



Air Quality Management Plan

Mt Thorley Warkworth

DOCUMENT CONTROL

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4.0	09/07/2021	Revision to Air Quality Monitoring Programme. Inclusion of detail around the inter-site communications protocol. Incorporate DPIE feedback on AQMP submitted 13/11/2020.	Doug Fenton Environment Advisor	Gary Mulhearn Environment & Community Manager	

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1. PREFACE

1.1 Introduction

Mt 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 2019 MTW produced 12.0 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.

Development Consent for the Warkworth and Mount Thorley Continuation Projects (SSD-6464 and SSD-6465 respectively) were granted on 26th November 2015.

The Projects are described in detail in the Environmental Impact Statements and supporting documents (prepared by EMM, June 2014).

1.2 Scope of the Air Quality Management Plan

This AQMP has been prepared in accordance with the requirements of Schedule 5, Condition 3 of the Approvals, which describes the requirements for all management plans. In addition, the plan meets the requirements of Schedule 3, Condition 20 (WML) and Schedule 3, Condition 18 (MTO), which sets out the requirements for the AQMP.

Table 1 highlights the Approval conditions required to be covered by this AQMP and the sections within this document in which they are addressed.

Table 2 describes the relevant conditions from MTW's Environment Protection Licences (EPL's), and the sections within the AQMP in which they are addressed.

1.3 Objectives

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

This AQMP describes procedures required to ensure compliance with the Approval conditions relating to air quality including the measures that MTW will use to manage air quality.

This AQMP details the management framework and mitigation actions to be taken in operating the Project. This AQMP also provides a mechanism for assessing air quality monitoring results against the relevant impact assessment criteria.

The key elements of the mitigation strategies will be,

- Application of water to trafficked unpaved areas to reduce dust;
- Minimisation of advance clearing to reduce wind exposure;
- Temporary stabilisation of exposed areas;
- Progressive rehabilitation of completed overburden emplacement areas and use of temporary cover crops;
- Continuation of the Trigger Action Response Plan, including real time alarms for elevated PM₁₀ and adverse wind conditions;
- Modification of operations where monitoring data indicates the need; and

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;

The objectives of this AQMP are to:

- Describe how MTW will ensure best management practice is employed;
- Set out the measures that will be used to minimise air quality impacts from MTW;
- Outline how MTW will ensure compliance with the legal and other requirements (see **Tables 1 and 2**); and
- Provide a program for monitoring performance, evaluating air quality compliance and measuring the effectiveness of controls undertaken by site to effectively manage air quality; and
- Describe how MTW intends to co-operate with neighbouring mines to minimise the cumulative air quality impacts of those mines and MTW.

Table 1: Consent Conditions Addressed

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement								
Warkworth Mining Limited Development Consent (SSD-6465)										
Sch. 2 Cond. 1	Obligation to Minimise Harm to the Environment In addition to meeting the specific performance criteria established under this consent, the Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.	N/A								
Sch. 2 Cond. 14	Updating & Staging Strategies, Plans or Programs With the approval of the Secretary, the Applicant may: (a) Submit any strategy, plan or program required by this consent on a progressive basis; and (b) Combine any strategy, plan or program required by this consent with any similar strategy, plan or program required for the Warkworth Mine. To ensure these strategies, plans or programs are updated on a regular basis, the Applicant may at any time submit revised strategies, plans or programs to the Secretary for approval. With the agreement of the Secretary, the Applicant may prepare any revised strategy, plan or program without undertaking consultation with all parties under the applicable condition of this consent. <i>Notes:</i> • While any strategy, plan or program may be submitted on a progressive basis, the Applicant will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times. • If the submission of any strategy, plan or program is to be stages, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.									
Sch. 3 Cond. 1	Acquisition upon request 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 5 and 6 of schedule 4. <i>Table 1: Land subject to acquisition upon request</i> <table><tr><th>Acquisition Basis</th><th>Land</th></tr><tr><td>Noise & Air</td><td>77, 102, D, E, F</td></tr><tr><td>Noise</td><td>34, 81, 148, 150, 190, 192, J</td></tr><tr><td>Air</td><td>A, B</td></tr></table> <i>Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 3.</i>	Acquisition Basis	Land	Noise & Air	77, 102, D, E, F	Noise	34, 81, 148, 150, 190, 192, J	Air	A, B	
Acquisition Basis	Land									
Noise & Air	77, 102, D, E, F									
Noise	34, 81, 148, 150, 190, 192, J									
Air	A, B									
Sch. 3 Cond. 2	The Applicant is only required to acquire property 77 if the owner of this land no longer has voluntary land acquisition rights under the planning approvals for the Wambo mine and/or its associated rail facilities.									
Sch. 3 Cond. 17	Air Quality Criteria Except for the land in Table 1, the Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately owned land.	Section 6 and Appendix A								

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
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Table 5: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	^d Criterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 6: Short term impact assessment criterion for particulate matter

Pollutant	Averaging period	^d Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µg/m ³

Table 7: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase ^d in deposited dust level	Maximum total ^a deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 5-7

- ^a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- ^b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
- ^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
- ^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Sch. 3 Cond. 18	Mine-owned Land The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any occupied residence on mine-owned land (including land owned by another mining company), unless and to the extent that: - The tenant and landowner (if the residence is owned by another mining or gas company) have been notified or any health risks associated with such exceedances in accordance with the notification requirements under Schedule 4 of this consent; - The tenant of any land owned by the Applicant can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice and cause; - Air Quality monitoring is regularly undertaken to inform the tenant or landowner (if the residence is owned by another mining or gas company) of the particulate emissions at the residence; and - Data from this monitoring is presented to the tenant and landowner in an appropriate format for a medical practitioner to assist the tenant and landowner in making informed decisions on the health risks associated with occupying the property	Section 5.3
Sch. 3 Cond. 19	Operating Conditions The Applicant shall: - Implement all reasonable and feasible measures to minimise the: - Odour, fume and dust emissions of the development; and - Release of greenhouse gas emissions from the development - Operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting and real-time air quality monitoring data to guide the day-to-day planning of mining operations and the implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this consent; - Minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d to Tables 5 – 7 above); and	Section 6.3.4 Section 6.3 Section 6.3 Section 6.3 Section 3.2

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	(d) Co-ordinate the air quality management on site with the air quality management at nearby mines (including the Mount Thorley, Bulga, Wambo and Hunter Valley Operations mines) to minimise any cumulative air quality impacts.	
Sch. 3 Cond. 20	Air Quality Management Plan The Applicant shall prepare and implement an Air Quality Management Plan for the development to the satisfaction of the Secretary. The plan must: a) Be prepared in consultation with EPA, and be submitted to the Secretary for approval prior to carrying out any development under this consent; b) Describe the measures that would be implemented to ensure compliance with relevant air quality criteria and operating conditions of this consent; c) Describe the proposed air quality management system; d) Include provisions for keeping the local community informed about the operation of the air quality management system and monitoring programs, including regular briefings and a public information session within 6 months of the granting of this development consent; e) Include an air quality monitoring program that: • Adequately supports the proactive and reactive air quality management system; • Evaluates and reports on: ○ The effectiveness of the air quality management system; and ○ compliance with the air quality operating conditions; and • Defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and any relevant stakeholders of any air quality incidents; and f) Include a protocol that has been prepared in consultation with the owners of nearby mines (including the Mt Thorley, Bulga, Wambo and Hunter Valley Operations mines) to minimise cumulative air quality impacts.	Appendix C Section 6.3 Section 6.3 Section 8.1.3 Appendix A Section 3.2
Sch. 3 Cond. 21	Meteorological Monitoring For the life of the development, the Applicant shall ensure that there is a meteorological station in the vicinity of the site that: a) Complies with the requirements in the <i>Approved Methods for Sampling of Air Pollutants in New South Wales</i> guideline; and b) Is capable of continuous real-time measurement of temperature inversions in accordance with the <i>NSW Industrial Noise Policy</i>, unless a suitable alternative is approved by the Secretary following consultation with the EPA.	Appendix A
Sch. 4 Cond. 1	Notification of Landowners / Tenants Within 1 month of the date of this consent, the Applicant shall: a) Notify in writing the owners of: • The land listed in Table 1 of Schedule 3 that they have the right to require the Applicant to acquire their land in accordance with the procedures in Conditions 5 – 6 below at any stage during the development; b) Notify the tenants of any mine-owned land of their rights under this consent (see condition 18 of Schedule 3); and Send a copy of the NSW Health fact sheet entitled “Mine Dust and You” (as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EIS identify that dust emissions generated by the development are likely to be greater than the relevant air quality criteria in schedule 3 at any time during the life of the development.	N/A
Sch. 4 Cond. 2	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:	Section 5.3

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	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 b) Advise the prospective tenants of the rights they would have under this consent, To the satisfaction of the Secretary.	
Sch. 4 Cond. 3	As soon as practicable after obtaining monitoring results showing: 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; and b) An exceedance of the relevant air quality criteria in Schedule 3, 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).	Section 8.1.2
Sch. 4 Cond. 4	Independent Review If an owner of privately-owned land considers the development to be exceeding the criteria in schedule 3 at his/her land, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land. If the Secretary is satisfied that an independent review is warranted, then the Applicant shall: a) Commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the Secretary, to: - Consult with the landowner to determine his/her concerns; - Conduct monitoring to determine whether the development is complying with the relevant impact assessment criteria in Schedule 3; and - If the development is not complying with these criteria then: - 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 - Identify the measures that could be implemented to ensure compliance with the relevant criteria; and (b) Give the Secretary and landowner a copy of the independent review within 2 months of the Secretary's decision, unless the Secretary agrees otherwise.	Section 7.1
Sch. 5 Cond. 2	Adaptive Management The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedules 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&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: a) Take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur; 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 c) Implement remediation measures as directed by the Secretary.	Section 6.3
Sch. 5 Cond. 3	Management Plan Requirements The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: a) Detailed baseline data;	Appendix B

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	b) A description of - The relevant statutory requirements (including any relevant consent, licence or lease conditions); - Any relevant limits or performance measures / criteria; - 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;	Section 1.2 Appendix A Section 6.3
	c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures / criteria;	Section 8.1
	d) A program to monitor and report on the: - Impacts and environmental performance of the development; - Effectiveness of any management measures (see c above)	Section 6.4
	e) A contingency plan to manage any unpredicted impacts and their consequences;	Section 6.5
	f) A program to investigate and implement ways to improve the environmental performance of the development over time;	Section 8.1.2 and Appendix A
	g) A protocol for managing any: - Incidents; - Complaints; - Non-compliances with statutory requirements; and - Exceedances of the impact assessment criteria and/or performance criteria; and	Section 8.3
	h) A protocol for periodic review of the plan.	
	<i>Note: The Secretary may waive some of these requirements if they are unnecessary for particular management plans.</i>	
Sch. 5 Cond. 4	Annual Review By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must: a) Describe the development that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year; b) Include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the - The relevant statutory requirements, limits or performance measurements / criteria; - The monitoring results of previous years; and - The relevant predictions in the EIS; c) Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; d) Identify any trends in the monitoring data over the life of the development; e) Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and f) Describe what measures will be implemented over the next year to improve the environmental performance of the development.	Section 8.1
Sch. 5 Cond. 5	Review of Strategies, Plans and Programs Within 3 months of:	Section 8.3

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	a) The submission of: - Annual review under condition 4 above; - Incident report under condition 7 below; - Audit under condition 9 below; or b) Any modification to the conditions of this consent (unless the conditions require otherwise), or c) the introduction of any NSW government policy regarding void, The Applicant shall review, and if necessary revise, the strategies, plans and programs required under this consent to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review, unless the Secretary agrees otherwise, the revised document must be submitted to the Secretary for approval. <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>	
Sch. 5 Cond. 7	Incident Reporting The Applicant shall notify the Secretary and any other relevant agencies immediately of any incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Section 8.1.2
Sch. 5 Cond. 8	Regular Reporting 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.	Section 8.1.2
Sch. 5, Cond. 11	Access to Information From the commencement of development under this consent, the Applicant shall: a) Make copies of the following information publically available on its website: - The EIS; - Current statutory approvals for the development; - Approved strategies, plans or programs required under the conditions of this consent; - A comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; - The results of real time noise monitoring, updated daily (unless otherwise agreed by the Secretary); - A complaints register, which is to be updated monthly; - Minutes of CCC meetings; - The annual reviews of the development (for the last 5 years, if applicable); - Any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit; - Any other matter required by the Secretary; and b) Keep this information up to date.	Section 8.1.2
Mount Thorley Operations Development Consent (SSD-6465)		
Sch. 2 Cond. 1	Obligation to Minimise Harm to the Environment In addition to meeting the specific performance criteria established under this consent, the Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.	
Sch. 2 Cond. 14	Updating & Staging Strategies, Plans or Programs With the approval of the Secretary, the Applicant may:	NA

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
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- (c) Submit any strategy, plan or program required by this consent on a progressive basis; and
- (d) Combine any strategy, plan or program required by this consent with any similar strategy, plan or program required for the Warkworth Mine.

To ensure these strategies, plans or programs are updated on a regular basis, the Applicant may at any time submit revised strategies, plans or programs to the Secretary for approval.

With the agreement of the Secretary, the Applicant may prepare any revised strategy, plan or program without undertaking consultation with all parties under the applicable condition of this consent.

Notes:

- While any strategy, plan or program may be submitted on a progressive basis, the Applicant will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times.

If the submission of any strategy, plan or program is to be stages, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.

Sch. 3
Cond 1. **Acquisition Upon Request**

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 5 and 6 of schedule 4.

Table 1: Land subject to acquisition upon request

Acquisition Basis	Land
Noise	144, 146, 149, 915
Air	K

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 3.

Sch. 3
Cond. 15 **Air Quality Criteria**

The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately owned land.

Section
6.3.3.1 and
Appendix A

Table 5: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	^d Criterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 6: Short term impact assessment criterion for particulate matter

Pollutant	Averaging period	^d Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µg/m ³

Table 7: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase ² in deposited dust level	Maximum total ¹ deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 5-7

- ^a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- ^b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
- ^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
- ^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
Sch. 3 Cond. 16	Mine-owned Land The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any occupied residence on mine-owned land (including land owned by another mining company), unless and to the extent that: (a) The tenant and landowner (if the residence is owned by another mining or gas company) have been notified or any health risks associated with such exceedances in accordance with the notification requirements under Schedule 4 of this consent; (b) The tenant of any land owned by the Applicant can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice and cause; (c) Air Quality monitoring is regularly undertaken to inform the tenant or landowner (if the residence is owned by another mining or gas company) of the particulate emissions at the residence; and (d) Data from this monitoring is presented to the tenant and landowner in an appropriate format for a medical practitioner to assist the tenant and landowner in making informed decisions on the health risks associated with occupying the property.	Section 5.3
Sch. 3 Cond. 17	Operating Conditions The Applicant shall: (a) Implement all reasonable and feasible measures to minimise the: • Odour, fume and dust emissions of the development; and • Release of greenhouse gas emissions from the development (b) Operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting and real-time air quality monitoring data to guide the day-to-day planning of mining operations and the implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this consent; (c) Minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d to Tables 5 – 7 above); and (d) Co-ordinate the air quality management on site with the air quality management at nearby mines (including the Warkworth, Bulga, Wambo and Hunter Valley Operations mines) to minimise any cumulative air quality impacts.	Section 6.3
Sch. 3 Cond. 18	Air Quality Management Plan The Applicant shall prepare and implement an Air Quality Management Plan for the development to the satisfaction of the Secretary. The plan must: a) Be prepared in consultation with EPA, and be submitted to the Secretary for approval prior to carrying out any development under this consent; b) Describe the measures that would be implemented to ensure compliance with relevant air quality criteria and operating conditions of this consent; c) Describe the proposed air quality management system; d) Include provisions for keeping the local community informed about the operations of the air quality management system and monitoring programs, including regular briefings and a public information session within 6 months of the granting of this development consent; e) Include an air quality monitoring program that: • Adequately supports the proactive and reactive air quality management system; • Evaluates and reports on:	Appendix C Section 6.3 Section 6.3 Section 8.1.3 Appendix A

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	○ The effectiveness of the air quality management system; and ○ compliance with the air quality operating conditions; and • Defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and any relevant stakeholders of any air quality incidents; and (e) Include a protocol that has been prepared in consultation with the owners of nearby mines (including the Warkworth, Bulga, Wambo and Hunter Valley Operations mines) to minimise cumulative air quality impacts.	Section 3.2
Sch. 3 Cond. 19	Meteorological Monitoring For the life of the development, the Applicant shall ensure that there is a meteorological station in the vicinity of the site that: a) Complies with the requirements in the <i>Approved Methods for Sampling of Air Pollutants in New South Wales</i> guideline; and b) Is capable of continuous real-time measurement of temperature inversions in accordance with the <i>NSW Industrial Noise Policy</i>, unless a suitable alternative is approved by the Secretary following consultation with the EPA.	Appendix A
Sch. 4 Cond. 1	Notification of Landowners / Tenants Within 1 month of the date of this consent, the Applicant shall: a) Notify the tenants of any mine-owned land of their rights under this consent (see condition 18 of Schedule 3); and b) Send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EIS identify that dust emissions generated by the development are likely to be greater than the relevant air quality criteria in schedule 3 at any time during the life of the development.	Section 5.3
Sch. 4 Cond. 2	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: 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 b) Advise the prospective tenants of the rights they would have under this consent, To the satisfaction of the Secretary.	Section 5.3
Sch. 4 Cond. 3	As soon as practicable after obtaining monitoring results showing: 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; and b) An exceedance of the relevant air quality criteria in Schedule 3, 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).	Section 8.1.2
Sch. 4 Cond. 4	Independent Review If an owner of privately-owned land considers the development to be exceeding the criteria in schedule 3 at his/her land, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land. If the Secretary is satisfied that an independent review is warranted, then the Applicant shall: b) Commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the Secretary, to: • Consult with the landowner to determine his/her concerns;	Section 7.1

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	- Conduct monitoring to determine whether the development is complying with the relevant impact assessment criteria in Schedule 3; and - If the development is not complying with these criteria then: - 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 - Identify the measures that could be implemented to ensure compliance with the relevant criteria; and Give the Secretary and landowner a copy of the independent review within 2 months of the Secretary's decision, unless the Secretary agrees otherwise.	
Sch. 5 Cond. 2	Adaptive Management The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedules 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&A Act or EP&A Regulation. Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity: d) Take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur; e) 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 Implement remediation measures as directed by the Secretary.	Section 5.2
Sch. 5 Cond. 3	Management Plan Requirements The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: a) Detailed baseline data; b) A description of - The relevant statutory requirements (including any relevant consent, licence or lease conditions); - Any relevant limits or performance measures / criteria; - 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; c) A description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures / criteria; d) A program to monitor and report on the: - Impacts and environmental performance of the development; - Effectiveness of any management measures (see c above) e) A contingency plan to manage any unpredicted impacts and their consequences; f) A program to investigate and implement ways to improve the environmental performance of the development over time; g) A protocol for managing any: - Incidents; - Complaints; - Non-compliances with statutory requirements; and	Appendix B Section 1.2 Appendix A Section 6.3 Section 8.1 Section 6.4 Section 6.5 Section 8.1.2 and Appendix A

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	- Exceedances of the impact assessment criteria and/or performance criteria; and h) A protocol for periodic review of the plan. <i>Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i>	Section 8.3
Sch. 5 Cond. 4	Annual Review By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must: - Describe the development that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year; - Include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the - The relevant statutory requirements, limits or performance measurements / criteria; - The monitoring results of previous years; and - The relevant predictions in the EIS; - Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; - Identify any trends in the monitoring data over the life of the development; - Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and - Describe what measures will be implemented over the next year to improve the environmental performance of the development.	Section 8.1
Sch. 5 Cond. 5	Review of Strategies, Plans and Programs Within 3 months of the submission of an: - Annual review under condition 4 above; - Incident report under condition 7 below; - Audit under condition 9 below; and - Any modification to the conditions of this consent, The Applicant shall review, and if necessary revise, the strategies, plans and programs required under this consent to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review, unless the Secretary agrees otherwise, the revised document must be submitted to the Secretary for approval. <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>	Section 8.3
Sch. 5 Cond. 7	Incident Reporting The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident.. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Section 8.1.2
Sch. 5 Cond. 8	Regular Reporting 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.	Section 8.1
Sch. 5, Cond. 11	Access to Information From the commencement of development under this consent, the Applicant shall: - Make copies of the following information publicly available on its website: - The EIS; - Current statutory consents for the development;	Section 8.1

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	- Approved strategies, plans or programs required under the conditions of this consent; - A comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; - The results of real time noise monitoring, updated daily (unless otherwise agreed by the Secretary); - A complaints register, which is to be updated monthly; - Minutes of CCC meetings; - The annual reviews of the development (for the last 5 years, if applicable); - Any independent environmental audit, and the Applicant's response to the recommendations in any audit; - Any other matter required by the Secretary; and	
	b) Keep this information up to date.	

Table 2: Environment Protection Licence conditions addressed in the AQMP

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement	
EPL 1376 – Warkworth Mining Limited			
P1.1	The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.	Appendix A	
<i>Air</i>			
EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
9	Particulate Matter Monitoring		Monitor "WML North Pit" at coordinates 316450, 6392620 (Easting Northing) identified as point 9 on Figure 1.
10	Particulate Matter Monitoring		Monitor "Dragline Crossing" at coordinates 318679, 6388113 (Easting Northing) identified as point 10 on Figure 1.
11	Particulate Matter Monitoring		Monitor "Heavy Vehicle Bridge" at coordinates 320800 6387890 (Easting Northing) identified as point 11 on Figure 1.
12	Particulate Matter Monitoring		Monitor "MTIE" at coordinates 321656, 6388797 (Easting Northing) identified as point 12 on Figure 1.
O3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.	Section 6.3	
O3.2	All trafficable areas, coal storage areas and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.	Section 6.3	
M1.1	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 A	
M1.2	All records required to be kept by this licence must be:		

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement								
	a) In a legible form, or in a form that can readily be reduced to a legible form; b) Kept for at least 4 years after the monitoring or event to which they relate took place; and c) Produced in a legible form to any authorised officer of the EPA who asks to see them.									
M1.3	The following must be kept in respect of any samples required to be collected for the purposes of this licence: a) The date(s) on which the sample was taken; b) The time(s) at which the sample was collected; c) The point at which the sample was taken; and d) The name of the person who collected the sample.	Appendix A								
M2.1	For each monitoring / discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Appendix A								
M2.2	POINT 9,10,11,12 <table><tr><th>Pollutant</th><th>Units of measure</th><th>Frequency</th><th>Sampling Method</th></tr><tr><td>PM10</td><td>micrograms per cubic metre</td><td>Continuous</td><td>Special Method 1</td></tr></table>	Pollutant	Units of measure	Frequency	Sampling Method	PM10	micrograms per cubic metre	Continuous	Special Method 1	Appendix A
Pollutant	Units of measure	Frequency	Sampling Method							
PM10	micrograms per cubic metre	Continuous	Special Method 1							
M5.1	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 8.2								
M5.2	The record must include details of the following: a) The date and time of the complaint; b) The method by which the complaint was made; c) Any personal details of the complainant which were provided by the complainant, or if no such details were provided, a note to that effect; d) The nature of the complaint; e) The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) If no action was taken by the licensee, the reasons why no action was taken.	Section 8.2								
M5.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Section 8.2								
M5.4	The record must be produced to any authorised officer of the EPA who asks to see them.	Section 8.2								
EPL 1976 – Mount Thorley Operations										
P1.1	The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.	Appendix A								

<i>Air</i>			
EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
10	Particulate Matter Monitoring		Monitor "Dragline Crossing" at coordinates 318679 6388113 (Easting Northing) identified as EPA 10 on Figure 2.
11	Particulate Matter Monitoring		Monitor "Heavy Vehicle Bridge" at coordinates 320800 6387890 (Easting Northing) identified as EPA 11 on Figure 2.
13	Particulate Matter Monitoring		Monitor "MTO Boundary" at coordinates 320781 6384921 (Easting Northing) identified as EPA 13 on Figure 2.
19	Particulate Matter Monitoring		Monitor "MTIE" at co-ordinates 321656, 6388797 (Easting, Northing) identified as EPA 12 on Figure 2.

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement																				
O3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.	Section 6.3																				
O3.2	Guide posts or other control measures must be maintained to define trafficable areas, restricting vehicle movements to these areas and identifying areas to be watered down.	Section 6.3.1.3																				
O3.3	All trafficable areas, coal storage areas and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.	Section 6.3																				
M1.1	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 A																				
M1.2	All records required to be kept by this licence must be: a) In a legible form, or in a form that can readily be reduced to a legible form; b) Kept for at least 4 years after the monitoring or event to which they relate took place; and c) Produced in a legible form to any authorised officer of the EPA who asks to see them.	Appendix A																				
M1.3	The following must be kept in respect of any samples required to be collected for the purposes of this licence: a) The date(s) on which the sample was taken; b) The time(s) at which the sample was collected; c) The point at which the sample was taken; and d) The name of the person who collected the sample.	Appendix A																				
M2.1	For each monitoring / discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Appendix A																				
M2.2	<table><tr><td>POINT</td><td>10,11,12,13</td></tr><tr><td>Pollutant</td><td>Units of measure</td><td>Frequency</td><td>Sampling Method</td></tr><tr><td>PM10</td><td>micrograms per cubic metre</td><td>Continuous</td><td>Special Method 1</td></tr></table>	POINT	10,11,12,13	Pollutant	Units of measure	Frequency	Sampling Method	PM10	micrograms per cubic metre	Continuous	Special Method 1	Appendix A										
POINT	10,11,12,13																					
Pollutant	Units of measure	Frequency	Sampling Method																			
PM10	micrograms per cubic metre	Continuous	Special Method 1																			
M4.1	The licensee must collect and analyse meteorological data on the premises for each weather parameter specified in column 1. The licensee must use the sampling method, units of measure and sample at the frequency specified in the other columns: <i>Meteorological Monitoring</i> <table><tr><td>Parameter</td><td>Units of measure</td><td>Frequency</td><td>Sampling method</td></tr><tr><td>Air temperature</td><td>0C</td><td>Continuous</td><td>Thermometer</td></tr><tr><td>Wind direction</td><td></td><td>Continuous</td><td>AM-2 & AM-4 (see note 1)</td></tr><tr><td>Wind velocity</td><td>m/sec</td><td>Continuous</td><td>AM-2 & AM-4 (see note 1)</td></tr><tr><td>Rainfall</td><td>mm</td><td>Daily</td><td>Rain gauge</td></tr></table>	Parameter	Units of measure	Frequency	Sampling method	Air temperature	0C	Continuous	Thermometer	Wind direction		Continuous	AM-2 & AM-4 (see note 1)	Wind velocity	m/sec	Continuous	AM-2 & AM-4 (see note 1)	Rainfall	mm	Daily	Rain gauge	Appendix A
Parameter	Units of measure	Frequency	Sampling method																			
Air temperature	0C	Continuous	Thermometer																			
Wind direction		Continuous	AM-2 & AM-4 (see note 1)																			
Wind velocity	m/sec	Continuous	AM-2 & AM-4 (see note 1)																			
Rainfall	mm	Daily	Rain gauge																			
M5.1	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 8.2																				
M5.2	The record must include details of the following: a) The date and time of the complaint; b) The method by which the complaint was made; c) Any personal details of the complainant which were provided by the complainant, or if no such details were provided, a note to that effect; d) The nature of the complaint; e) The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and	Section 8.2																				

Consent Condition	Environmental Performance Conditions	Section of AQMP which addresses this requirement
	f) If no action was taken by the licensee, the reasons why no action was taken.	
M5.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Section 8.2
M5.4	The record must be produced to any authorised officer of the EPA who asks to see them.	Section 8.2

2. BACKGROUND

This AQMP 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.). Development Consent for the Warkworth Continuation Project (SSD-6464) and Mount Thorley Continuation Project (SSD-6465) was granted on 26 November 2015. The Approvals stipulate the air quality criteria that operational activities at MTW must comply with.

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 air pollution) emissions in NSW. EPL's 1376 for Warkworth Coal Mine (issued on 21 August 2000) and 1976 for Mt Thorley Operations (issued on 28 September 2000) stipulate a range of conditions relating to Air Quality. These conditions are reproduced in **Table 2**.

While the primary intent of this AQMP 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.

2.2 Relevant Standards and Guidelines

Guidelines and standards applying to air quality at MTW include:

- *Protection of the Environment Operations (Clean Air) Regulation 2010*;
- *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW*"

- AS 3580.1.1:2016 – Methods for sampling and analysis of ambient air;
- AS 3580.9.3:2015 – Determination of Total Suspended Particulates – High Volume Air Sampler – Gravimetric Method;
- AS 3580.9.6:(2015) – Determination of Particulate Matter – PM10 High Volume Air Sampler with size selective inlet – Gravimetric Method;
- AS 3580.10.1:2016 – Determination of Particulates – Deposited Matter – Gravimetric Method;

3. CONSULTATION

The relevant conditions of the Approvals detailing the requirements for this AQMP stipulate the agencies and parties to be consulted during the preparation of this AQMP.

3.1 Government Agencies

In a letter to the EPA dated 18 July 2018, MTW sought to clarify the EPA's position with regard to the review and input of Environmental Management Plans. In a letter dated 19 July 2018, the EPA advised "The EPA encourages the development of such plans to ensure that proponents have met 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/conservation management, not to be directly involved in the development of strategies to achieve those objectives. (See **Appendix C**).

3.2 Nearby/Neighbouring Mines

Neighbouring mines adjacent to MTW mining operations were also consulted to create communication protocols to effectively manage cumulative air quality impacts under a cooperative arrangement. MTW engages with the neighbouring Hunter Valley Operations, Wambo and Bulga Open Cut mines on an as-needs basis to inform of problem dust sources, generally in response to real-time alarms or

community concerns. MTW also shares air quality data upon request, with these neighbouring mines.

The communications protocols are intended to ensure timely and effective management of environmental issues (including air quality) between neighbouring mine sites. The mine with a concern will initiate contact with other relevant mine(s) on an as needs basis. Where an issue is identified and reasonably believed to be the responsibility of a neighbouring mine(s), either in whole or in part, the mine initially aware of the concern will notify the other mine(s) of the matter as soon as reasonably practicable to enable review and action if required.

3.3 Community Consultative Committee

This AQMP was provided to members of the MTW Community Consultative Committee (CCC) for review and comment. Comments received from CCC members will be considered by MTW for inclusion or amendment to the AQMP.

4. EXISTING CHARACTER

4.1 Existing Character

Mt 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 partially bounded by public roads – the Golden Highway alongside the Northern and Eastern WML boundary, Charlton Road to the West of MTO, and Wollombi Brook to the west of WML. 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 (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:

- 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.

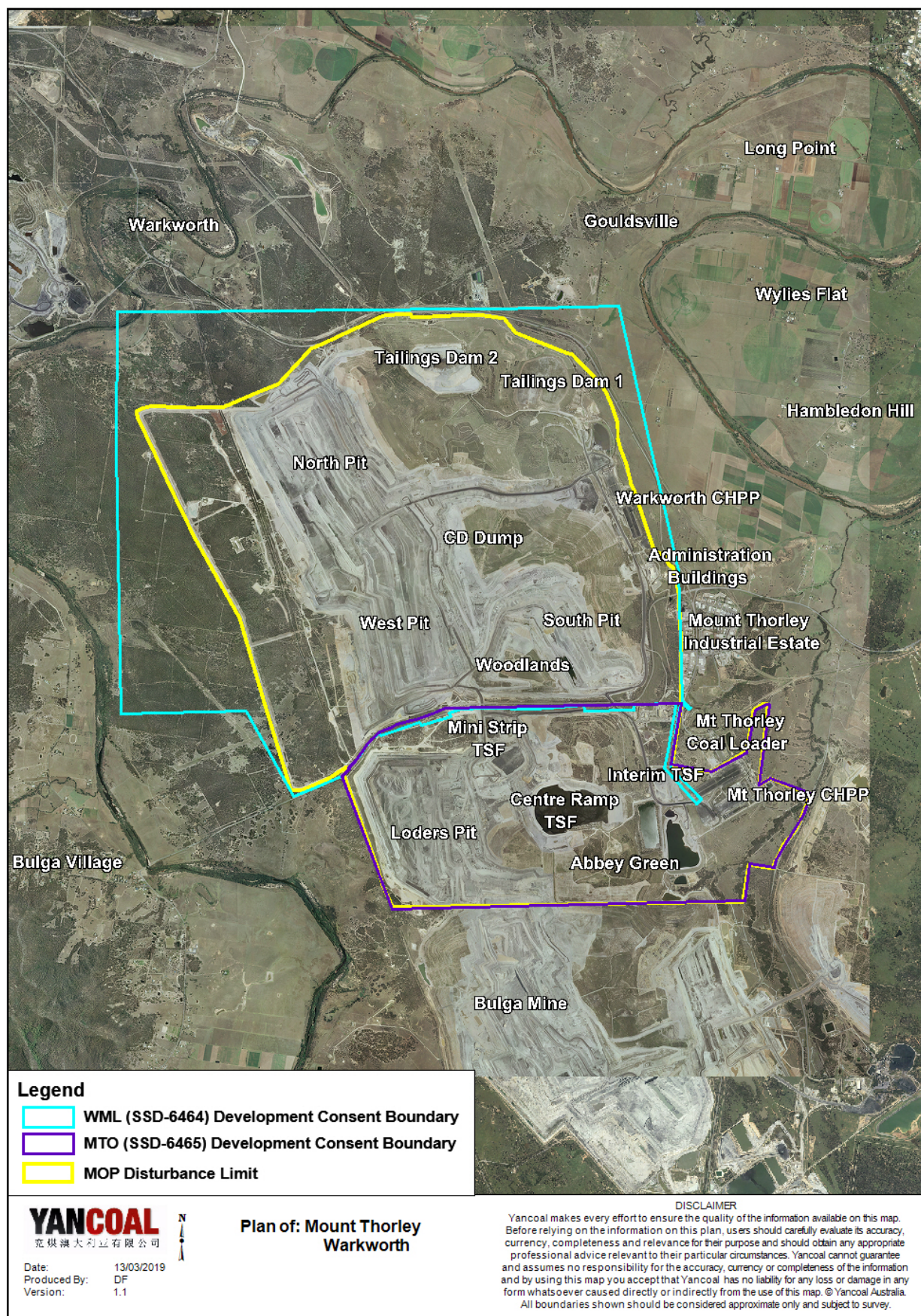


Figure 1 - Layout of MTW

4.3 Background Air Quality

Detailed air quality assessments were undertaken as part of the environmental assessment phase of the Warkworth and Mount Thorley Continuation Projects.

The air quality studies detail key receptors and background conditions, as well as modelled impacts under a range of meteorological scenarios at different stages of the life of the developments. The modelling also takes into account typical meteorological conditions, based on measured conditions in the years prior to the study. Each of these modelling exercises has been undertaken using methodologies which are accepted by the NSW EPA.

For full details, refer to:

- *'Air Quality and Greenhouse Gas Assessment Warkworth Continuation 2014'*, Appendix G in Volume 2 – Environmental Impact Statement – Warkworth Continuation 2014, Todoroski Air Sciences / EMGA Mitchell McLennan– 12 June 2014.
- *'Air Quality and Greenhouse Gas Assessment Mount Thorley Operations 2014'*, Appendix G in Volume 3 - Environmental Impact Statement – Mount Thorley Operations 2014, Todoroski Air Sciences / EMGA Mitchell McLennan – 12 June 2014.

These studies can be found on MTW's webpage (<https://insite.yancoal.com.au/document-library/eamtw>).

4.4 Impact Assessment Criteria

The air quality criteria for WML and MTO, as specified in the Approvals, are provided in full in **Table 1** above. The air quality criteria include impact assessment criteria, used for assessing compliance, and land acquisition criteria. An exceedance of the land acquisition criteria may trigger acquisition rights for the impacted property.

The Approvals require the monitoring of:

- Total Suspended Particulates (TSP);
- Particulate Matter with an equivalent spherical aerodynamic diameter less than 10 µm (PM₁₀); and
- Deposited dust (insoluble solids).

All of the criteria refer to the mass of the substance measured over a period of time; please refer to **Table 1**.

TSP refers to the total dust particles that are suspended in the air. PM₁₀ is a subset of TSP, as is deposited dust. TSP is assessed as defined by Standards Australia AS / NZS 3580.9.3:2015: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High Volume sampler gravimetric method (AS 3580.9.3:2015). This method can be used for regulatory compliance monitoring.

PM₁₀ refers to particulate matter with an aerodynamic diameter less than 10µm. PM₁₀ is assessed in accordance with the requirements of AS / NZS 3580.9.6:2015: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM₁₀ high volume sampler with size selective inlet – Gravimetric method. Daily (24hr average) and annual average results measurements are collected for operational management and compliance assessment purposes.

Deposited dust relates to the largest dust particles in the air. These particles rarely travel far from the source as they rapidly settle under gravity. Deposited dust is assessed as insoluble solids as defined by Standards Australia AS / NZS 3580.10.1:2016: Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric Method. This method can be used for regulatory compliance monitoring.

4.5 Existing or Background Air Quality

This section provides a brief overview of the existing, or background, dust levels in the area based on data drawn from the MTW Air Quality monitoring network which provide measurements of 24-hour average concentrations of TSP and PM₁₀ on a six-day cycle and monthly averages of dust fallout levels. Appendix B provides a summary of the annual average PM₁₀ and TSP values for monitoring locations around MTW from 2005 to 2013 inclusive.

5. MANAGEMENT & MITIGATION

5.1 Principles and framework

Environmental Management at MTW is based on the following principles and framework which are described in more detail in the *Environmental Management Strategy*;

- “Policy” component of framework – understand all regulatory requirements
 - “Plan” component of framework – undertake risk analysis of air quality emissions;
 - “Do” component of Framework – manage operations
 - “Measure” component of framework – regular monitoring; and
 - “Review” component of framework - reporting and analysis.
- Complaints management;
 - Dynamic improvement/evolution;

- Implementation of effective Reactive and proactive controls; and
- Co-ordination/cumulative impact management.

5.2 Best Management Practice

Section 128 of the *PoEO Act* requires that the Project must operate “...by such practicable means as may be necessary to prevent or minimise air pollution.” This requirement applies the concept of practicable means to air quality management.

Part 7.2.1 of the NSW Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005) introduces the concept of minimising (toxic) air pollutants “...to the maximum extent achievable through the application of best-practice process design and/ or emission controls..” and outlines that this would have regard to technical, logistical (i.e. practicable) and financial (cost-effective) considerations.

Best management practice in this AQMP is defined as practices used to manage air quality that is consistent with the following:

- The measure will firstly aim to prevent emissions, and where that is not practicable, to generally reduce emissions and impacts¹ to the environment as a whole²;
- 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.

1 Due to the often large distances between the source of emissions and the potentially impacted receptor, priority will be given to measures that can be shown to minimise impact over measures that simply minimise emissions. For example, to manage deposited dust at a

location, the nearest sources are most likely to influence the level of impact, even if these are relatively minor sources compared to others.

2 Meaning more than just air quality impacts will be considered.

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

5.3 Management of Mine Owned Residences

Schedule 3, Condition 18 (WML) and Schedule 3, Condition 16 (MTO) of the Approvals outline specific requirements for the management of mine-owned residences. Specifically, MTW:

1. Must ensure that the air quality criteria listed in Schedule 4 are not exceeded at any occupied residence on mine-owned land (including land owned by adjacent mines), unless a range of administrative measures are undertaken; and
2. Must ensure that prescribed notification requirements are met.

5.3.1 MTW Owned, Occupied, Residences

To comply with these requirements at MTW owned and occupied residences MTW will:

- As soon as practicable after an exceedance of Air Quality criteria:
 1. Provide the tenant with written notice of the exceedance;
 2. Provide the tenant with regular monitoring results until the development is again complying with the relevant criteria previously exceeded;
 3. Provide the tenant with a copy of the NSW Health fact sheet entitled “Mine Dust and You” (if not recently provided); and
 4. Provide the tenant with a copy of the most recent EPL Monitoring Data summary, submitted to the EPA in accordance with the data reporting requirements of the PoEO Act. The data is in an appropriate format for the

tenant’s medical practitioner to assist them in making an informed decision on the health risks associated with continued occupation of the property.

- Subject to giving reasonable written notice, permit tenants to terminate their tenancy agreement without penalty.
- Install air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) at the residence if the tenant so requests.
- Provide particulate matter monitoring data collected from existing nearby monitors (see **Appendix A**). This data will be provided upon request, and presented in a form suitable for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property.

MTW has provided written notification to the tenants of MTW owned residences of their rights as described above.

5.3.2 Other Mine Owned, Occupied, Residences

To comply with the relevant requirements for tenants and landowners of residences owned by mining companies, other than MTW, MTW will:

- As soon as practicable after an exceedance of applicable air quality criteria:
 - Provide the landowner with a notice of an exceedance;
 - Provide the landowner with regular monitoring results until the development is again complying with the relevant criteria previously exceeded;
 - Provide the landowner with a copy of the NSW Health fact sheet entitled “Mine Dust and You” (if not recently provided);
 - Provide the landowner with a copy of the most recent EPL Monitoring Data summary, submitted to the EPA in accordance with the data reporting requirements of the PoEO Act.

The data is in an appropriate format for the tenant's medical practitioner to assist them in making an informed decision on the health risks associated with continued occupation of the property; and

- Request that the landowner provide a copy of all this information to any tenant occupying those residences.
- Install air mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning) at the residence if the tenant and landowner jointly requests such, unless:
 - the listed mitigation measures are required as a condition in the neighbouring mine's existing project approval; and/or
 - the listed mitigation measures are already installed at the affected property.
- Provide particulate matter monitoring data collected from existing nearby monitors (see **Appendix A**). This data will be presented in a form suitable for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property.

MTW has provided written notification of these rights to the landowners and request that a copy of the notification be passed on to the tenants of those properties which are occupied now or in the future.

6. MITIGATION MEASURES / MANAGEMENT CONTROLS

6.1 Introduction

To understand how mining activities may affect air quality, four factors will be considered by MTW:

1. The generation of dust from mining activities;
2. The dispersion in the air of the generated dust ;
3. How various size fractions of dust behave in the air; and
4. The prevailing background dust levels.

Overall, there are two distinct weather conditions under which most short term dust impacts will occur:

- Hot, high wind conditions, especially where winds are relatively constant - under these conditions the quantity of dust from an operation can be high, leading to high impacts; and
- Stable atmospheric conditions with a gentle wind drift towards receptors - often these are temperature inversion conditions where there is little vertical mixing of the air, and hence relatively low dispersion of the dust leaving the site.

Background dust levels will vary considerably in the wider area around a mine, and from day-to-day. The background levels at a monitoring site are affected by localised sources of dust including dirt roads, activities on, and wind erosion of, exposed or grazed agricultural land, burning, particles from urban areas, wood heating in winter and pollens. In addition, background levels will include regional events, such as extremely dry and windy conditions, dust storms and bushfires.

6.2 Sources of Dust

The generation of dust emissions from open cut mine activities can be considered in three distinct categories:

1. Wind generated emissions, such as wind erosion of exposed surfaces, including stockpiles, overburden dumps and active pit areas, among others;
2. Wind sensitive emissions, such as dragline tipping, loading, dumping, emplacement, (essentially wherever material falls through the air); and
3. Wind insensitive emissions, such as wheel generated dust from hauling, and dust from blasting and drilling where the amount of dust does not depend on the wind speed at the time.

On windy days, particularly during prolonged dry periods, wind generated emissions and wind sensitive emissions will greatly increase. Dust generating activities identified from MTW comprise:

- Hauling of materials along unsealed roads;
- Loading and unloading of materials;
- Dozer, excavators and dragline operations;

- Wind erosion from exposed areas;
- Clearing of vegetation, topsoil and subsoil stripping;
- Stockpiling of coal, topsoil and gravels;
- Drilling and blasting of materials;
- Grading roads;
- Re-handling of materials;

The prevailing atmospheric stability class conditions greatly affect the dispersion of dust emissions in the air. The degree of atmospheric dispersion effects the concentration of dust in the air at a distance away from the source.

The various size fractions of particulate matter generated by mining activity will remain entrained in the air for different periods due to gravitational settling. Larger fractions will rapidly fall out of the air, while the smaller fractions can travel large distances before settling out of the atmosphere. It is important to note the further the dust travels the more dispersion will occur and the lower the concentration will be.

6.3 Operational Controls

In order to mitigate any potential impacts from dust generating activities, MTW will implement a number of management controls throughout the life of MTW.

The management controls / mitigation measures are derived from the principles outlined in Section 11.5 of the Warkworth Continuation 2014 Environmental Impact Statement.

Measures to manage MTW air quality 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 Air Quality Management System.

6.3.1 Standard Mitigation Measures

6.3.1.1 Disturbed Areas

- Minimise advance clearing to reduce wind erosion. Only the minimum area necessary for mining and associated infrastructure will be disturbed;
- Design overburden placement to minimise the disturbance area;
- Progressively reshape, topsoil and rehabilitate completed overburden emplacement areas. Temporary cover crops will be used to stabilise rehabilitation areas if sowing of long term species is unlikely to occur within four weeks (waiting for more favourable sowing conditions in Autumn/Spring);
- Temporary stabilisation of unused areas or dump slopes will be undertaken annually (provided conditions are considered favourable, such as not in drought etc.) by way of aerial seeding or similar. Autumn and Spring are the preferred times to undertake temporary stabilisation to assist successful vegetation establishment. Review of operating areas will be conducted in the weeks leading up to each seeding event. Seed will be applied to any area foreshadowed to be inactive for six months or more;
- Cleared vegetation is mulched and incorporated into topsoil and then used for stabilising rehabilitated landforms; this may include spreading of mulch and branches on completed overburden landform; and
- Watering of cleared areas during construction activities and reapplication of water as required.

6.3.1.2 Handling of Materials

- During topsoil stripping, make dust suppression options available to increase topsoil moisture if significant dust lift off occurs during stripping; and
- Cease or modify activities as required following valid trigger (see section 6.3.3) during adverse conditions.

6.3.1.3 Roads design

Consideration will be given to:

- Using the largest practical and cost-effective truck size for transporting coal and overburden; and
- Major Haul Roads will be constructed using preferentially selected material.

6.3.1.4 Roads, all

- Impose speed limits on all roads;
- Utilise the existing watercart fleet to maintain road dust control effectiveness;
- Suspend operations of unused road networks as soon as practicable;
- Roads which are seldom used will be watered as appropriate;
- Obsolete roads will be rehabilitated;
- Minor roads will be constructed in a proper manner;
- Implement a system to track water application rates on major haul roads; and
- Where practical, haul roads will have edges clearly defined with marker posts or equivalent to control their locations, especially when crossing large overburden emplacement areas.

6.3.1.5 Other unsealed roads and tracks

- Road vehicles will aim to remain on formed roads and tracks at all times, i.e. limited discretionary off-road driving. Limit off-road driving to necessary situations, e.g. survey/ inspection work; and
- Closure of auxiliary roads as required under adverse conditions.

6.3.1.6 Topsoil stockpiles

- Long term stockpiles will be re-vegetated as soon as practicable following completion.

6.3.1.7 Drilling and blasting

- Conduct blasting when dispersion is favourable in accordance with the internal permissions process, unless otherwise required for safety reasons;
- Blasting will not be undertaken under adverse weather conditions without the prior approval of the Mining Superintendent Dragline Drill and Blast or higher;
- Periodically review and update the Blasting Permissions process over the life of the development, in line with progression of mining, changes in land ownership, and growth in knowledge regarding blast cloud behaviour;
- Production drill rigs will utilise water injection or be fitted with dust mitigation such as sprays and dust aprons will be lowered during drilling. Production drill rigs will not be operated without adequate dust control; and
- Use adequate stemming in drill holes at all times;

6.3.1.8 CHPP

- Maintain and utilise the enclosed ROM Hoods at the Warkworth CHPP;
- Water sprays will be employed at the feeder, crusher, conveyor and transfer points unless operating conditions do not necessitate additional suppression;
- All conveyors will be fitted with appropriate cleaning and collection devices;
- Where possible use of 'hood and spoon' chutes;
- Regularly clean areas where spilt material can build up, e.g. under transfer chutes and conveyors, and paved areas;
- Daily completion of area environmental inspection;

6.3.2 Proactive Mitigation Measures

The best practice control measures and actions, (both proactive and reactive), for air quality management at MTW can be broken down into a number of sub categories based on control target, as listed below.

6.3.2.1 Proactive management

- Predictive modelling is undertaken and received by MTW Environmental and Drill and Blast staff on a daily basis, which is used to identify periods of the day where air pollutant (particularly blast plume) dispersion is favourable / unfavourable. The forecast dispersion conditions are reviewed and used to inform drill and blast staff of the optimum time to fire, based on the risk of plume trajectory towards sensitive receptors.
- Predictive meteorological forecast information is received on a daily basis by a range of MTW personnel. The forecast data describes hourly temperature wind speed and rainfall probabilities. The forecast information highlights periods of the day which are predicted to present potential dust risk, which have been derived through desktop review of the key meteorological risk factors evident on elevated PM₁₀ days in recent years. The system is used to identify periods of the day where adverse dust conditions are forecast. During such times, MTW will review operating conditions to understand and prepare the mitigating actions which are to be taken if the forecast adverse conditions eventuate, including:
 - Communication of the forecast to relevant personnel;
 - Ensuring as far as is practicable the availability of the watercart fleet;
 - Identification of low / in-pit dump options which may be available;
 - Water application to identified 'at risk' inactive areas; and/or

- Closure or restricted access to areas which are unable to be serviced by the watercart fleet.

6.3.3 Reactive Mitigation Measures – Adverse Conditions

The aforementioned pro-active management actions are supported by a system of reactive management measures to ensure a high level of dust management is maintained under adverse conditions. Reactive measures are introduced following receipt of a trigger, allowing prompt response to periods of increased dust risk.

6.3.3.1 Real Time Air Quality Alarms

Alarms are generated in real time by the air quality monitoring network, following measurement of elevated PM₁₀ levels or high wind speeds. Real time air quality alarms are currently in place at the following locations:

- Charlton Ridge (Meteorological Station);
- Bulga TEOM;
- Wambo Road TEOM;
- Warkworth TEOM; and
- MTIE laser photometer (Dust Trak)

The trigger levels are detailed in **Table 3**.

6.3.3.2 Response to Real Time Air Quality Alarms

Real time alarms are received by Environmental Services personnel, MTW Community Response Officers, and / or Shift Co-ordinators (depending on staff roster). The initial response to an alert is an assessment of the validity of the alert (correct monitor function), followed by an inspection of at risk areas. The inspection will take account of the elevation and wind exposure of active mining and dumping areas, and dragline activities. Where the inspection identifies excessive dust being generated from operating equipment, remedial action is taken as soon as

practicable, commensurate with the nature and severity of the dust event, and includes at least one of the following:

- Send water cart to area;
- Operational modification e.g. change haul route, lower dig rate, minimise dragline drop heights;
- Change dump location (lower / less exposed dump);
- Reduce equipment numbers;
- Shut down task; and/or
- Complete site shutdown (with the exception of reject trucks and watercarts as required)

Task modifications and remedial actions will be recorded in the mine monitoring and control system for reporting purposes. Following modification to operating activities, an assessment of the effectiveness of any mitigating actions will be undertaken by way of active monitoring of real-time air quality and meteorological conditions, and visual inspections.

6.3.3.3 *Supplementary monitoring network*

In support of the TEOM network described above, MTW has implemented additional supplementary real time monitors upwind and downwind of the operation as part of the EPA's air quality monitoring optimisation programme.

6.3.3.4 *Visual surveillance - cameras*

Cameras are in place at elevated vantage points at MTW (WML Maintenance Workshop and Charlton Ridge) to assist MTW personnel in identifying problem dust sources, informing management response and verifying the effectiveness of controls implemented.

TABLE 3 - REAL TIME AIR QUALITY ALARM SYSTEM OVERVIEW

Monitoring location	Trigger level	Response actions
MTW Charlton Ridge Met Station	Wind Speed >8m/sec	• Validation of alarm (verify monitors functioning correctly and review meteorological conditions) • Notify relevant Open Cut Examiner • Response per section 6.3.3.2
Bulga TEOM	Stage one • 10 min average PM₁₀ > 150µg/m³ • 1 hour average PM₁₀ > 50µg/m³ for three consecutive hours Stage two • rolling 24hr average PM₁₀ > 50µg/m³ for six consecutive hours (winds in arc of mine to monitor) • 10min average PM₁₀ >150 µg/m³ for three consecutive hours (winds in arc of mine to monitor)	
Wambo Road TEOM		
Warkworth TEOM		
MTIE laser photometer (Dust Trak)		

6.3.4 Odour

Measures will be put in place to ensure, as far as practicable, that no offensive odours, as defined under the PoEO Act, are emitted from MTW.

6.3.4.1 Blast Fume

Blast fume events are considered the only substantial odour risk at MTW. Refer to the MTW Post Blast Fume Generation Mitigation and Management Plan, contained within the Blast Management Plan, for details on strategies employed to manage the risk of blast fume.

6.3.4.2 Spontaneous Combustion

Spontaneous combustion is identified as a potential odour and air pollution emission source at MTW; however recent experience indicates that this risk is well managed, with very few 'spon-com' events in recent years.

The following preventative measures are currently in place at MTW to manage the risk of Spontaneous Combustion in coal stockpiles and in the pit:

- Keeping discrete piles separate where possible;
- Avoid building stockpiles by coning. Coning increases the surface area and tends to encourage size segregation of the coal; and
- Prompt turnover of coal on both Raw and Product stockpiles.

6.4 Management of Unpredicted Impacts

In the unlikely event that unpredicted air quality impacts are found to be occurring at nearby privately owned residences, MTW will consider management options 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); or

- Acquisition of the affected property.

6.5 Continuous Improvement

MTW will continuously seek to further air quality 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.

7. MONITORING PROGRAM

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

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 air quality criteria can request Independent Review of air quality impacts at any time. Such requests must be made in writing, to the Secretary.

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

Upon receiving direction to undertake Independent Review, MTW will complete the review in accordance with the requirements of the approvals.

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

Where Independent Review determines MTW to be exceeding the relevant land acquisition criteria, MTW

will acquire the residence in accordance with the requirements of the relevant condition(s).

8. IMPLEMENTATION OF THE AIR QUALITY MANAGEMENT PLAN

8.1 Reporting

8.1.1 Internal reporting

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

The Environmental Advisor – Systems and Monitoring will report any confirmed exceedance / non-compliance to relevant site personnel, including the General Manager, Manager – Mining, and Manager Environment & Community.

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 Advisor – Systems and Monitoring will notify the Secretary any confirmed exceedance/non-compliance immediately. Within 7 days of the date of the incident, MTW will provide the Secretary with a detailed report on the incident, and such further reports as may be requested. No further agencies are considered relevant, and thus do not require notification of non-compliance events.

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

Air Quality monitoring data, collected in accordance with this AQMP will be made available on the MTW website (<https://insite.yancoal.com.au>) via the Monthly Environmental Monitoring Report, and Annual Review.

8.1.3 Keeping the local community informed

Schedule 3, Condition 20(d) (WML) and Schedule 3, Condition 18(d) (MTO) of the Approvals requires that the AQMP *“include provisions for keeping the local community informed about the operation of the air quality management system and monitoring programs, including regular briefings and a public information session within 6 months of the granting of this development consent.”*

MTW publishes a range of information relating to air quality management on a monthly basis via the Monthly Environmental Report, available via MTW’s website (<https://insite.yancoal.com.au>). This report includes:

- Results from air quality monitoring for the previous month, including assessment against the short and long term criteria;
- A summary of air quality related alarms received in the previous month; and
- A summary of equipment operating hours lost (actions taken) in response to air quality alarms or visual inspections, for the previous month.

In addition to the Monthly Report, MTW is committed to providing up-to-date information on matters of environmental management to near-neighbours. To facilitate this, MTW launched “InSite” on April 1, 2016. An interactive website, InSite displays noise and meteorological data, as well as any operational changes made during shift. Accessible at <http://insite.yancoal.com.au> and compatible with most browsers. The website is also smartphone compatible.

8.2 Complaints Management

Community Complaints are lodged via the Community Complaints line, 1800 656 892. The hotline number is prominently displayed on the MTW 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.

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

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.

8.3 Review of this Management Plan

This AQMP will be reviewed within three months of the submission of the Annual Review and updated to the satisfaction of the Secretary of the Department of Planning, Industry and Environment (DPIE) where necessary.

This AQMP 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.

The AQMP may also be reviewed/revised at any time (e.g. other than at triggered events described above), to ensure it is updated on a regular basis.

Any major amendments to this AQMP 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.

8.4 Roles and Responsibilities

TABLE 4 - ROLES AND RESPONSIBILITIES³

Manager – Environment & Community
• Implementation of Management Plan • Regulator liaison and technical oversight
Manager – Mining
• Direction and operational oversight of management practices
Manager – Mine Planning
• Provision of mine plans for proactive model • Allocation of contingency mine plan options in consideration of air quality impacts
Manager – Maintenance
• Maintenance of equipment in a proper and responsible manner
Community Response Officer
• Implementation of key proactive and reactive measures • Community liaison • Complaints administration management
Environment and Community Coordinator
• Assistance with exceedance investigation • Community and regulator liaison • Complaints administration management
Environment – Systems and Monitoring
• Administer air quality monitoring programme • Non-compliance reporting • Co-ordination of Management Plan review • Systems development and implementation • Co-ordination of exceedance investigation • Regulator liaison • Technical oversight • Routine and Ad-hoc reporting
Shift Co-ordinator
• Implementation of operational modifications in response to triggers • Infrequent community liaison
Mine Monitoring and Control (MAPS)
• Support to Shift Co-ordinator and Community Response Officer (access to real time tools)
Consultants
• Technical oversight and exceedance investigation

3 – MTW reserves the right to revise the roles and responsibilities within this AQMP from time to time, subject to business needs

REFERENCES

- Mount Thorley Development Consent (SSD-6465);
- Warkworth Mining Limited Development Consent (SSD-6464);
- The EIS titled '*Mount Thorley Operations 2014*', dated June 2014 and prepared by EMGA Mitchell McLennan;
- The document titled '*Mount Thorley Operations 2014 Response to Submissions*', dated November 2014 and prepared by EMGA Mitchell McLennan;
- Approved Methods for the modelling and assessment of air pollutants in New South Wales" (DEC 2005)
- Standards Australia AS / NZS 3580.9.3:2015: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High Volume sampler gravimetric method.
- Standards Australia AS / NZS 3580.9.6:2015: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM₁₀ high volume sampler with size selective inlet – Gravimetric method.
- Standards Australia AS / NZS 3580.9.8:2008: Methods for sampling and analysis of ambient air – PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser
- Standards Australia AS / NZS 3580.10.1:2016: Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric Method
- NSW Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2016)
- European Union Directive 2008/1/EC

Appendix A – Mt Thorley Warkworth Air Quality Monitoring Programme

Mt Thorley Warkworth Air Quality Monitoring Programme Part 1 - Monitoring Programme

1 PURPOSE

This document provides a summary of the air quality monitoring programme for Mt Thorley Warkworth.

The monitoring locations are subject to change and will be updated periodically to align with management needs and to accommodate progression of mining.

2 PURPOSE

Table A1: MTW Air Quality Monitoring - Planning Approval compliance assessment

Parameter	Frequency	Monitor Location	Limit/Guideline	Sampling Method
Depositional Dust – privately owned land	Monthly	D11 D122 D124 DW14 DW20A DW21A Warkworth	Maximum increase in deposited dust level 2 g/m ² /month (Annual Average) Maximum total deposited dust level 4 g/m ² /month (Annual Average)	AM-19 AS3580.10.1 - 2016
Total Suspended Particulate	24 hours every 6 days	MTO TSP Loders Creek TSP WML TSP Warkworth TSP Long Point TSP	Concentration 90 µg/m ³ (Annual Average)	AM-15 AS3580.9.3 - 2015
PM ₁₀	24 hours every 6 days (HVAS)	Long Point PM ₁₀ HVAS Warkworth TEOM (OEH operated) Wambo Road TEOM Bulga TEOM (OEH operated)	Short Term Concentration 50 µg/m ³ (24 hour)	AM16 AS3580.9.6 - 2015
	Continuous		Long Term Concentration 30 µg/m ³ (Annual Average)	
	Continuous	MTIE	Measurement for management purposes only	DustTrak TSI 8530
Meteorological Station	Continuous	Charlton Ridge	Measurement for management purposes	AS 3580.14-2014

+ Meteorological stations are currently calibrated and maintained to a Class 2 performance standard.

Table A2 – MTW Air Quality Monitoring – EPL Monitoring Locations

Parameter	Frequency	Monitor Location	Guideline	Sampling Method
PM ₁₀	Continuous	WML North Pit Dragline Crossing Heavy Vehicle Bridge MTIE MTO Boundary	EPL 1976 EPL 1376	DustTrak TSI 8530

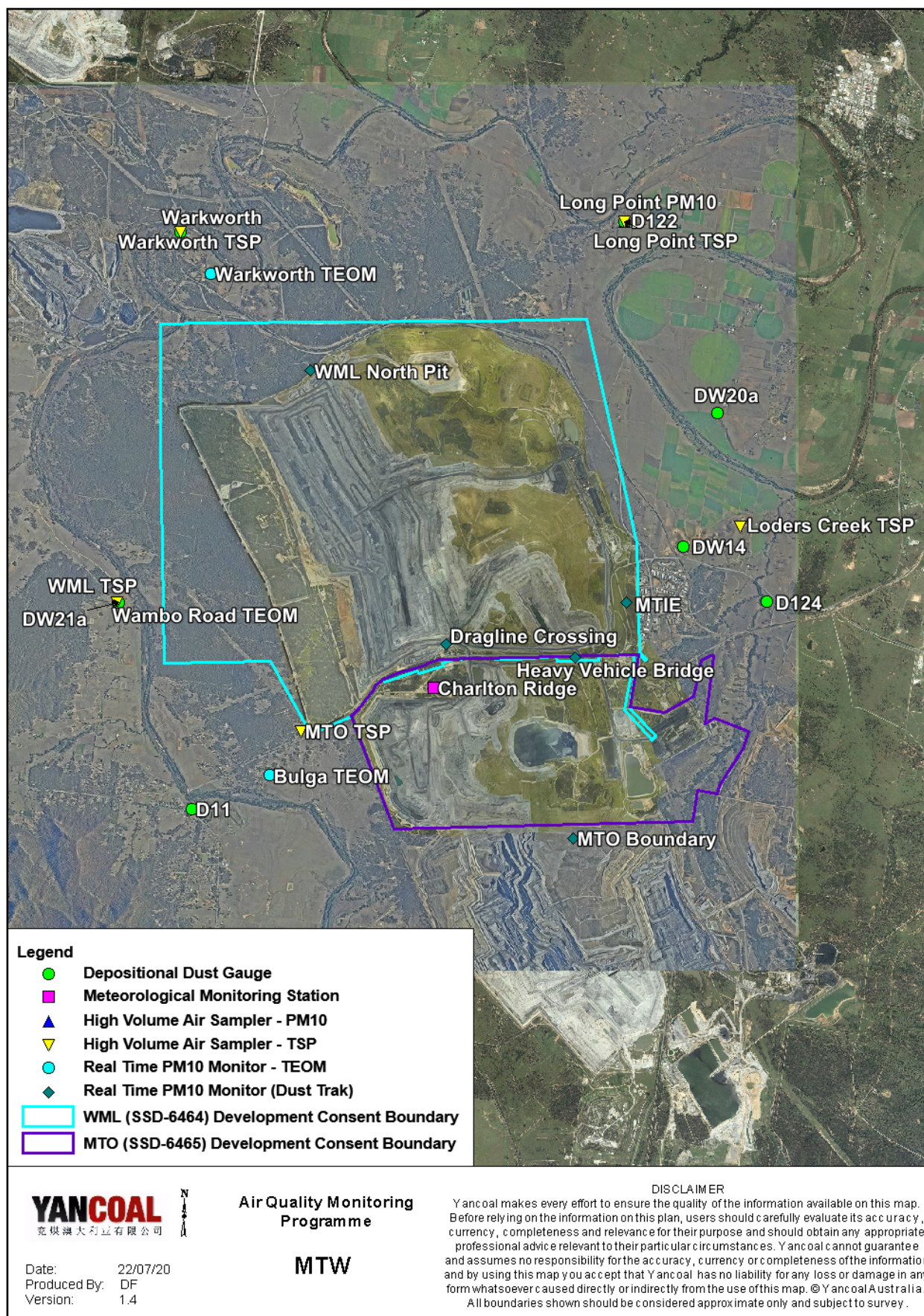


Figure 2 - MTW Air Quality Monitoring Programme

Mt Thorley Warkworth

Air Quality Monitoring Programme

Part 2 - Protocol for evaluating compliance

1 PURPOSE

The Approvals require monitoring of air quality parameters to measure and assess any impact of the development on neighbouring communities. The criteria to be measured refer to particulate matter, classified on the basis of size. All of the criteria require measurement of the mass of the substance, over a specified period of time.

Deposited dust relates to the largest dust particles in the air. These particles rarely travel far from the source as they settle rapidly under gravity. Deposited dust is assessed as insoluble solids as defined by Standards Australia AS 3580.10.1:2016: Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric Method.

Total Suspended Particulates (TSP) refers to the total particles that are suspended in the air. TSP is assessed as defined by Standards Australia AS 3580.9.3:2015: Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method.

PM₁₀ refers to particulate matter with an equivalent spherical aerodynamic diameter less than 10 µm. Compliance with PM₁₀ criteria is assessed as defined by Standards Australia AS 3580.9.6:2015 (High Volume Air Sampler) and 3580.9.8:2008 (Tapered Element Oscillating Microbalance (TEOM)).

PM₁₀ can also be indirectly inferred using other instruments that use light scattering techniques to infer the mass of particles present. MTW's DustTrak monitors are examples of this. Accordingly, these are not used for regulatory compliance purposes at MTW. This is mainly because the result can vary significantly according to particle properties such as size, colour and reflectivity. These instruments are suitable for operational management, e.g. for indicative or portable monitoring.

Air Quality Incident – refers to any confirmed non-compliance with air quality criteria as described in section 7 and 8 of this document.

Exceedance – refers to any measurement which is recorded in excess of the relevant licence or consent condition limit, prior to any investigation into the circumstances relating to the measured result

Non-compliance – refers to any exceedance which is determined to constitute non-compliance with the relevant licence or consent condition, in accordance with the protocols for evaluating non-compliance set out in section 7 and 8 of this document.

2 MONITORING

Monitoring will be undertaken in accordance with the New South Wales EPA 'Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales' guideline and relevant Australian Standards

The requirement for “supplementary monitoring” as described in the Project Approval shall be satisfied through the placement of DustTrak PM10 units in close proximity to the mine boundary, aligned with prevailing winds, in conjunction with the principles of the NSW EPA Air Quality Monitoring Optimisation program.

Real-time meteorological data will be collected in conjunction to air quality monitoring data. This information shall include wind speed and direction, rainfall, temperature and humidity.

3 AIR QUALITY CRITERIA

The air quality criteria applicable to MTW are reproduced in **Table 1** in the MTW Air Quality Management Plan. The criteria specified in both approvals, and notes applicable to the relevant tables, are identical in both the WML and MTO Approval. Therefore the method of compliance assessment is described once only for each criterion below.

3 COMPLIANCE EVALUATION

Compliance evaluation will be undertaken for private residences on the basis of the outcomes of air quality assessment from monitors located nearby to neighbouring communities, as detailed in the Air Quality Monitoring Programme. Compliance with the impact assessment criteria and land acquisition criteria requires a direct or indirect assessment of measured results, depending on the averaging period and requirements of the specific condition.

Compliance with the criteria in **Table 1** is demonstrated where the measured level is below the criteria. However it is not always the case that measured levels above the criteria constitute non-compliance. In this case indirect methods are needed to demonstrate compliance. Furthermore, as MTW operates a single monitoring network to evaluate compliance against the criteria in both approvals, any instance of data measured in excess of an air quality criterion must be further assessed to determine the relative contribution of each of the approval areas in order to determine compliance with the conditions of each approval.

3.1 Long term impact assessment criteria for particulate matter

Compliance with the Long term impact assessment criteria for particulate matter can be assessed by direct comparison of the criterion with measured results. Level of compliance against these conditions will be determined by way of comparing the annual average (calendar year) against the relevant criterion, with the outcome being compliant or non-compliant with the condition, for each monitoring location. This assessment will be undertaken at the completion of each calendar year.

Where extraordinary events (as defined in the Approvals) are considered to have contributed to an annual average exceedance, this will be referred to an air quality consultant for determination.

MTW will be considered non-compliant with the long term impact assessment criteria for particulate matter where the annual average particulate concentration, (excluding extraordinary events) exceeds the relevant annual average criterion, and the non-compliant measurement is attributable solely to WML or MTO.

3.2 Short term impact assessment criteria for particulate matter

Compliance with the short term impact assessment criteria for particulate matter can be assessed by direct comparison of the criterion with measured results. Level of compliance against this condition will be determined by

way of comparing 24hr PM₁₀ results (as measured by High Volume Air Sampler with size-selective inlet or TEOM monitor) against the impact assessment criterion of 50µg/m³. This assessment will be undertaken on a daily or monthly basis (dependant on monitoring technique).

This assessment however does not take account of background particulate matter, or particulate matter due to all other sources. Further assessment (indirect) of individual exceedances is therefore required to determine MTW's compliance position in these instances (individual assessment for WML and MTO). Further assessment will be undertaken by a suitably experienced person, and take account of background particulate concentration, prevailing meteorology, and operational factors influencing particulate dispersion.

MTW will be considered non-compliant with the short term impact assessment criteria for particulate matter when investigation into a measured PM₁₀ exceedance determines WML or MTO to have been a significant contributor (estimated contribution of >75%) to the measured result.

Any measured result from monitors in **Table 1** (with assigned limits), which is in excess of the impact assessment criterion (50µg/m³), will be assessed, in a timely manner and where MTW's contribution to the measured result exceeds 75% of the measured result, the result will be reported to the Secretary. A formal incident report will be provided to the Department within 7 days of confirmation of non-compliance. Details of all investigations of exceedances will be provided in the Annual Review (AR), including those that were found to be a result of non-mine contributions.

3.3 Long term impact assessment criteria for deposited dust

Compliance with the long term impact assessment criteria for deposited dust can be assessed by direct comparison of the criterion with measured results. Level of compliance against these conditions will be determined by way of comparing the Annual Average (calendar year) against the relevant criterion, with the outcome being compliant or non-compliant with the condition, for each monitoring location. This assessment will be undertaken at the completion of each calendar year.

Outcomes of Depositional Dust monitoring will be reviewed on a monthly basis (following receipt of results for the previous month). Where individual samples are noted as contaminated (typically with insects and bird droppings), or where extraordinary events (as defined in the approvals) are suspected to have contributed to any exceedance, these will be referred to a suitably experienced person for resolution, to determine the validity of the result in compliance assessment.

MTW will be considered non-compliant with the long term impact assessment criteria for deposited dust where the annual average deposited dust concentration (as measured by Depositional Dust gauges), (excluding contaminated gauges and extraordinary events) exceeds the relevant annual average criterion, or the maximum allowable increase in deposited dust criterion, and the non-compliant result is attributable to either of WML or MTO.

4 REPORTING

The Approvals require regular reporting on the outcomes of routine air quality monitoring. This will be undertaken as follows:

- On a monthly basis, via the Mt Thorley Warkworth Monthly Environmental Monitoring Report (MEMR), posted to the MTW Website;
- In writing, to affected landowners, as soon as practicable following confirmation of a non-compliance with relevant air quality criteria (accompanied by the NSW Health fact sheet “Mine dust and you”);
- In the Annual Review;
- Summarised and presented to the Community Consultative Committee; and
- To the Secretary, in the event of a non-compliance and as referred to in section 8 of this document.

Appendix B - Detailed Baseline Data

Baseline data presented includes:

- Distribution of the frequency of occurrence of different wind speed categories, by total hours, measured at the MTW Charlton Ridge met station for the period 2011 – 2013 (**Table B1** below);
- Measured hourly PM₁₀ concentrations by wind direction and wind speed for nearby surrounding TEOM units (**Figure B1** below); and
- 24hr PM₁₀ concentrations for the period 2011 – 2013 for MTW TEOM monitoring locations (**Figure B2** below).

Table B1 - Charlton Ridge wind speed distribution

Year	Wind speed category (m/s)								Total hours
	0-1.5	1.5-3.0	3.0-4.5	4.5-6.0	6.0-7.5	7.5-9.0	9.0-10.5	>10.5	
2011	1,070	2,954	1,858	909	231	41	5	5	7,073
2012	1,165	3,586	2,034	857	231	57	13	2	7,945
2013	1,094	3,760	2,251	978	312	56	13	4	8,468

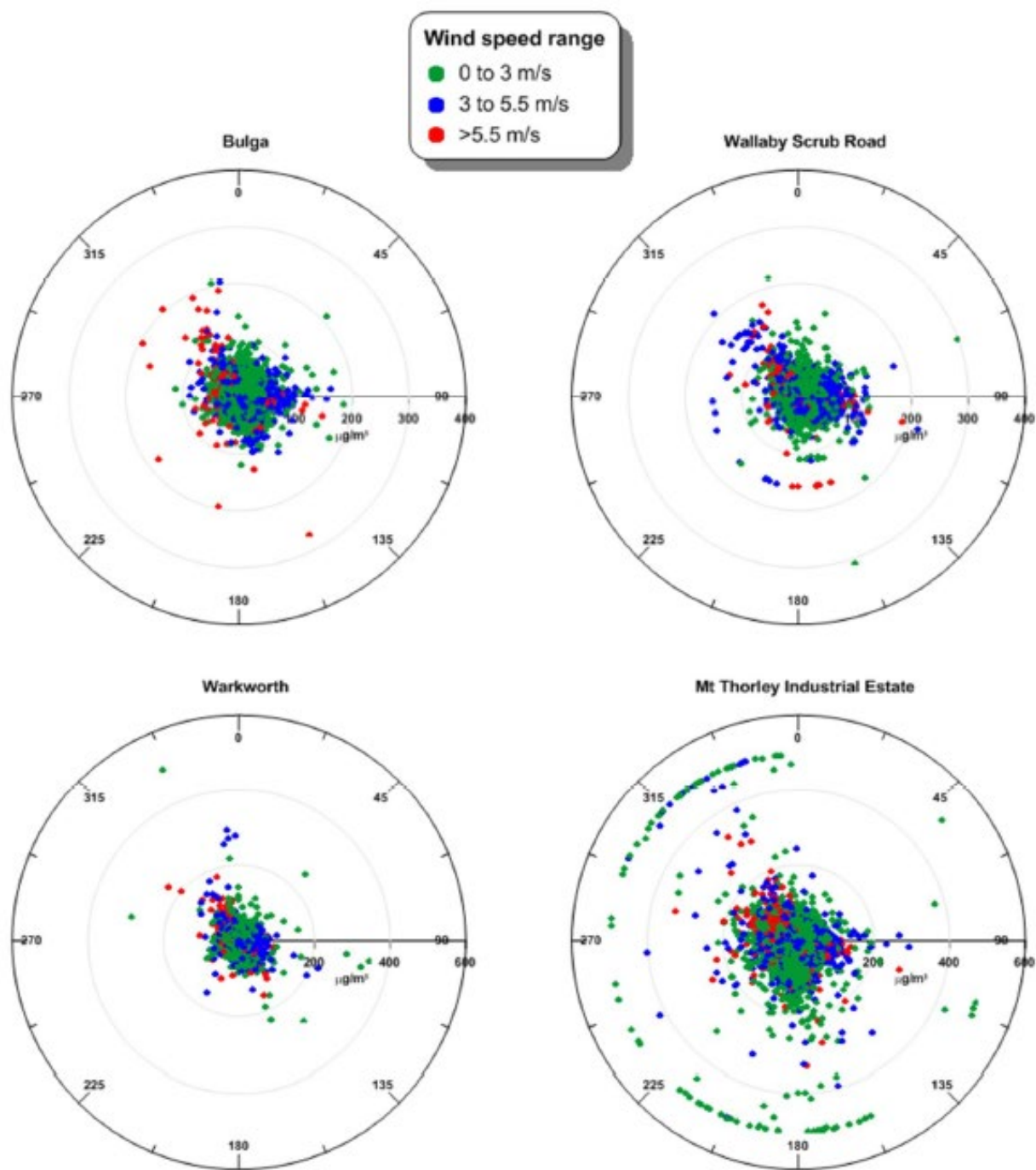


Figure B1 – Measured hourly PM₁₀ concentrations by wind direction and speed

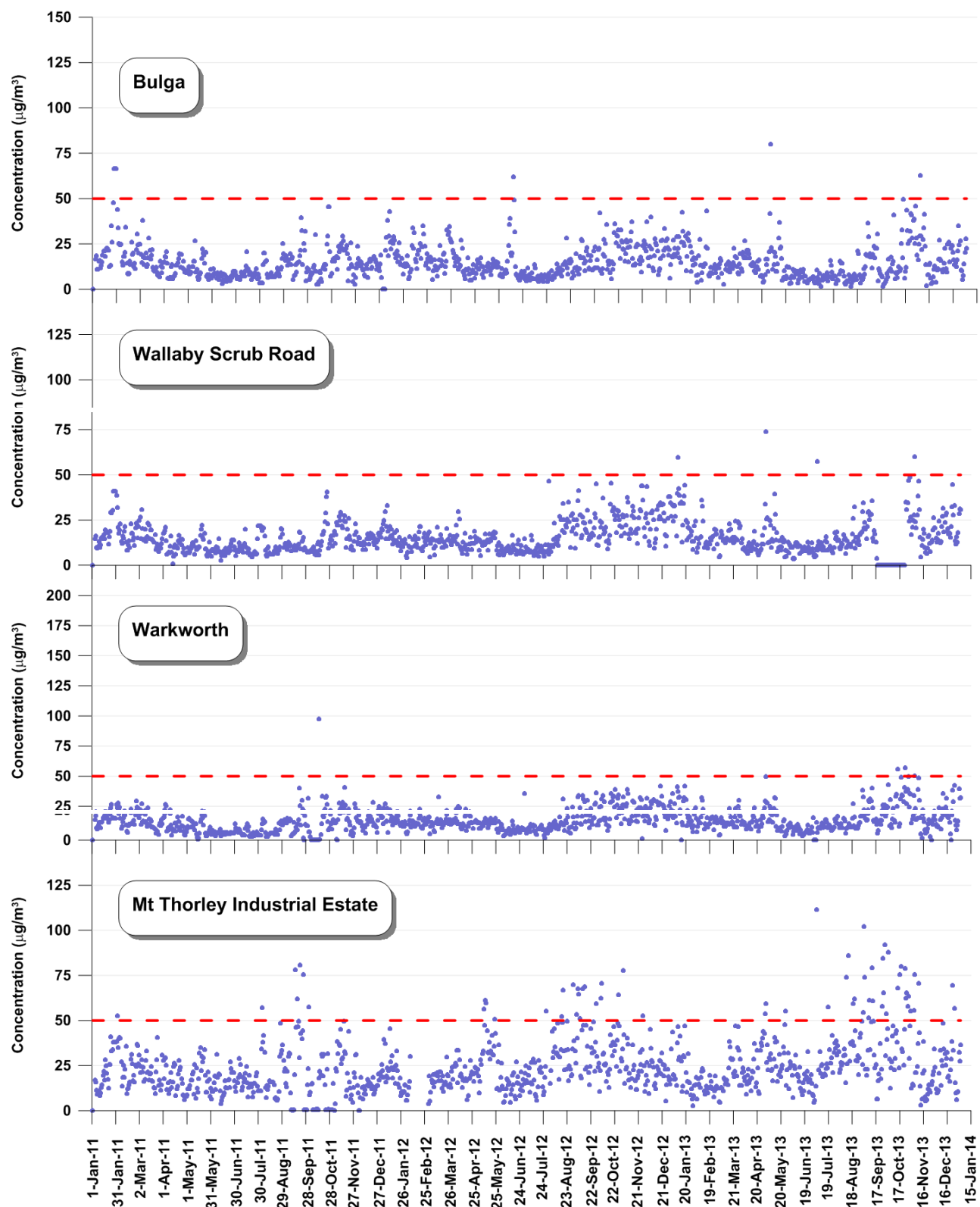


Figure B2 - Daily 24hr PM₁₀ averages 2011 - 2013

Appendix C – Consultation with the EPA



YANCOAL Mt Thorley Warkworth
SITE: Putty Road, Mt Thorley via Singleton NSW 2330
POSTAL: PO Box 267, Singleton NSW 2330
PHONE: +61 2 6570 1500
FAX: +61 2 6570 1576
WEBSITE: www.yancoalaustralia.com.au
ABN 42 001 385 842

18 July 2018

Ms Natasha Ryan
Environmental Protection Authority NSW
PO Box 448G
Newcastle NSW 2300

Dear Natasha,

Re: Yancoal Mount Thorley Warkworth – EPA Consultation on Noise, Air Quality, Blasting and Water Management Plans

Yancoal Mt Thorley Warkworth's (MTW's) development consents (SSD-6464 and SSD-6565) granted under the Environmental Planning and Assessment Act 1979 (EP&A Act), require MTW to consult with the Environment Protection Authority (EPA) during development of Environmental Management Plans for Noise, Air Quality, Blasting and Water.

MTW has existing Environmental Management Plans in place, prepared to comply with the relevant development consent conditions which have been approved by DP&E previously (available on the MTW website (<https://insite.yancoal.com.au/document-library/management-plans-mtw>)). I can advise that MTW previously consulted with the EPA on the plans listed above as part of their development, and a written response was provided to Coal & Allied Operations (reference DOC 14/115042. EF13/2793).

I would like to advise that MTW have drafted updates to aforementioned plans after submission of an Annual Review Report, in preparation for submission to the Department of Planning and Environment for approval. As part of consultation with the EPA required by SSD-6464 and SSD-6465, I would like to seek a response from the EPA on the review and consultation of the updated Environmental Management Plans mentioned above.

Should you have any questions or wish to obtain further information regarding the above, please contact me on (02) 4993 7334 or 0403 963 081 or via email on gary.mulhearn@yancoal.com.au.

Yours faithfully,

Gary Mulhearn
Environment & Community Manager
Yancoal Mt Thorley Warkworth



DOC18/502102-01, EF16/906 and EF13/3817

Yancoal Mt Thorley Warkworth
Via e-mail at: gary.mulhearn@yancoal.com.au
PO BOX 267
SINGLETON NSW 2330
Attention: Mr Gary Mulhearn

19 July 2018

Dear Mr Mulhearn

**Environment Protection Licences 1376 and 1976
Environment Management Plans**

Reference is made to your letter dated 18 July 2018 to the Environment Protection Authority ("EPA") in relation consultation for Mt Thorley Warkworth's draft noise, air quality, blasting and water management plans.

The EPA encourages the development of such plans to ensure that proponents have met 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/conservation management, not to be directly involved in the development of strategies to achieve those objectives.

The EPA notes that you have not provided us with a copy of the plans, and reminds you that you must comply with your Environment Protection Licences.

If you require any further information regarding this matter please contact Natasha Ryan on (02) 4908 6833.

Yours sincerely

A handwritten signature in black ink, appearing to read "Natasha Ryan".

NATASHA RYAN
Regional Operations Officer
Environment Protection Authority

Phone 131 555
Phone 02 4908 6800

Fax 02 4908 6810
TTY 133 677
ABN 43 692 285 758

PO Box 488G
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Appendix D – Examples of MTW Air Quality Management tools

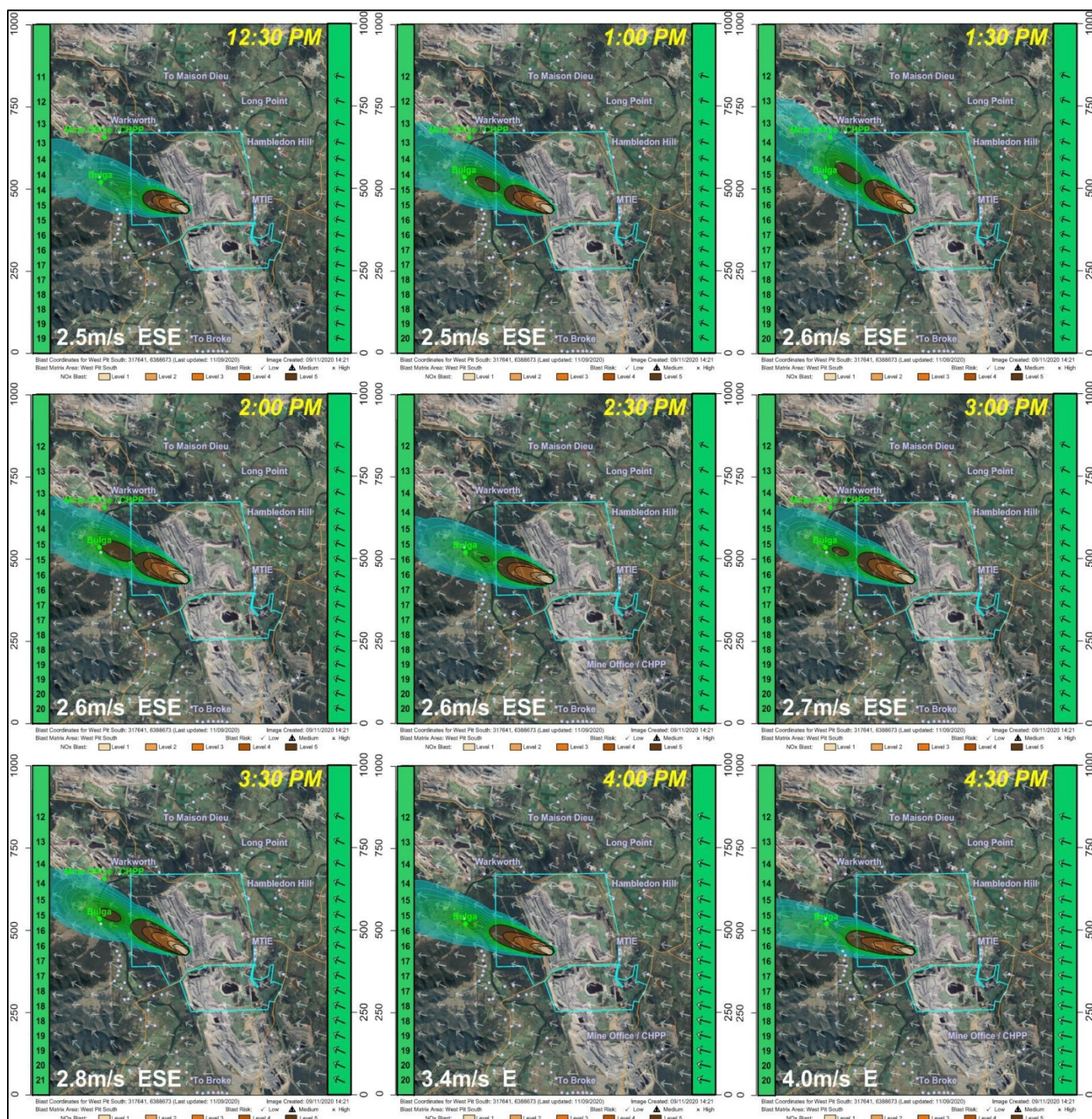


Figure D1 - Blast plume / dust predictive modelling tool

Issued at 6am, 28th June 2018

Muswellbrook LGA Forecast														Next 24hrs (6am-6am)														No Alert Current									
Thursday, 28th June 2018														6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm						
Wind Speed														0.9m/s	0.7m/s	1.0m/s	1.0m/s	2.0m/s	2.7m/s	3.4m/s	3.9m/s	3.7m/s	4.1m/s	3.9m/s	2.7m/s	2.5m/s	1.8m/s	1.4m/s	1.3m/s	1.0m/s	0.8m/s						
Temp														9.4 °C	9.4 °C	10.3 °C	11.8 °C	13.6 °C	15.2 °C	15.7 °C	16.0 °C	16.1 °C	15.9 °C	15.3 °C	13.5 °C	12.0 °C	11.0 °C	9.9 °C	9.0 °C	8.7 °C	8.4 °C						
Lapse Rate /100m														0.81 °C	2.68 °C	0.22 °C	-1.12 °C	-1.46 °C	-1.72 °C	-1.75 °C	-1.76 °C	-1.89 °C	-1.56 °C	-0.94 °C	2.37 °C	2.6 °C	2.62 °C	1.79 °C	0.14 °C	0.74 °C	0.15 °C						
Rainfall														NO	NO	NO	NO	NO	YES	YES	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO					
Friday														12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed														1.1m/s	0.9m/s	0.8m/s	0.7m/s	0.8m/s	0.8m/s	0.9m/s	1.4m/s	1.8m/s	3.0m/s	4.1m/s	4.6m/s	4.9m/s	4.6m/s	4.8m/s	4.5m/s	3.3m/s	2.8m/s	2.1m/s	1.5m/s	1.6m/s	1.4m/s	1.4m/s	
Temp														8.0 °C	7.8 °C	7.5 °C	7.2 °C	7.1 °C	6.9 °C	7.1 °C	6.7 °C	7.6 °C	9.7 °C	12.1 °C	14.1 °C	15.1 °C	16.3 °C	16.9 °C	17.1 °C	16.3 °C	14.4 °C	12.4 °C	11.0 °C	9.6 °C	8.7 °C	8.1 °C	7.7 °C
Lapse Rate /100m														0.1 °C	-0.06 °C	-0.51 °C	0.18 °C	-0.43 °C	-0.5 °C	-0.73 °C	-0.69 °C	-0.82 °C	-1.17 °C	-1.33 °C	-1.46 °C	-1.71 °C	-2.06 °C	-1.96 °C	-1.72 °C	-1.19 °C	2.47 °C	2.48 °C	2.28 °C	2.68 °C	2.18 °C	1.99 °C	1.9 °C
Rainfall														NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Saturday														12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Wind Speed														1.7m/s	1.3m/s	1.3m/s	1.0m/s	1.1m/s	1.3m/s	1.4m/s	1.5m/s	1.9m/s	2.0m/s	2.7m/s	3.7m/s	4.6m/s	4.7m/s	4.4m/s	4.3m/s	4.0m/s	3.2m/s	2.7m/s	1.8m/s	1.2m/s	1.2m/s	0.8m/s	0.7m/s
Temp														7.0 °C	7.0 °C	6.8 °C	6.8 °C	6.8 °C	6.7 °C	6.9 °C	7.2 °C	8.6 °C	10.8 °C	13.5 °C	15.1 °C	16.0 °C	16.5 °C	17.1 °C	17.1 °C	16.6 °C	14.6 °C	12.4 °C	10.6 °C	9.1 °C	7.8 °C	7.1 °C	6.4 °C
Lapse Rate /100m														2.43 °C	2.49 °C	3.3 °C	2.95 °C	2.85 °C	2.7 °C	1.62 °C	1.54 °C	-0.36 °C	-1.21 °C	-1.58 °C	-1.74 °C	-1.63 °C	-1.58 °C	-1.2 °C	-1.13 °C	-0.89 °C	2.73 °C	3.82 °C	3.71 °C	3.79 °C	4.0 °C	3.68 °C	3.47 °C
Rainfall														NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Singleton LGA Forecast														Next 24hrs (6am-6am)														No Alert Current										
Thursday, 28th June 2018														6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm							
Wind Speed														1.0m/s	0.7m/s	0.6m/s	1.4m/s	2.3m/s	2.4m/s	2.3m/s	3.1m/s	2.6m/s	2.3m/s	1.6m/s	0.9m/s	1.1m/s	1.1m/s	1.3m/s	1.1m/s	1.2m/s	1.1m/s							
Temp														10.9 °C	11.4 °C	12.3 °C	13.3 °C	14.2 °C	15.3 °C	16.7 °C	17.7 °C	18.0 °C	17.3 °C	16.7 °C	14.6 °C	12.7 °C	11.4 °C	10.6 °C	10.2 °C	10.0 °C	9.5 °C							
Lapse Rate /100m														5.03 °C	5.06 °C	1.81 °C	-0.16 °C	-1.38 °C	-1.58 °C	-1.63 °C	-1.57 °C	-1.44 °C	-0.53 °C	-0.61 °C	0.35 °C	2.43 °C	3.1 °C	1.85 °C	3.16 °C	1.75 °C	3.53 °C							
Rainfall														NO	YES	YES	NO	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO			
Friday														12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm	
Wind Speed														1.4m/s	1.1m/s	1.5m/s	1.4m/s	1.6m/s	1.7m/s	1.8m/s	1.2m/s	1.4m/s	2.5m/s	3.6m/s	4.5m/s	4.6m/s	5.1m/s	4.7m/s	4.6m/s	3.3m/s	2.2m/s	2.1m/s	2.0m/s	1.8m/s	1.3m/s	1.3m/s	1.3m/s	
Temp														9.4 °C	9.2 °C	9.3 °C	9.1 °C	8.6 °C	8.5 °C	8.4 °C	8.4 °C	8.9 °C	10.6 °C	12.6 °C	14.5 °C	15.9 °C	16.6 °C	16.9 °C	17.0 °C	16.5 °C	14.1 °C	11.9 °C	11.0 °C	9.6 °C	9.1 °C	9.0 °C	8.7 °C	
Lapse Rate /100m														3.39 °C	3.27 °C	2.4 °C	2.86 °C	1.94 °C	3.17 °C	2.05 °C	0.26 °C	-0.66 °C	-1.21 °C	-1.46 °C	-1.63 °C	-1.71 °C	-1.71 °C	-1.61 °C	-1.33 °C	-0.52 °C	2.96 °C	3.3 °C	3.42 °C	4.04 °C	3.86 °C	3.55 °C	3.83 °C	
Rainfall														NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Saturday														12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm	
Wind Speed														1.5m/s	1.3m/s	1.5m/s	1.4m/s	1.6m/s	1.7m/s	1.6m/s	1.3m/s	1.6m/s	2.8m/s	3.6m/s	4.2m/s	4.2m/s	4.5m/s	4.2m/s	3.8m/s	3.2m/s	2.4m/s	2.5m/s	2.3m/s	2.5m/s	2.0m/s	2.1m/s	2.0m/s	
Temp														9.0 °C	8.9 °C	9.0 °C	8.8 °C	8.7 °C	8.4 °C	8.2 °C	8.6 °C	9.8 °C	11.9 °C	13.9 °C	15.8 °C	17.2 °C	17.8 °C	18.0 °C	18.0 °C	17.5 °C	15.2 °C	12.0 °C	10.7 °C	9.0 °C	8.2 °C	7.8 °C	7.5 °C	
Lapse Rate /100m														3.43 °C	3.38 °C	3.07 °C	2.91 °C	2.42 °C	2.18 °C	2.53 °C	2.84 °C	-0.36 °C	-1.18 °C	-1.48 °C	-1.66 °C	-1.72 °C	-1.68 °C	-1.53 °C	-1.26 °C	-0.18 °C	4.41 °C	4.67 °C	4.37 °C	3.75 °C	3.25 °C	2.37 °C	3.04 °C	
Rainfall														NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

ACTIONS

- Communicate forecast to relevant staff
- Consider any preparatory actions required for triggers (e.g. ensure water cart availability; reschedule activities)
- Record any preparatory actions taken.

Figure D2 - Upper Hunter predictive meteorological forecast

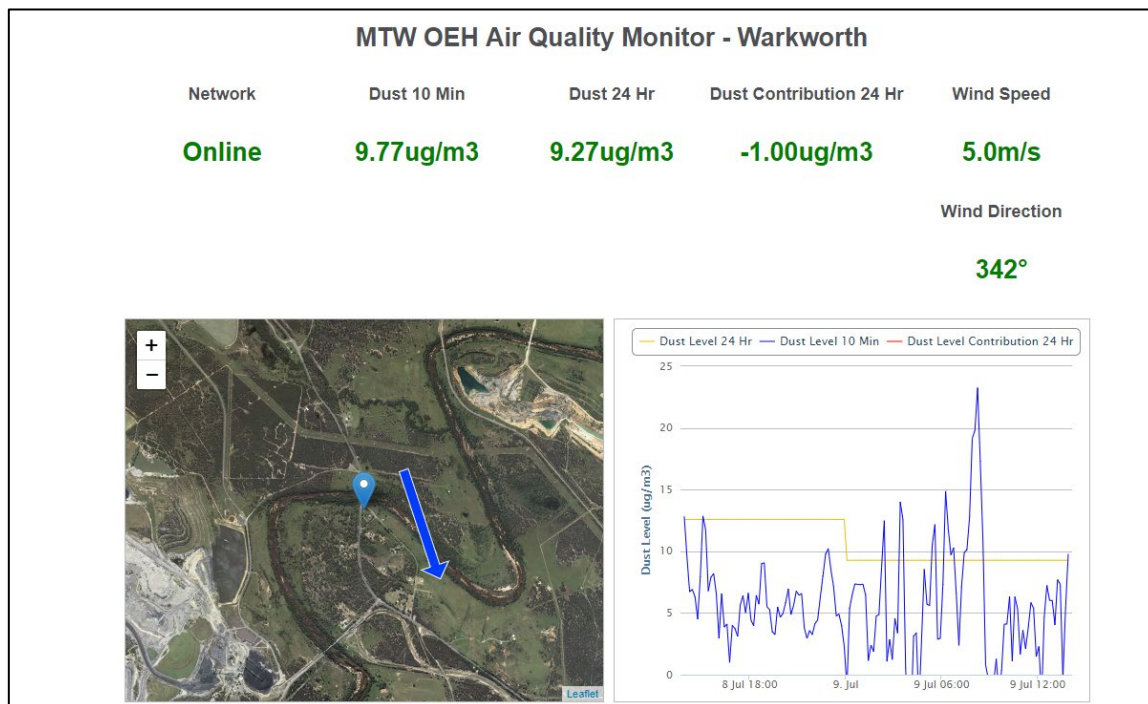


Figure D3 - Example of MTW's real time air quality interface

Dust Alert

[Alerts](#) [Events](#)
[Users](#) [Admin](#)
[Logout](#)

Nag server running

[Delete](#)

Alert Details

Time: 2017/05/12 09:30 AM
Location: Bulga Dust Alarm
Description: PM10 1 hour average > 50ugm3 for last 3 hours
Click Here: <http://hvoenviro.corp.riotinto.org/dust/bulga>

Actions

Event acknowledged 2017/05/12 12:38 PM

2017/05/12 12:38 PM

CRO inspected area at time of alarm. Nil visible dust seen coming from site. Heavy smoke over whole valley due to back burning in area.

Record New Actions

Your Actions

Figure D4 - Example of dust alarm and response

Appendix E – Approval of Management Plan