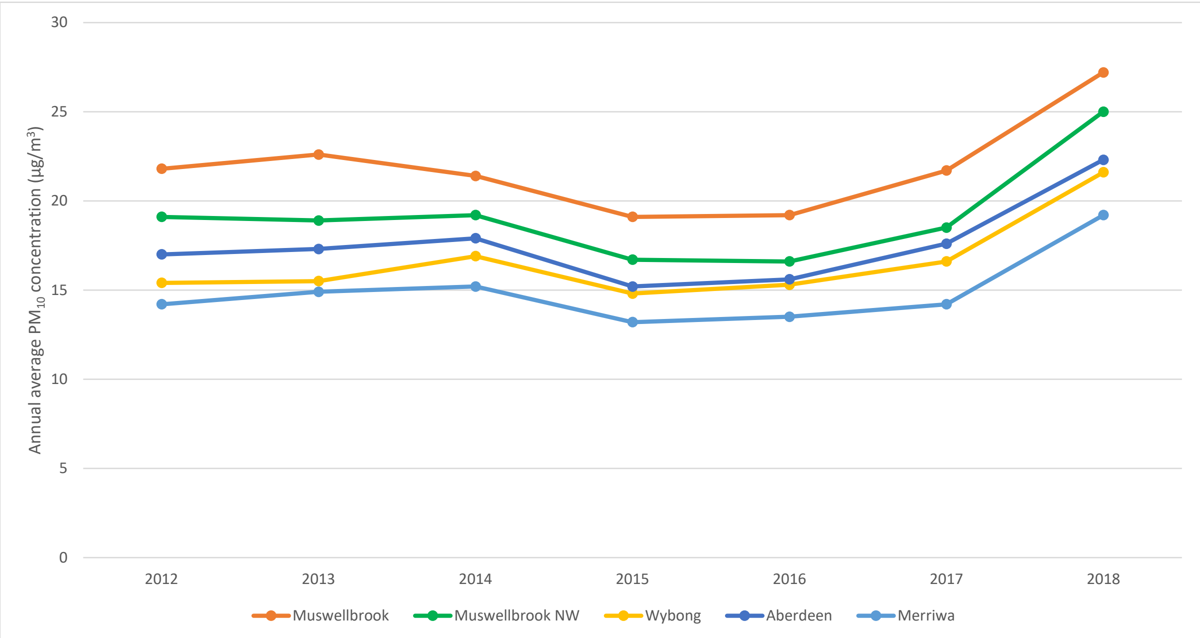


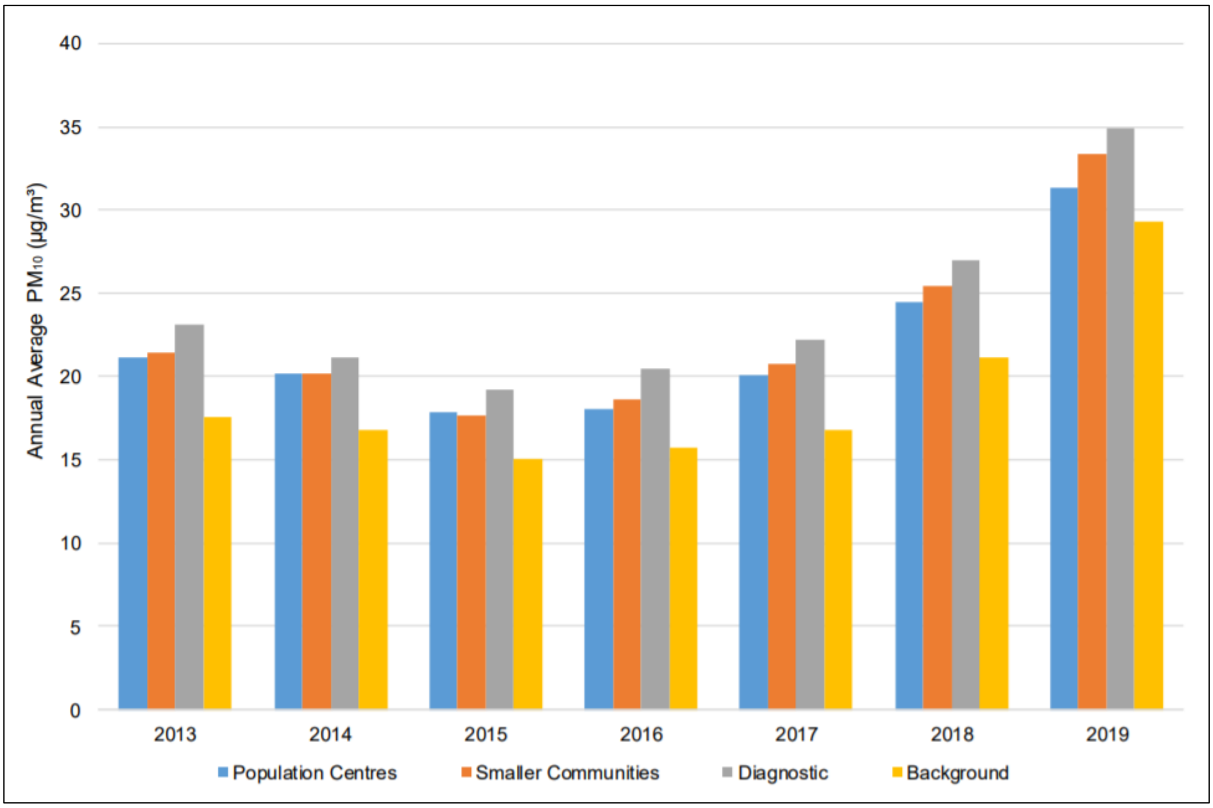
Figure 2: Annual average PM_{10} concentrations measured in the Upper Hunter 2012 – 2018

Table 1: Annual average PM_{10} concentrations measured in the Upper Hunter 2012 – 2018

Year	Muswellbrook	Muswellbrook NW	Wybong	Aberdeen	Merriwa
2012	21.8	19.1	15.4	17.0	14.2
2013	22.6	18.9	15.5	17.3	14.9
2014	21.4	19.2	16.9	17.9	15.2
2015	19.1	16.7	14.8	15.2	13.2
2016	19.2	16.6	15.3	15.6	13.5
2017	21.7	18.5	16.6	17.6	14.2
2018	27.2	25.0	21.6	22.3	19.2
Average	21.9	19.1	16.6	17.6	14.9

A study carried out for the NSW Minerals Council (ERM, 2020) presents additional information from across the Upper Hunter Air Quality Monitoring Network (UHAQMN). This study, peer reviewed by the CSIRO, presents a detailed analysis of data from 2013 to 2019. Figure 3 (taken from that study) clearly shows 2015 to be a year with the lowest PM_{10} concentrations, in all station group categories, whether they be in populated centres, or background locations.

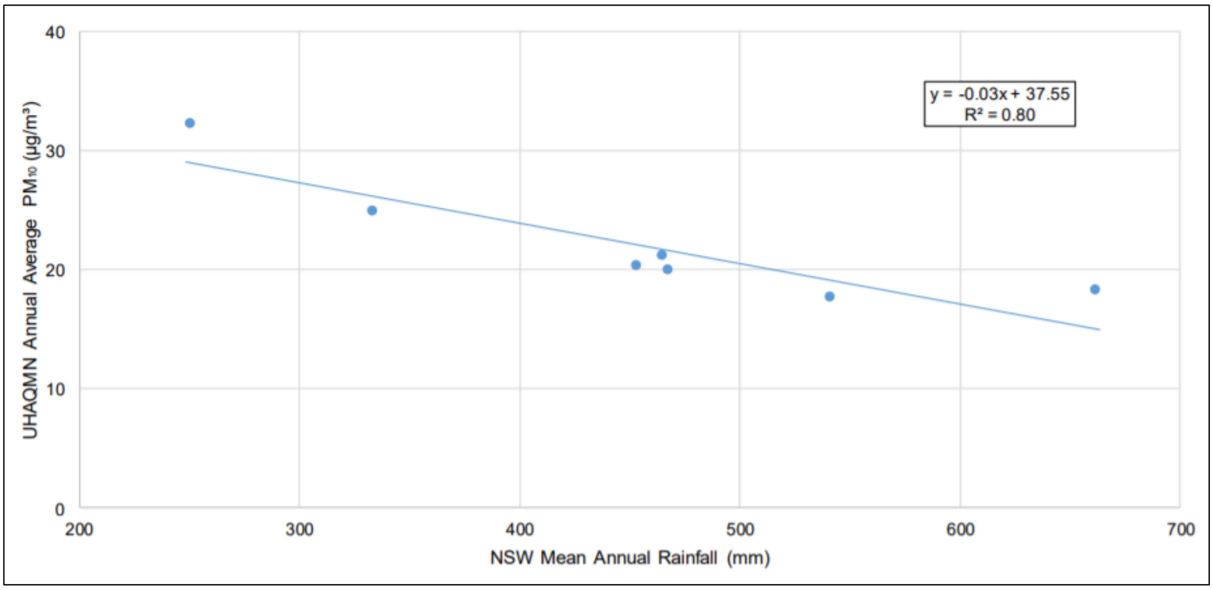
These data show that 2015 is not a representative year with regard to background concentrations. Using 2015 is therefore likely to lead to an underestimation of annual average cumulative impacts, particularly around Muswellbrook.



Source: ERM, 2020

Figure 3: UHAQMN annual average PM_{10} concentrations by station group and year

With regard to the claim in the AQIA that there is no correlation between rainfall and PM_{10} concentrations in the Upper Hunter, this has also been shown to be incorrect in the Minerals Council study. Figure 4 (taken from that report) shows there was a clear relationship between the two and that when rainfall is high across the state, PM_{10} concentrations in the Upper Hunter are lower. It is also noted that as the BoM St Heliers site is not an automatic weather station (AWS) and the rainfall dataset contains gaps and unvalidated data. The data used to substantiate the lack of correlation presented in the AQIA report may therefore not be sufficient to support this claim.



Source: ERM, 2020

Figure 4: Scatter plot showing average 2013-2019 UHAQMN PM_{10} concentration against NSW mean annual rainfall (with linear regression)

5.4 Determining background values

The methods used to determine background concentrations for PM_{10} and $PM_{2.5}$, lack consistency and scientific rigour and are not in line with the NSW EPA Approved Methods. ERM are not opposed to alternative methods being used, as determining background levels in this environment is difficult, but these alternatives need to be adequately justified which is not the case here.

In their submission, the EPA asked for additional information on this, but the response was simply that a similar methodology has been used in previous assessments. The AQIA references "Cumulative Impact Assessments Mt Arthur, Bengalla and Mangoola Coal Mines" (TAS, 2014) for this justification, but that study does not provide any additional detail to enable the assumptions to be tested.

There is no detail provided on how the spatially varying PM_{10} background grid has been calculated, and so this approach cannot be verified. It appears that a number of mines were modelled and predictions made at monitoring sites. The differences between the measured and modelled concentrations were then determined to be the background, or the contributions from other non-modelled sources. With this information at locations across the domain a varying grid could then be made. This should be confirmed and further clarified, and the data used to calculate the grid provided so it can be validated.

The levels provided in the varying background bear no similarity to the data from background UHAQMN sites, as shown above in Figure 3, and are likely to be significantly underestimating conditions in the area.

The highest PM_{10} levels in the Muswellbrook area (according to Figure 6-10 in the AQIA), are around 12 µg/m^3 which would seem low, particularly when compared to measurements made at UHAQMN background locations being around 15 µg/m^3, as shown earlier. In addition, and as also described earlier, these values are not likely to be representative as concentrations were low 2015.

Using a varying background for PM_{10} and then a constant value for $PM_{2.5}$, is not consistent. It is also not valid to remove the influence of wood smoke from the annual average $PM_{2.5}$ background, as this will be the most significant non-modelled source. The annual value of 2.9 µg/m^3 for background $PM_{2.5}$ (outside Muswellbrook) is not supported as it is a gross underestimation and bears no resemblance to the receiving environment in the Upper Hunter Valley. This is more typical of concentrations at Cape Grim in Tasmania, which is recognised as one of the most pristine air environments in the world.

Adopting a higher value of 5.4 µg/m^3 on the edge of Muswellbrook is also unscientific, as it appears to assume that there is no impact from wood smoke beyond the town boundary. The $PM_{2.5}$ impacts of wood smoke, or any source (agricultural burning or large scale power production), will not be confined within a geographic boundary such as this and should be incorporated in the wider background levels across the domain. These particles are, by definition very small, and will therefore remain airborne for considerable periods of time and potentially travel great distances. This assumption that they are confined to the town of Muswellbrook is incorrect.

In summary, the application of background for PM_{10} and $PM_{2.5}$ has not been sufficiently justified to warrant this significant departure from the Approved Methods. The AQIA states in section 6.6 that "it is important that [these] values are not confused with measured background levels". This is a concern, as the Approved Methods requires that they are based on measured values. It is recommended that either the annual average PM_{10} and $PM_{2.5}$ cumulative assessment be updated using measured data as per the Approved Methods, or the current approach be suitably justified.

Finally, it is understood that the NO_X emissions from blasting will not be as significant in terms of potential impact as mechanically generated particulate matter emissions. While monitoring data are reported in section 5 of the AQIA, the assumed levels used for background are not.

There is also no discussion of how the NO_X predictions are converted to NO_2. It appears that emissions have simply been modelled as NO_2. There are a number of conversion methods considered in the Approved Methods, but it appears that none of these have been discussed or applied.

5.5 Emissions estimation

The emission factors used for this assessment have been drawn largely from the US EPA AP-42 (US EPA, 1985 and updates). Emission inventories and spreadsheets were also reviewed and individual calculations checked.

A list of the equations used is presented in Table C-1 in Appendix C of the AQIA. It is noted that some of the equations are presented incorrectly in text form (such as for loading / emplacing overburden as well as the $PM_{2.5}$ emission factor for dozers on overburden). However, these are correct in the calculation spreadsheets and so are likely just typographical reporting errors. The 'M' term in the wheel generated dust equation is also incorrect and should be 'W'. M in the footnotes refers to moisture content which is incorrect, this should be mass (denoted by W in AP-42). Again, this is a typographical error and is correct in the spreadsheet.

There is mention of the inclusion of a dragline operations to be implemented in the future (section 6.4 of the AQIA). However, there is no accounting for emissions from a dragline in the inventories. This should be included if a dragline is to be used in the future.

The control factors applied are reasonable, with the possible exception of 90% for wheel generated dust. Figure 5 shows that wheel generated dust is one of the most significant sources, with the highest percentage contribution. It is therefore vital that this 90% control is achieved if the predictions are to be considered valid. No evidence is provided as to what investigations were carried out to determine whether this level of control is achievable for this site, but rather general statements are made claiming this is attainable. Also, no mention or justification for this level of control is provided in Table C-9 of the AQIA. It is recommended this evidence is submitted to support and validate this claim.

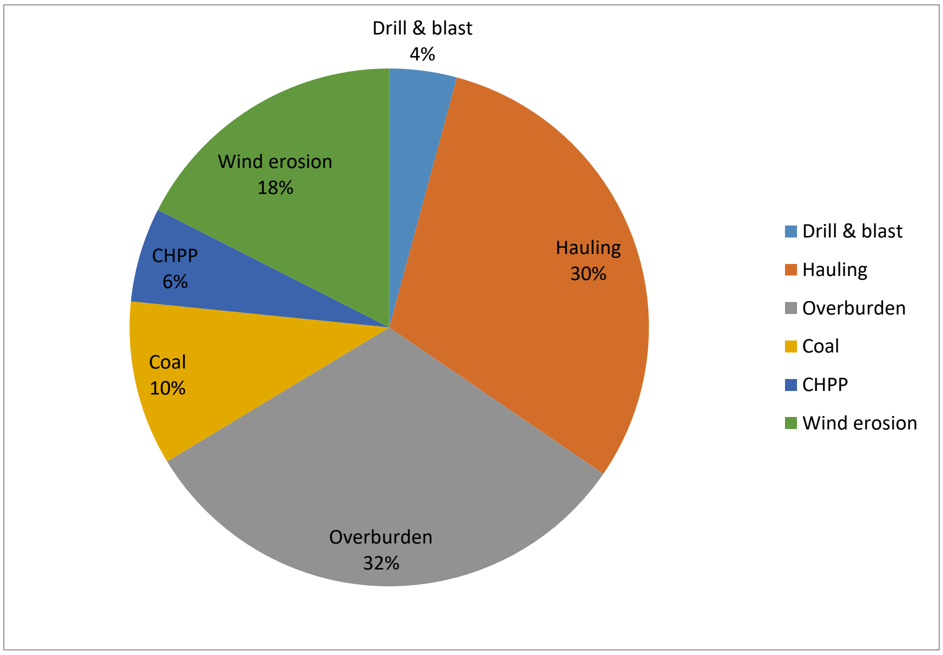


Figure 5: Percentage contribution of each source / activity type in Year 2041

Another important factor in calculating total emissions from wheel generated dust is the silt content. The AP-42 emission factor equation is very sensitive to silt content and so it is very important this is justified. The assessment uses a silt content of 2%, but presents no site specific evidence to validate this. This 2% value is at the lowest end of the range of silt contents measured across other sites in the Hunter Valley, with values of 3-4 percent likely to be more realistic. The data presented in Table 2 shows that even a small increase in silt content to 3% would increase the haulage PM_{10} emissions by up to 31% in Year 2041 (the highest emission year). This equates to 12% increase of the total emissions, which is significant, and likely to result in an increase in predicted concentrations, particularly at the nearest and most impacted receptors.

Table 2: Changes to wheel generated PM_{10} in Year 2041 with small increase in silt content

Parameter	Value
Total PM_{10} emissions in 2041 with 2% silt content	1,868,139 kg/y
Total PM_{10} emissions in 2041 with 3% silt content	2,117,990 kg/y
Percentage increase in total PM_{10}	12%
Wheel generated PM_{10} emissions in 2041 with 2% silt content	567,331
Wheel generated PM_{10} emissions in 2041 with 3% silt content	817,181
Percentage increase in wheel generated PM_{10}	31%

Given the magnitude of this emission source, this silt content parameter is important and needs to be verified for the site. Obtaining site specific information for haul road silt content is relatively straight forward and should be done to validate this claim.

The combination of an overly conservative control factor and low silt content may significantly underestimate the total emissions due to wheel generated dust from haulage. It is therefore important that both these claims are supported by evidence.

5.6 Analysis of impacts

The dispersion patterns of the predicted concentrations presented in Appendix E, particularly with regard to the 24-hour average isopleths, do not appear to disperse the way that would be expected in the Hunter Valley. That is, it would be typical to see more dispersion along the NW / SE axis, particularly for short time periods such as 24-hours. It is understood that the emission sources are located generally more north / south and this will have an effect, but given the wind roses presented in Figure 6-2 of the AQIA, it would be expected to see some dispersion to the northwest and southeast. Given this is not seen, it would be helpful for the author to explain this.

The further analysis of how the predictive and reactive mitigation measures assist in reducing 24-hour impacts, which was provided in response to the NSW EPA submissions, is helpful.

Generally, the discussion of results in section 7 of the AQIA is difficult to follow, with multiple methods of presentation and multiple references to other sections and appendices.

Also, and as mentioned in the previous section, it is not possible to conclude that all impacts have been identified at this point due to the underestimation of background air quality and the potentially significant underestimation of emissions from haulage. It is best practice for assessments of this nature to remain reasonably conservative where there is uncertainty, but the AQIA has not demonstrated this.

6. RECOMMENDATIONS

There are a number of unsubstantiated assumptions made throughout the AQIA, which when combined, may lead to a significant underestimation of predicted impacts at sensitive receptors. There are also some additional minor issues that could be addressed to strengthen the AQIA. Table 3 lists these issues, their relevant significance, and the information or analysis required to address them. Those issues noted as '*Minor*' are not likely to alter the outcomes of the assessment but DPIE may find the responses helpful. The '*Response / Additional action required*' issues require a response and depending on the information provided may require further analysis. Suggested actions are listed in the table.

With regard to the outcomes of the assessment, the main concern is with the approach used to determine the background concentrations for annual average PM_{10} and $PM_{2.5}$. As this is a substantial departure from the Approved Methods this needs to be justified more clearly. The current assumptions lack consistency between approaches and are not able to be validated with the information provided in the AQIA, or in the responses to submissions.

There is an extensive monitoring network in the area and a number of these monitors have been placed in locations to enable reasonable estimates of background concentrations to be made. Not only is the year 2015 unrepresentative with regard to ambient air quality, the estimates used in the AQIA are unrealistically low for $PM_{2.5}$. Further justification or sensitivity analysis would be helpful to fully understand the cumulative impacts and to ensure all potential risks to sensitive receptors have been identified. The combination of these less than conservative assumptions means it is unlikely that all these risks have been fully identified.

Table 3: Issues and further work required

Area	Issue	Significance	Action required
Air quality criteria	No mention of new NEPM standards	Minor	Discussion of new NEPM standards for $PM_{2.5}$ and NO_2 and comparison to predictions.
Selection of model scenarios	Clarification of peak activities	Minor	Presentation of annual waste and ROM production volumes for the life of the project, in graphical or tabular form, to ensure worst-case years have been evaluated.
Meteorological modelling	Inclusion of pit terrain in CALMET	Response / Additional Analysis required	Clarification of whether pit terrain has been incorporated into the CALMET model for each year. If not, then justification provided as to why not.
Representative year – meteorology	5-year analysis at Muswellbrook	Minor	A 5 year analysis of meteorological data from Muswellbrook should be carried out to confirm 2015 is representative in the Project area.
	Weightings	Response / Additional Analysis required	Provide details on how the weightings and scores were assigned for each parameter, and justify why the $PM_{2.5}$ and PM_{10} weightings are different.
Representative year – air quality	Use of 2015	Response / Additional Analysis required	Evidence presented in this report and also the AQIA, suggests that 2015 it is not a representative year with respect to air quality. Further justification is needed as to why this year was deemed representative when it demonstrates consistently lower PM_{10} and $PM_{2.5}$ concentrations than other years.
Background values	Deviation from the Approved Methods	Response / Additional Analysis required	When deviating from the Approved Methods, detailed justification is required for doing so. Provide a detailed description of how each background value was determined, including all assumptions, so it can be verified (see below).
	Lack of detail on how the varying map for PM_{10} was produced	Response / Additional Analysis required	Provide the values used to calculate the spatially varying map and details on how these were determined, including boundary conditions and data and assumptions used. Provide details (a worked example or flow chart) of how this was applied to the cumulative assessment.
	Background estimates for annual $PM_{2.5}$ are unrealistic	Response / Additional Analysis required	Clear and full justification for the use of 2.9 $\mu g/m^3$ and 5.4 $\mu g/m^3$ for the background value for annual average $PM_{2.5}$, and why this is considered representative. This needs to demonstrate how monitoring data were used to determine these values, and not just a reference to a previous report.
	NO_2	Minor	Detail should be provided as to what background NO_X and NO_2 values were used and how cumulative NO_2 values were calculated to provide the contours in Appendix H of the AQIA.
Emissions estimation	Dragline emissions	Response / Additional Analysis required	If draglines are to be used in the future then further investigation should be done to include these emissions in the inventories and modelling to ensure the outcomes of the assessment do not change.
	90% control on some haul roads	Response / Additional Analysis required	Justification for this level of control should be provided and should be site specific. This is a high level of control for only Level 2 watering and evidence is required to justify this assumption.
	Silt content on haul roads	Response / Additional Analysis required	Site specific investigations should be carried out on a number of different types of haul roads to ensure that 2% silt content is representative of the site. If this is higher then the inventories need to be recalculated and additional modelling may need to be carried out to understand if this changes the assessment outcome for any sensitive receptors.

7. CONCLUSIONS

There are too many unjustified assumptions in the AQIA to support the conclusions that have been drawn therein. It is best practice to make sure assumptions are reasonably conservative where there is sufficient uncertainty, but this has not been demonstrated in the AQIA as it stands.

There are site specific investigations noted above which could be carried out to confirm, or otherwise, some of these assumptions and which would help strengthen the assessment. However, the main issues around the use of 2015 and the lack of justification of the low background values need to be addressed if the outcomes of the assessment are to be accepted.

8. REFERENCES

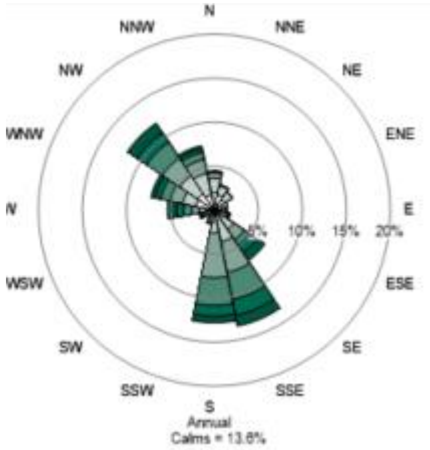
NSW EPA 2016, *The Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*, NSW Environment Protection Authority, 2016.

ERM 2020, *Upper Hunter Mining Dialogue: Air Quality Monitoring Data Analysis Project*, prepared for the NSW Minerals Council in November 2020

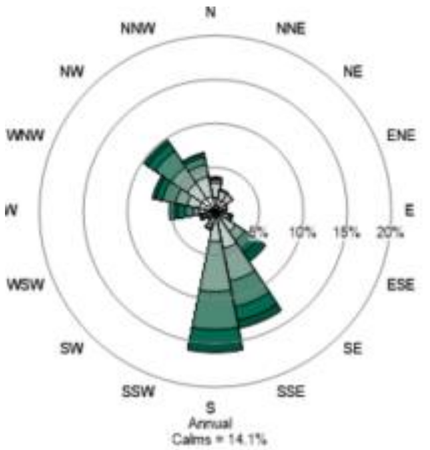
TAS 2014, *Cumulative Impact Assessments Mt Arthur, Bengalla and Mangoola Coal Mines*, prepared by Todoroski Air Sciences for NSW Department of Planning and Infrastructure, January 2014.

APPENDIX A WIND SPEED AND DIRECTION DATA COMPARISON

Comparison of annual wind roses at Scone Airport from 2013 – 2018



2013



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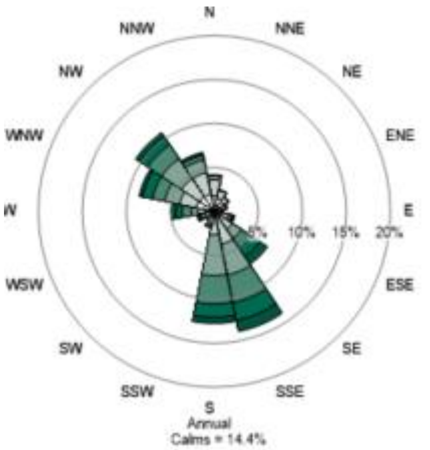
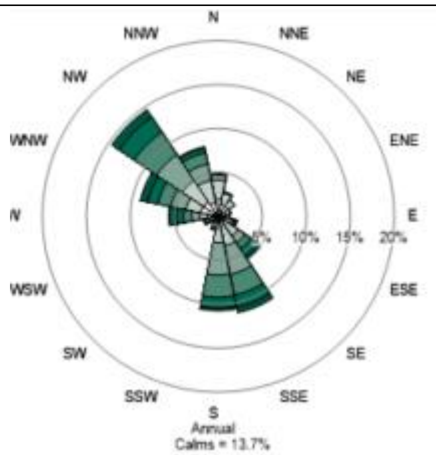
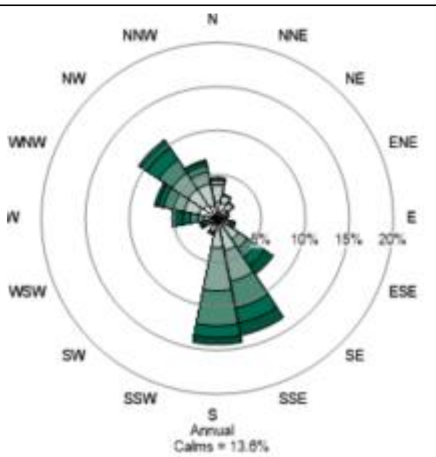


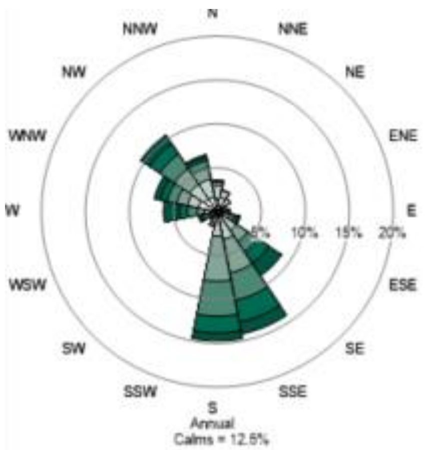
2015



2016



2017



2018