Muswellbrook Coal Continuation Project

Response to Submissions

Prepared for Muswellbrook Coal Company Limited| 20 July 2016

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Muswellbrook Coal Continuation Project

Final

Report J16011RP1 | Prepared for Muswellbrook Coal Company Limited | 20 July 2016

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1 Introduction

1.1 Overview

Muswellbrook coal mine (MCM) is an open cut coal mine operated by Muswellbrook Coal Company Limited (MCC). MCM is located 3 kilometres (km) north-east of the township of Muswellbrook, in the Muswellbrook local government area (LGA) in New South Wales (NSW).

MCC has development consent from Muswellbrook Shire Council (MSC) to mine within the No. 1 Open Cut Extension Area (Open Cut 1) (Development Consent No. DA 205/2002, as modified), with operations to be completed by 2020.

Additional coal resources have been identified under a previously rehabilitated area adjacent to Open Cut 1. While this area is within the development consent boundary, a modification to the development consent is required to allow mining of these additional resources, as well as extending the approved mine life and modifying the conceptual final landform (the modification). The modification would maximise the recovery of coal resources at MCM and would enable the recovery of approximately 4.2 million tonnes (Mt) of additional coal resources.

A Statement of Environmental Effects (SEE) was prepared by EMM Consulting Pty Limited (EMM) on behalf of MCC to support an application to modify Development Consent No. DA 205/2002 (as modified) under section 96(2) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The purpose of this SEE was to provide information on the modification and allow MSC to assess the projects merits and impacts in order to make a determination on the application, and conditions of such approval if approval is granted. The SEE was also intended to inform the public about the modification so that they could make submissions on its merits or impacts. The SEE was publicly exhibited from 18 May to 15 June 2016.

This response to submissions (RTS) report has been prepared by EMM on behalf of MCC to respond to the matters raised in the submissions.

1.2 Current operations

DA 205/2002 (as modified) includes approval for MCC to extract up to 2 million tonnes per annum (Mtpa) of product coal to the end of 2020.

Open cut mining at MCM commenced in 1944 with the No. 1 Open Cut. This was one of the first open cut coal mining operations in the southern hemisphere. Approval for the No. 1 Open Cut Extension Area (referred to as Open Cut 1) was granted in 2003 and operations commenced in 2005. The No. 2 Open Cut (Open Cut 2) operated from 1965 to 2013, and the Common Open Cut operated in 1992.

All mining operations have concluded except for mining in Open Cut 1 and selective placement of overburden and waste materials in Open Cut 2.

1.3 Proposed modification

The modification involves an extension of open cut mining operations in the development consent boundary to maximise the recovery of coal resources within ML 1304, ML 1562 and CCL 713. The extension would enable recovery of approximately 4.2 Mt of additional coal resources.

In summary, the modification involves:

- extension of open cut mining operations in Open Cut 1;
- extension of the mine life, with operations to cease by the end of 2025;
- changes to the conceptual final landform within the modification area; and
- overburden emplacement in both Open Cut 1 and Open Cut 2, so as to achieve the conceptual final landform.

As the modification involves mining of a previously disturbed area that was used as an overburden dump, there would be no direct impact to previously undisturbed land.

No changes are proposed to the currently approved maximum production rate of 2 Mtpa, mining methods, coal processing, blasting methods, water management, waste management and handling, coal transport, access to site, and employee numbers.

An overview of the approved operations at MCM and key changes proposed as part of the modification are in Table 1.1.

Table 1.1 Overview of approved operations (Development Consent No. DA 205/2002) and the modification

Aspect	Original approval (2002 EIS)	Approved operations, as modified	Modification
Mine life	Completion of coal mining in 2015	Completion of operations by 1 September 2020.	Completion of operations by 2025.
Annual production	Up to 2 Mtpa of product coal.	As per original approval, up to 2 Mtpa of product coal.	No change.
Mining method	Open cut using a shovel/excavator and truck fleet	Open cut using an excavator and truck fleet.	No change.
Mining footprint	Mining within the Open Cut 1 Pit Extension (Area A and B).	Mining within the approved extraction area, including Area C.	Extension of mining in Open Cut 1 to include mining of around 16.5 ha beyond the approved No. 1 Open Cut Extension Area of 160.1 ha. No change to the approved development consent boundary.
Coal processing	ROM coal crushed on-site at the CCP. No washing required and coal sold as ROM coal. All coal is stockpiled prior to transport off site.	ROM coal is crushed on-site in the CCP. High ash coal is washed in the CPP. All product coal is stockpiled prior to transport off site.	No change.
Coal rejects	No coal rejects generated to be disposed of.	Belt press filter used at the CPP to treat fines. Coarse and fine reject material then stockpiled and trucked back to the open cut for disposal with overburden.	No change to the currently approved disposal method. Rejects would continue to be co-disposed with overburden.

Table 1.1 Overview of approved operations (Development Consent No. DA 205/2002) and the modification

Aspect	Original approval (2002 EIS)	Approved operations, as modified	Modification
Overburden	Overburden generally emplaced within the Open Cut 1 void. Inert capping material may be emplaced in the Open Cut 2 void where required for spontaneous combustion management.	Overburden generally emplaced within the Open Cut 1 void. Inert capping material may be emplaced in the Open Cut 2 void where required for spontaneous combustion management.	Overburden emplacement to occur sequentially in the voids of both Open Cut 1 and 2.
Key site infrastructure	MIA, coal crushing plant and CPP (although not used).	MIA, coal crushing plant and CPP. MIA in relocated position from that in the original 2002 EIS.	No change.
Coal transport	Transport of product coal by road to RCT.	Transport of product coal by road to RCT.	No change.
Site access	Access via Muscle Creek Road off the New England Highway and private access road into the mine site.	Access via Muscle Creek Road off the New England Highway and private access road into the mine site.	No change.
Hours of operation	Mining approved 24 hours per day, seven days per week.	Mining approved 24 hours per day, seven days per week. Blasting Monday-Friday, 9,00 am-5.00 pm.	No change.
Employee numbers	Approximately 69 permanent positions and 39 contractors.	Up to 95 full-time equivalents (FTEs) with additional contractors as required.	No change. It is noted that the expected workforce is predicted to be approximately 75 permanent positions with additional contractors to meet operational requirements.
Conceptual final landform and final voids	Final land use comprises a mixture of grazing and woodland, with a vegetation corridor between Bells Mountain and Skelletar Ridge. Two final voids, in Open Cut 1 and 2, with Open Cut 2 remaining open for future access to the Sandy Creek reserves.	Shaped landform with maximum RL of 340 m (Open Cut 2 rehabilitation) and 340 m (eastern emplacement) supporting a combination of approximately 50% pasture and 50% native trees, with a vegetation corridor between Bells Mountain and Skelletar Ridge. Two final voids in Open Cut 1 and 2. Slope of 18 degrees into Open Cut 2 void, with the void remaining open for future access to the Sandy Creek reserves.	Shaped landform with maximum RL of 340 m supporting a combination of approximately 50% pasture and 50% native trees, with a vegetation corridor between Bells Mountain and Skelletar Ridge. Two smaller final voids in Open Cut 1 and 2. Change proposed to the low wall slope into Open Cut 2 void to 14 degrees. Only one highwall will remain in the final landform (in Open Cut 2).

1.4 Proponent

MCM is owned and operated by MCC. MCC is the proponent of the modification.

MCC is a wholly owned subsidiary of Idemitsu Australia Resources Pty Limited (IAR). IAR has been operating in Australia since 1979 and is an Australian subsidiary of Japanese company Idemitsu Kosan Co. Ltd. IAR also has part ownership in other mining operations in NSW and Queensland. IARs combined operations attribute to more than 1,000 jobs and 12Mtpa of thermal and semi-soft coal for export.

1.5 Approval process

Modification to Development Consent DA 205/2002 is sought under the provisions of Section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). MSC is the consent authority for the application.

2 Submissions summary

2.1 Introduction

This chapter summarises submissions received on the SEE for the proposed modification and the approach adopted to respond to matters raised.

2.2 Submissions received

Submissions were received from the following NSW government agencies, local government, authorities and individuals:

- Muswellbrook Shire Council (MSC);
- Department of Planning and Environment (DP&E);
- Environment Protection Authority (EPA);
- NSW Health – Hunter New England Local Health District (NSW Health);
- NSW Department of Industry, Division of Resources & Energy (DRE);
- Roads and Maritime Services (RMS);
- Office of Environment and Heritage (OEH);
- Mine Subsidence Board;
- Ausgrid; and
- six individual community submissions.

MCC acknowledges and thanks all stakeholders for taking the time to review the SEE, and prepare and submit a response.

2.3 Response methodology

All submissions received have been reviewed and matters raised are summarised in Chapter 3 (government agency submissions) and Chapter 4 and Appendix A (individual community submissions).

Matters raised in individual community submissions have been tabulated (Appendix A) and assigned an identification code representing the respondent and matter number for reference purposes. Matters raised have been grouped in categories, for example 'noise' or 'air quality' and addressed in Chapter 4.

The response to submissions has been prepared by EMM, MCC and where required, the technical specialists that undertook the assessments in the SEE. Responses are provided in the following chapters.

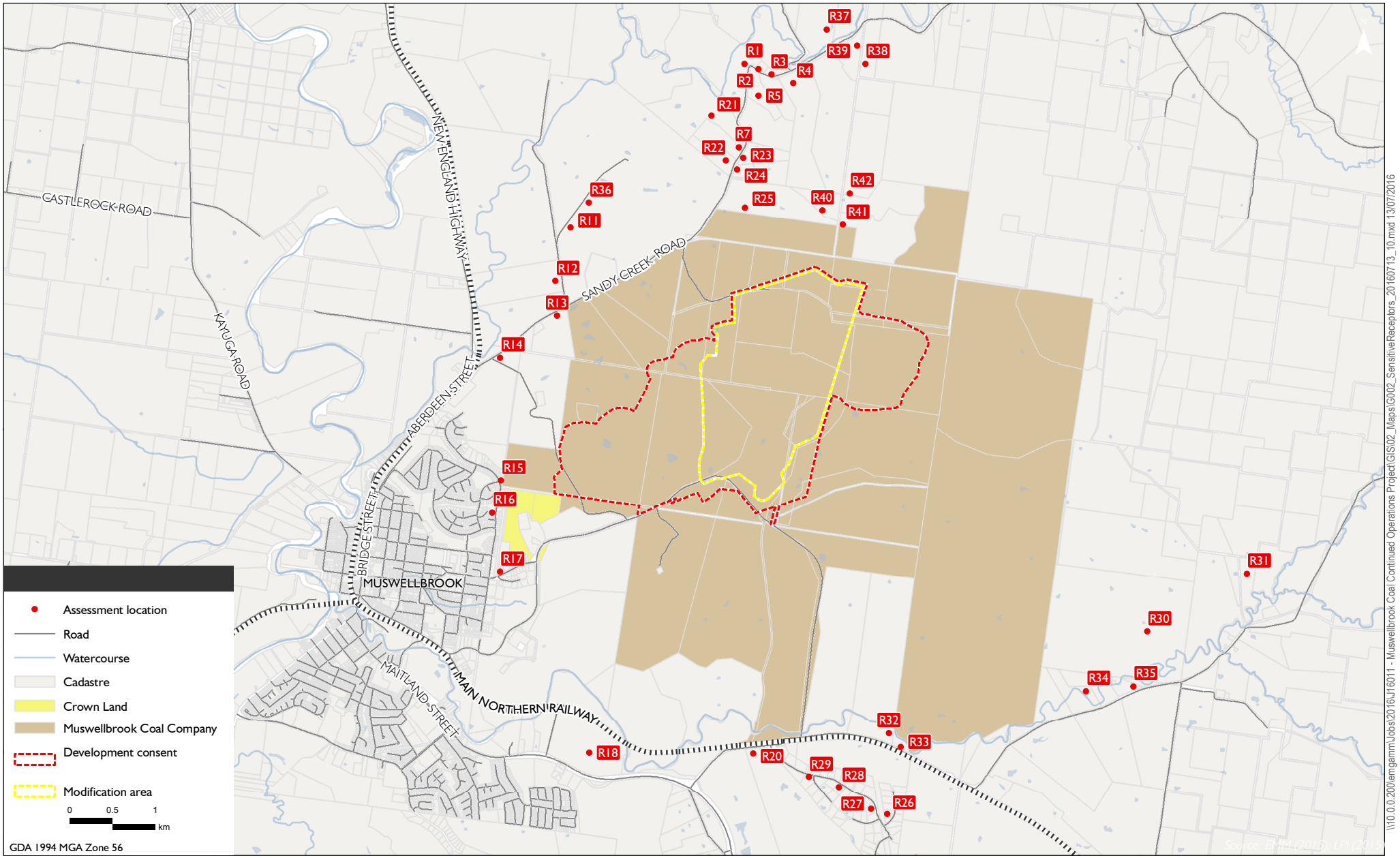
2.4 Identification of additional receptors

One submission identified three receptors to the north of MCM that were not assessed in the SEE. To rectify this, an updated receptor plan is presented in Figure 2.1, with the additional receptors labelled R40, R41 and R42 (located to the north of MCM). An assessment of noise impacts at these newly identified receptors is presented in Appendix B. Consideration of air quality impacts is included in Section 3.1.13.

A summary of predicted noise and air quality impacts at these receptors is included in Table 2.1.

Table 2.1 Predicted impacts at newly identified receptors

Aspect	Predicted impacts
Noise and vibration	Additional noise modelling has been undertaken to assess the noise impacts at these receptors (see Appendix A for the results of noise modelling). Exceedances of up to 5 dB are predicted at two of the three receptors during worst case operations and meteorological conditions. Mitigation measures would be negotiated with the landowners where impacts are predicted to be moderate (ie 3-5 dB above relevant criteria) in accordance with the process outlined in Section 7.1.5 of the SEE.
Air quality	Receptor R40 is estimated to experience maximum 24-hour PM_{10} impacts greater than 50 µg/m³ (maximum of 58.9 µg/m³). It is expected that impacts at R40 would be similar to those at R25 and would exceed 50µg/m³ for up to three days in a year. All other receptors would be below the applicable criteria for particulates emissions.



Land ownership and assessment locations

Muswellbrook Coal Continued Operations Project
Response to submissions
Figure 2.1

3 Government agency submissions

3.1 Muswellbrook Shire Council

MSC provided a submission outlining matters to be addressed by MCC in this RTS. Each of these matters is addressed below.

3.1.1 Void 3

> The SEE states (Section 3.12.3) that the final land use of Void 3 is for waste management. MSC is currently considering their position on this and the matter is on the agenda to be discussed at the July MSC meeting. Should changes to MSC's current position eventuate from this meeting you will be advised after this meeting.

As stated in Section 2.1.2 of the Rehabilitation and Closure Strategy (Appendix B of the SEE), a memorandum of understanding exists between MCC and MSC for the potential future use of the void in the Open Cut 1 rehabilitation area (Void 3) for waste management. Void 3 is excluded from the modification area and is considered to be unrelated to the modification. Notwithstanding, MCC acknowledges MSC's comments regarding Void 3.

3.1.2 Voluntary Planning Agreement

> The component of Condition 11.3 of the consent, relating to the Community Enhancement Program needs to be revised to reflect MSC's current policies. In this regard, there are two options available to MCC. The first is the payment of Section 94A contributions for the development. This amount is calculated on the total estimated cost of the overall project. The second option is to enter into a Voluntary Planning Agreement with MSC. Your response in relation to which option MCC wishes to pursue is required.

MCC is reviewing options in relation to an appropriate mechanism for community contributions. MCC proposes to liaise with MSC further in relation to this matter.

3.1.3 Sandy Creek Colliery

> Section 3.12.3 of the SEE mentions the use of the No. 2 open cut for an approved underground mine. The SEE has been assessed on the assumption that the Sandy Creek Underground mine will not proceed and conditions of consent, if the modification is granted, will prohibit the development of an underground mine within this consent.

MCC holds a separate approval for the development of the Sandy Creek underground mine under DA 86/98, which was granted by MSC in April 1999. Works under DA 86/98 were physically commenced on 5 April 2004. No coal extraction has commenced under this approval to date.

3.1.4 Closure planning

> The Muswellbrook Coal mine is approaching the end of its mine life. This will require the need for detailed closure management plans. This is briefly covered in Section 3.13 of the SEE. The modified consent, if approved, will need to include timeframes for the submission and content of the closure plans. MSC will require MCC to submit suggested dates for the submission of the detailed closure plan and an outline of what is planned to be included.

MCC proposes that the modified consent sets a timeframe for the submission of detailed closure management plans by 31 December 2017.

3.1.5 Mine access

> The SEE does not appear to identify any options available and/or outcomes for the roads that provide access to the Muswellbrook Coal mine. Further, the SEE also needs to include details on the roads which are within the mine and post closure treatments. Whilst a post approval closure plan can include details on the methodology of closure, MSC will need detail on the conceptual plans for road management as a part of this assessment.

The closure requirements are addressed in the Rehabilitation and Closure Strategy (Appendix B of the SEE). Section 5.4.1 of the Rehabilitation and Closure Strategy states:

> MSC and DRE would be consulted regarding existing services and roads (including the private mine access road to Muscle Creek Road) prior to rehabilitation to determine whether these can be used for any potential future land use opportunities.

This would be further addressed in the detailed closure management plan. Roads within the development consent boundary are part of the 'Infrastructure' domain. Therefore, if no beneficial future use for existing roads within the development consent boundary is able to be determined, roads would be subject to the same rehabilitation treatment as carparks and other hardstand areas in the infrastructure domain, and would be decommissioned and rehabilitated in accordance with the domain objectives and completion criteria outlined in Chapter 6 of the Rehabilitation and Closure Strategy.

It is also noted that the private mine access road (from Muscle Creek Road to the site) is subject to a separate development consent (DA 18/88).

3.1.6 Timing of mining and the revised consent period

> The Section 96 application and its supporting SEE requests an extension of the consent to 2025 (Table 4.1)...Section 4.1 states mining is proposed to be completed by 2021. It is proposed that a condition may be placed on the consent, limiting mining (the extraction and sale of coal) to June 2022. It is then proposed to not then place an expiry date on the consent. Whilst much of the closure process will be managed by DRE, as the consent will remain active, MSC can still provide an input for the rehabilitation and monitoring phases until it is agreed the consent can be surrendered.

MCC acknowledges the requirement for MSC to regulate the timeframe for completion of mining. Based on the latest mine planning schedule, MCC requests that MSC specify a completion date for coal extraction of 31 December 2022. Whilst mining is proposed to be completed by early 2022, this would allow some flexibility in the timing of mining activities which may be subject to change to account for inclement weather, geological conditions and market requirements.

There will be an ongoing requirement for blasting operations and for the operation of heavy equipment and earth moving for several years after cessation of coal extraction, associated with final landform establishment and rehabilitation.

3.1.7 Exposed highwall

> It is noted that Void 2 is planned to include an exposed highwall in its completed landform. This is not consistent with MSC policy. In this instance we will recommend to the Councillors that this landform be accepted.

MCC acknowledges MSC's position in relation to this matter.

3.1.8 Composition of the highwall

> The SEE did not contain any information on the composition of the highwall, how much was broken ground and how much was inert material. To better assess the claim there is 32.75 Mbcm of inerts (Section 4.3) and how high blasting will be undertaken in the highwall profile, we would like additional information on the composition of the highwall side of the current mine. Submission of cross sections would also assist in the assessment.

Further analysis of the highwall composition and waste volumes for the additional area to be mined is presented below.

There is a total of 45 million bank cubic metres (Mbcm) of waste to be mined. Of this:

- 19 Mbcm is inert material, which would be excavated from the Open Cut 2 rehabilitation area; and
- 25 Mbcm would be blasted, of which 13.7 Mbcm is inert material above the Fleming seam.

Therefore, it is estimated that there is a total of more than 30 Mbcm of inert waste to cover approximately 13 Mbcm of carbonaceous waste in the Open Cut 1 and Open Cut 2 voids.

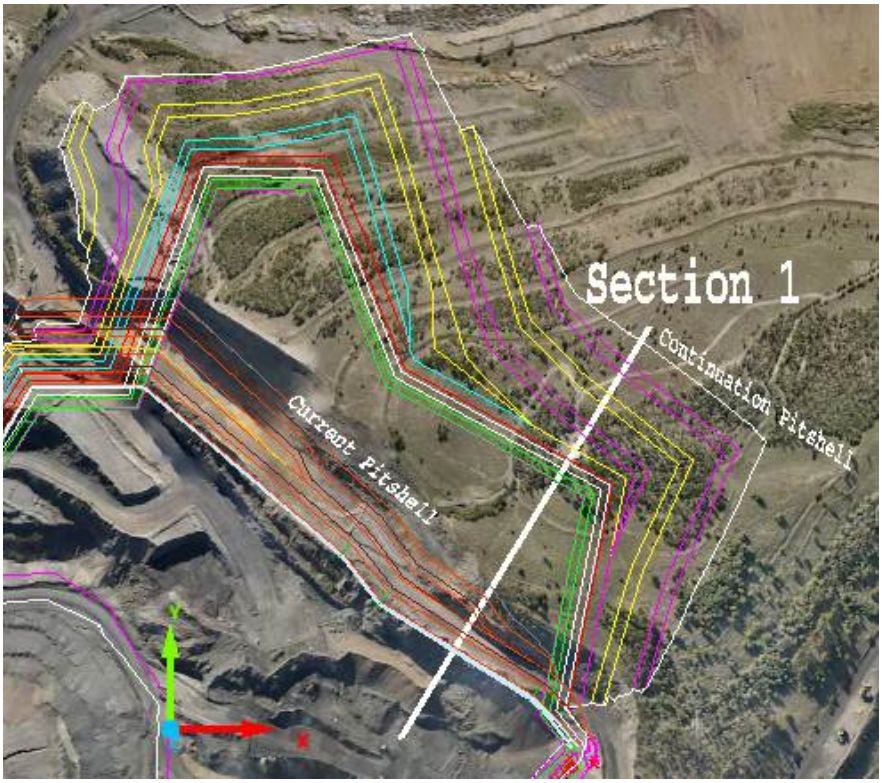
To achieve design slopes of 14 degrees in Open Cut 2, an estimated 9.2 Mbcm of inert waste will be required, which leaves more than 20 Mbcm of inert material to cover the 13 Mbcm of carbonaceous waste. It is also noted that modelling has included an allowance to retain around 2 Mbcm of inert waste in two out of pit dumps, which would act as a contingency to cover any shortfall of inert material during rehabilitation.

In relation to the composition of the material in the overburden emplacement that would be mined (ie the Open Cut 2 rehabilitation area), photographs are provided below. Photograph 3.1 shows the inert material above the Fleming seam in Open Cut 2. The Fleming seam is located at 142.96 RL. The Fleming seam is approximately at the location of the bottom catch bench in the photograph. The mining horizons in this area were from 146 – 196 m. There is no sign of heating in this wall despite it being exposed for more than 10 years. This is the overburden material that was mined initially and placed on the natural surface between the two open cuts, and is the material that MCC plans to rehandle.

Photograph 3.2 shows the inert material from Open Cut 1 that is planned to be mined. There is also no sign of heating in this overburden, or any darker waste that indicates the presence of carbonaceous waste material.

There were also no underground workings in Open Cut 2, so there was no broken coal mined from old roadways that could lead to spontaneous combustion.

As this material is blasted, it is not feasible to drill and take samples to indicate the presence of carbonaceous material in the dump.



Photograph 3.1 **Inert material above the Fleming seam in Open Cut 2**

Photograph 3.2 **Inert material from Open Cut 1**

3.1.9 Rehabilitation drainage

> Figure 4.9 shows the planned drainage design for the rehabilitated mine. In MSC's letter dated 22 December 2015 under 'Rehabilitation' it was requested, among other things, micro-relief and natural drainage lines (and the avoidance of linear drop structures). MSC's requests do not appear to be adequately taken into account in Figure 4.9 and will not be accepted. A revised landform and drainage design is requested.

MCC has re-reviewed its ability to incorporate micro-relief within the modification area, in light of comments in submissions from MSC and other agencies. As described in the SEE and Rehabilitation and Closure Strategy, the final landform will be hydrologically, geomorphically and visually compatible with the surrounding topography and will be designed to be consistent with the adjoining natural landscape.

The SEE committed to, where practical, designing the final landform to take advantage of microrelief through the use of concave slopes to better mimic natural flow patterns. However, it also stated that the volume of overburden material to be emplaced within the modification area and the resulting overall shape of the voids will impose limits on the potential for micro-relief. Consequently, traditional drainage control structures will also be required to safely convey runoff over the final landform and into the relevant water management dams. The Surface Water Assessment (Appendix G to the SEE) stated:

> The final landform will have maximum slope gradients of up to 14 degrees within the final shaped voids with slope lengths of between 200 – 700m from the void crest to the base of the void. It is noted that the lower portion of the voids will fill with water over time...and, as such, the slope lengths will be reduced to a maximum length of approximately 600m.
>
> Based on the principles of the Blue Book, benching (contour banks) would be required at a spacing of 60 – 100m (depending upon the slope gradient) within the voids to safely convey runoff down the slopes. Subsequently, drop structures will also be required to convey concentrated flow captured by these contour banks into the base of the final voids. Without such drainage control structures, it is expected that rilling and gullying would occur on the landform which would destabilise the soils and reduce the overall effectiveness of rehabilitation.

Further review of the final landform has confirmed that MCC's ability to adopt micro-relief across the final landform is restricted, primarily due to the advanced stage of mine plan progression, the volume of overburden to be emplaced, and the spatial, design, stability and safety constraints identified in the SEE associated with emplacement of this overburden and construction of the final landform. These factors prevent the deviation from the use of more conventional methods involving the use of contour drains and drop structures, which are presented in Figure 4.9 of the SEE.

3.1.10 Mine drainage

> The SEE states that all the mine runoff water will be held on site. An assessment of the design (particularly Dams 1 and 2) would indicate that overflows are possible. Further information is required on the storm event the dams have been designed for and where the overflow, if it occurs, will be discharged to.

Water level management within dams is addressed in Section 4.5 of the Surface Water Assessment (Appendix G to the SEE). Dams 1 and 2 currently receive water extracted from licensed bores and the voids, and runoff from the overburden emplacement area between Open Cut 1 and Open Cut 2. The level of stored water is managed in the dams with a transfer pump which supplies water for site's dust suppression operations.

Dams 1 and 2 (approximately 50 ML combined capacity), and the Final Settling Pond, which are the major out-of-pit mine water dams, have pumping infrastructure installed to allow the transfer of water around site for operational and environmental purposes. These dams are maintained at a level which provides for sufficient storage for future rainfall events. The design capacity for each dam is for a 95th percentile, five day rainfall event.

Section 4.5 of the Surface Water Assessment (Appendix G to the SEE) states:

> In the unlikely event that Dam 1 and 2 were to overflow, water would enter the adjacent ephemeral drainage line and would report into Dam 3 further downstream. Downstream from Dam 3, the ephemeral drainage line continues to the west and joins Sandy Creek immediately west of the junction between Sandy Creek and the New England Highway.
>
> In the unlikely event that the Final Settling Ponds were to overflow, water would report to an ephemeral drainage line immediately to the east. The ephemeral drainage line joins Muscle Creek some 1.5km to the south. By monitoring the water level within these dams and adjusting accordingly (through the use of existing pumping infrastructure), MCC will maintain a water level within these dams which minimises the risk of overflow.

3.1.11 Noise management and assessment

i Properties entitled to mitigation

> The SEE indicates that there will be an increase in current noise levels for residents to the north of the mine. Whilst acquisition or mitigation is not mentioned in the report for noise, Section 7.8.4 (ii) mentions "six receptors would experience moderate noise impacts which would require mitigation…". The SEE needs to be clear on how many, and which properties will require mitigation as a result of the noise assessment in the SEE.

Section 7.1.4(i) of the SEE states:

> ...a negligible impact (up to 2 dB above the PSNLs) is predicted at eight assessment locations; a moderate impact (3-5 dB above the PSNLs) is predicted at six assessment locations...

Predicted noise emission levels as a result of the modification at assessment locations with a negligible or moderate impact are provided in Table 3.1, replicated from Table 7.4 of the SEE. Noise emission levels predicted to be above the project specific noise levels (PSNLs) are indicated by shading, and levels above Development Consent No. DA 205/2002 limits are indicated by bold text. It is noted that in reviewing the individual community submissions received, three additional sensitive receptors were identified to the north of MCM. These have been identified as R40, R41 and R42. Additional noise modelling has been undertaken to assess the noise impacts at these receptors (see Appendix A for the results of noise modelling).

Table 3.1 Predicted operational noise levels at assessment locations with a negligible or moderate impact

Assessment location	Predicted operational $L_{Aeq(15\text{-}min)}$ noise levels, dB				Noise criteria, $L_{Aeq(15\text{-}min)}$, dB					
	Day	Day	Evening/ Night	Night	PSNLs			Development Consent		
	Calm	Wind	Calm	Inversion	Day	Evening	Night	Day	Evening	Night
Negligible impact – up to 2 dB above PSNL										
R15	34	**36**	35	37	36	36	35	35	35	35
R16	33	35	34	36	37	37	35	35	35	35
R21	33	36	35	36	35	35	35	-	-	-
R22	35	38	36	38	37	37	37	-	-	-
R23	36	38	37	39	37	37	37	-	-	-
R36	35	37	36	37	35	35	35	-	-	-
Moderate impact – 3-5 dB above PSNL										
R11	35	37	37	38	35	35	35	-	-	-
R12	36	38	37	39	35	35	35	-	-	-
R13	37	40	38	40	37	37	37	40	40	40
R24	37	39	38	40	37	37	37	-	-	-
R25	39	41	39	41	37	37	37	-	-	-
R40	40	42	41	42	37	37	37	-	-	-
R41	40	42	41	42	37	37	37	-	-	-
R44	37	40	38	40	37	37	37	-	-	-

MCC proposes to offer mitigation measures to residences which are moderately impacted, being R11, R12, R13, R24, R25, R40, R41 and R42. Mitigation measures would be negotiated with the landowners in accordance with the process outlined in Section 7.1.5 of the SEE.

ii Changes to noise levels in the consent and EPL

MSC notes that the EPA's response acknowledges a change in noise levels and will require a change to MCC's EPL to acknowledge these changes. MSC suggests that MCC contact the EPA to get advice on what these changes should be and provide a response to MSC. The levels in a revised consent and the EPL will need to be the same.

The noise levels proposed in the modification are the predicted operational $L_{Aeq(15\text{-}min)}$ noise levels presented in Table 7.4 of the SEE, and replicated in Table 3.1 above. MSC will consult with the EPA regarding any necessary amendments to the EPL.

iii Requirement for a Pollution Reduction Program

The SEE indicates that residences to the north are likely to receive elevated and increasing noise levels and will go over the current limits. MSC has reviewed the content and intent of the Acquisition and Mitigation Policy with this in mind (Page 11). It will allow for minor increases where there is a beneficial or negligible change to the noise impact. The Policy then recommends a Pollution Reduction Program (PRP) for noise to be issued by the EPA. MSC requests that MCC make enquiries with the EPA to see if they would be prepared to do this.

The EPA acknowledged the noise levels predicted in the SEE in its submission, and has not identified the requirement for pollution reduction program (PRP). In relation to the predicted noise levels, the EPA's submission states:

> Should the Modification be approved the Licence will need to be varied to reflect the change in noise levels and the changes to monitoring frequency.

Based on the above, it is expected that the MSC as the consent authority would apply new noise levels to the modified development consent, based on the predicted noise levels in the SEE (refer Table 3.1 above), which is consistent with the EPA's intention to similarly vary the EPL. It is noted that all reasonable and feasible mitigation measures have been considered in the noise modelling for the modification to achieve noise level reductions where possible.

iv Real time noise monitoring

> MSC are aware that MCC currently does not have any real time noise assessment of its operations at nearby residences. It is a standard requirement of similar coal mines in the Hunter Valley to have such monitoring and management plans to maximise the benefit of the monitoring. MSC are also aware of the costs involved to set up and run such monitoring and do not require them for now. MSC will require monthly attended monitoring at sites to be identified in a future noise management plan. Should this monitoring indicate sustained exceedances, then our position on real time monitors may need to be changed and they are included in a revised management plan. Following a review of concerns raised by Mr Goodhew and an inspection of attended noise monitoring site in the SEE, some of the identified locations for attended monitoring may need to be moved.

MCC is willing to commit to quarterly attended monitoring as proposed in the SEE. Should monitoring identify an exceedance of the relevant criteria at any location, monitoring frequency would be increased to monthly at that location only until it is demonstrated that the relevant criteria are met.

MCC will consult with MSC and the EPA regarding the relocation of attended monitoring locations as part of an update to relevant management plans, should the modification be approved.

3.1.12 Air quality

i Spontaneous combustion management

> Spontaneous combustion management was identified in MSC's correspondence dated 22 December 2015. It requested an increased focus in this area and additional assessment of the issue needs to be undertaken. This is not evident in the SEE.
>
> MSC notes the response provided by the EPA in their submission and its requirements for further information. We also note the requirement for a "pollution study". Additional conditions may be included in the consent requiring a need to undertake and implement any actions that may result out of the pollution study.
>
> Much discussion has already been had regarding spontaneous combustion between MCC and MSC. Some weeks ago we forwarded a draft consent condition and the requirement for a spontaneous combustion management plan to the satisfaction of MSC. A review of a draft of this document, along with your responses to submissions, should provide adequate information for MSC to make a decision regarding this issue for the modification assessment process.

Spontaneous combustion management was addressed in Sections 3.5 and 4.3 of the SEE, and Section 9.2 of the Air Quality Impact and Greenhouse Gas Assessment (Appendix F of the SEE). A review of current management actions related to spontaneous combustion has been undertaken by MCC, with actions to improve management outcomes for spontaneous combustion proposed in Table 3.2.

Table 3.2 Current and proposed management actions related to spontaneous combustion

Current action	Proposed action
The Spontaneous Combustion Management Plan is developed internally and is approved by DRE.	The Spontaneous Combustion Management Plan will be developed internally, will be reviewed by a spontaneous combustion expert and will be approved by MSC.
An annual mining plan is produced, however, a technical review by a spontaneous combustion expert isn't undertaken.	The annual mining plan will be developed in consultation with a spontaneous combustion expert.
A summary of spontaneous combustion management activities is included in the Annual Environmental Management Report.	An annual review of performance will be conducted by a spontaneous combustion management expert with more detailed reporting of spontaneous combustion management activities to be included in the Annual Environmental Management Report.
While the website is updated with environmental data, there is no process in place for regular community updates on environmental performance through community newsletters.	An annual newsletter will be produced summarising environmental performance for the previous reporting period. This will be developed in conjunction with the Annual Environmental Management Report.

It is acknowledged that the EPA intends to vary MCC's EPL to require a pollution study. MCC proposes to use the outcomes of the pollution study to optimise its management of spontaneous combustion. A method for the pollution study will be development in consultation with EPA, NSW Health and MSC.

3.1.13 Dust

i Mitigation measures

MSC are aware that Mr Goodhew raised concerns regarding the dust assessment at his property. Following MSC's receipt of your response to submissions, MSC will need to inspect the area near Mr Goodhew's residence to assess the dust monitoring program. MSC note mitigation is required at residence R25 as identified in the SEE. MSC also require confirmation if other residences will also be affected.

As described above, three additional receptors have been identified that were not assessed in the SEE. These are identified as R40, 41 and R42 (see Figure 2.1). Receptor R40 is estimated to experience 24-hour PM_{10} impacts greater than 50µg/m³. It is expected that impacts at R40 would be similar to those at R25 and would exceed 50µg/m³ for up to three days of the year. Dust levels at all other receptors would be below the applicable criteria.

ii Air quality monitoring network

> MSC note in the EPA's submission they have included the optimisation of particulate monitoring. Discussion and agreement will need to be reached on this matter so the monitor locations can be included in the modified consent.

Variations to the air quality monitoring network requested by the EPA raise issues for compliance, which is currently assessed against criteria applicable at receptors specified in the development consent, rather than at the edge of the active mining areas (which is the EPA's intended location for monitoring as part of optimisation).

MCC has requested guidance from the EPA on the management of this compliance issue, as well as financial matters in respect of changes to the monitoring network. To date, MCC has not received a response on how the issue of compliance with the development consent is to be addressed. Further discussion and advice is required from both MSC and EPA in regards to managing compliance with air quality standards.

> MSC supports the installation of an air quality monitor at location R22.

MCC notes that the SEE proposed an additional monitor near R32, not R22.

3.1.14 Mine access road

> MCC has an obligation under DA 18/1988 to maintain Muscle Creek Road from the internal haul road to the New England Highway. This requirement has not been extinguished and so the requirements in this consent that relate to the mine access road to the south will be brought through to the modified consent.
>
> To update this to current requirements, Council plans to add the following additional condition:
>
> To enable maintenance of Muscle Creek Road to be carried out legally, the applicant must apply for a Section 138 Consent to undertake works on Muscle Creek Road. Such consent will be issued by MSC on an annual basis for minor maintenance works subject to conditions. For major works a separate Section 138 Consent will be required.

Approval is sought for a modification of DA 205/2002, and this would not change or affect existing obligations under DA 18/1988. Notwithstanding, MCC notes that it currently obtains consent under section 138 of the *Roads Act 1993* for works carried out in the road corridor.

3.2 Office of Environment and Heritage (OEH)

The OEH has not identified any matters for which a specific response from MCC is required.

In relation to biodiversity, the OEH noted that it has no statutory role in assessing the modification unless the consent authority (MSC) determines that the impact is likely to significantly affect a threatened species, population, ecological community, or its habitat, as listed under the *Threatened Species Conservation Act 1995*. The SEE stated that there would be no significant impacts on a listed threatened species, population, ecological community, or its habitat.

In relation to Aboriginal cultural heritage, the OEH noted that if the proposal triggers Section 90 of the *National Parks and Wildlife Act 1974* then it will be deemed an 'integrated development' under the EP&A Act and will require consent to knowingly destroy, deface or damage or knowingly cause or permit the destruction or defacement of or damage to, a relic or Aboriginal place. The SEE stated that the modification would not impact Indigenous heritage. As noted in OEH's submission, if Aboriginal objects are later found works would cease in the vicinity of the find and OEH would be notified.

3.3 Department of Planning and Environment (DP&E)

The DP&E has not identified any specific issues for which a response is required. However DP&E made a number of comments for MCC's consideration. These comments (replicated below) and responses to each are provided in the following sections.

3.3.1 Noise

i Background noise levels

> Council would be advised to carefully consider the justification for using background noise levels measured in 2002, and to seek further clarification on the predicted exceedances of the project specific noise levels and the predicted cumulative noise impacts.

It is expected that background noise levels would not have changed significantly in the area since 2002. However, due to increased traffic and/or development, background levels may have increased slightly in some areas, thus making the project specific noise levels (PSNLs) adopted in the SEE conservative.

ii Noise mitigation entitlements

> The Department notes that six assessment locations are predicted to experience moderate noise impacts (3-5dB above the project specific noise levels) and that some reference has been made to mitigation measures in the social impacts section. The Department recommends that more information is provided to ascertain appropriate entitlements to mitigation rights in line with criteria established under the NSW Integrated Mining Policy on Voluntary Land Acquisition and Mitigation Policy (VLAMP), and to inform the development of relevant conditions of consent.

The VLAMP states that it applies to "development applications and modification applications for mining, petroleum and extractive industry developments, subject to the State significant development [SSD] provisions of the Environmental Planning and Assessment Act 1979". The modification application is not subject to the SSD provisions of the EP&A Act. Notwithstanding, the SEE (and accompanying noise impact assessment (NIA)) does recommend a negotiation process with relevant authorities and community given the predicted moderate noise impacts, which is consistent with methodology outlined in the VLAMP.

Given the limited noise reduction achievable and the relatively short extension of mine life, the on-site noise mitigation options considered were found not to be feasible or reasonable. Hence, the negotiation process would likely result in consideration of acoustic treatments only to adversely affected residential dwellings.

MCC proposes to offer mitigation measures to residences which are moderately impacted, being R11, R12, R13, R24, R25, R40, R41 and R42 (see Section 3.1.11 of this report). Mitigation measures would be negotiated with the landowners in accordance with the process outlined in Section 7.1.5 of the SEE.

3.3.2 Air Quality

> Regarding the predicted exceedance of the cumulative 24-hour average PM10 criteria at assessment locations R24 and R25 on 'two to three additional days of the year', it would be advisable for Council to confirm the total number of exceedances over the life of the development, as this will assist in determining entitlement rights under the VLAMP.

As noted above, the VLAMP applies to development subject to the SSD provisions of the EP&A Act. The modification is not subject to the SSD provisions of the EP&A Act. Therefore, the VLAMP is used as a basis for guidance only.

3.3.3 Rehabilitation and final landform

> The Department supports the SEE's proposed reshaping of the final landform, particularly the backfilling of pits to reduce the size of the voids in Open Cut 1 and 2. Section 4.5.2 of the SEE acknowledges the importance of using micro-relief to better mimic natural drainage patterns and to achieve a final landform that is sympathetic to the surrounding landscape. However, Section 7.3.4 identifies that (due to spatial, design, stability and safety constraints) MCC is proposing to use conventional drainage control structures (such as contour drains and drop structures) in some areas. The Department believes Council's assessment would benefit from the clarification of those areas that will be subject to micro and macro relief, the extent of these works and examples of the relief features that would be used to provide variation to the final landform.

MCC has reviewed its ability to incorporate micro-relief within the modification area, in light of comments in submissions from MSC, DP&E and DRE. Given the advanced stage of mine plan progression and the spatial, design, stability and safety constraints identified in the SEE, MCC is not able to deviate from the use of more conventional methods involving the use of contour drains and drop structures, which are presented in Figure 4.9 of the SEE, to safely convey runoff from the landform.

> With regards to disturbing the partially rehabilitated overburden dump between Open Cuts 1 and 2, the Department is satisfied that the SEE adequately addresses issues related to rehandling of reactive spoil to minimise the risk of spontaneous combustion. Council is advised to also confirm that there is no tailings or reject material in this dump that could result in harmful emissions or leachate if re-handled or moved to the pit voids.

MCC has can confirm there are no tailings or reject material in the overburden dump.

> The Department understands that the Muswellbrook Coal Mine contains limited coal reserves beyond those now proposed for extraction. Consequently, it would be advisable for Council's assessment to include a specific focus on requirements for mine closure, including completion criteria for rehabilitation objectives and future relinquishment issues.

The above comments are acknowledged by MCC. It is noted that MCC has a current Mining Operations Plan (MOP) in place which addresses closure requirements in detail. Additionally, a Rehabilitation and Closure Strategy was submitted as part of the SEE which provides detailed completion criteria to achieve rehabilitation objectives for the modification area. Further, as noted in Section 3.1.4, MCC proposes that the modified consent sets a timeframe for the submission of detailed closure management plans by 31 December 2017.

3.4 Roads and Maritime Services (RMS)

RMS states that it has no objection to the proposed modification provided the following matter is addressed and included in MSC's conditions of development consent:

> The property is within the study area for the Muswellbrook Bypass. The project is at the strategic design stage, with a preferred route having been selected. Any improvements and mining activities are to exclude the area shown hatched on the attached property image (Attachment 1).

Figure 3.1 below presents the property image referred to as Attachment 1 in RMS's submission. The modification area is excluded from the hatched area referred to by RMS. There are already conditions in the consent relating to restricting activities in this area.

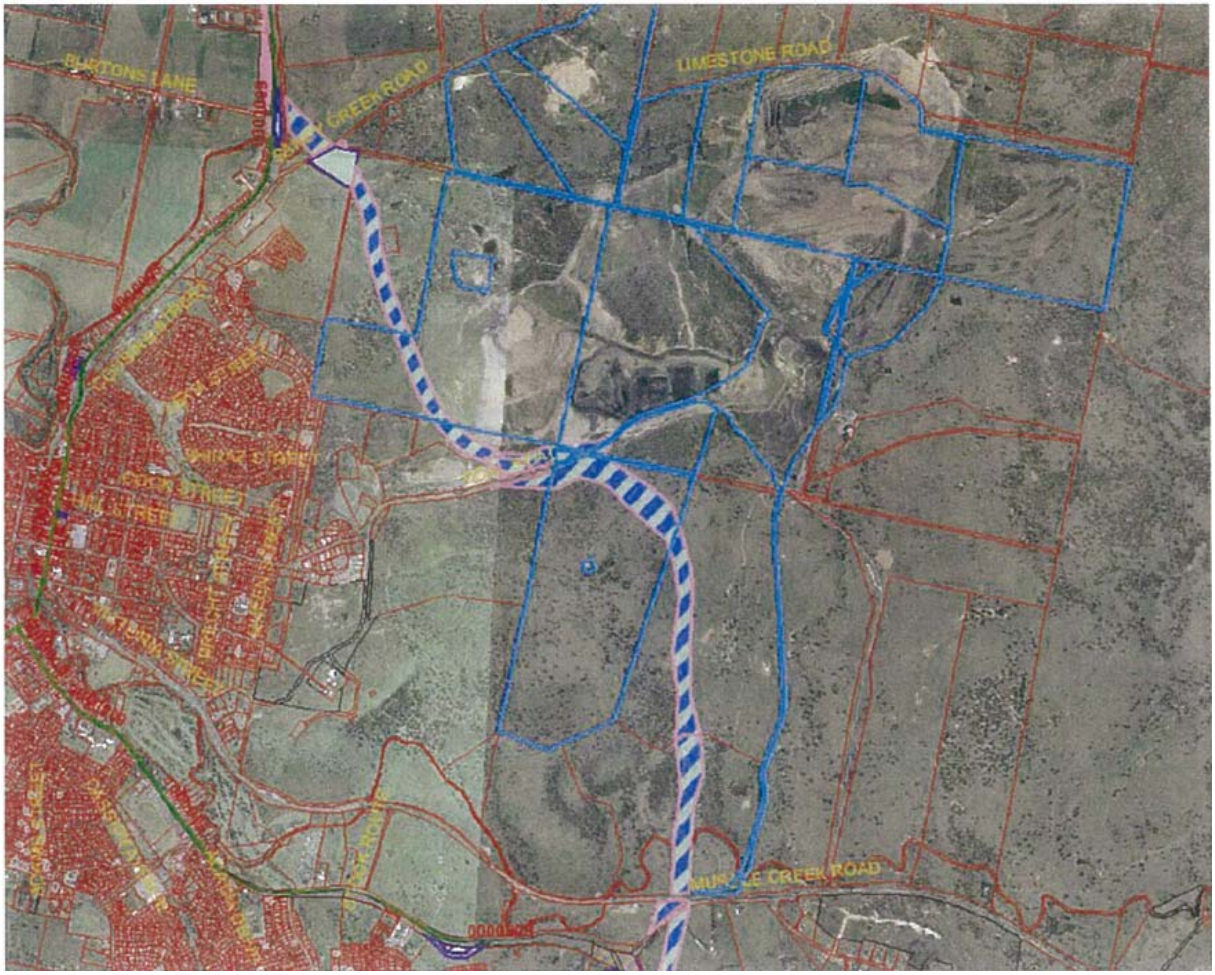


Figure 3.1 RMS exclusion area

3.5 Environment Protection Authority (EPA)

The EPA raised the following matters in its response:

- air quality, including particulate emissions and optimisation of the air quality monitoring network;
- spontaneous combustion; and

- variations required to the EPL in respect of noise, vibration, air quality monitoring, and meteorological monitoring.

There matters are addressed in the following sections.

3.5.1 Air quality

The EPA notes that the AQIA has been carried out generally in accordance with guidance provided in the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (Approved Methods).

i Particulates

The matters raised by the EPA regarding particulates are replicated below, with responses provided to each matter.

> Pro-active and re-active dust mitigation strategies are listed within the AQIA, but no commitment is made to implementing them.

Section 7.2.5 of the SEE states that the existing air quality management system described in MCM's Dust Management Plan would continue to be implemented under the modification, and explicitly states that this includes the implementation of both reactive and proactive management techniques to reduce dust. MCC commits to continuing to implement its Dust Management Plan under the modification.

> Annual average PM2.5 currently exceeds the criterion and mine operation will exacerbate this.

The National Environment Protection (Ambient Air Quality) Measure (NEPM) reporting standard for annual average $PM_{2.5}$ is shown to exceed the goal of 8µg/m³ at the Muswellbrook monitor in 2013, 2014 and 2015 (refer to Section 4.3.4 of the Air quality Impact and Greenhouse Gas Assessment prepared for the modification (TAS 2016)). A seasonal trend is seen in the monitoring data which is identified to be governed by non-mining sources such as domestic wood burning.

Due to the large contingent of domestic wood heaters in the Muswellbrook area which influence the measured $PM_{2.5}$ background level, these levels would not be applicable for areas outside of Muswellbrook where wood heaters are more spatially distributed. Applying a background level exceeding the goal of 8µg/m³ would mean that all predictions at assessment locations would exceed the NEPM goal, which would not occur in practice. As the majority of assessment locations considered in the AQIA are not located within Muswellbrook area, these locations are likely to experience lower $PM_{2.5}$ background levels and therefore the background levels at Muswellbrook would not be representative.

As such, for this assessment background air quality levels which are not influenced by domestic wood heater emissions in Muswellbrook have been applied in the assessment. This background level was taken from an air quality assessment using monitoring data from other stations in the general area.

ii Optimisation of particulate monitoring

The matters raised by the EPA regarding particulate monitoring are replicated below, with responses provided to each matter.

> The EPA would like to bring to Council's attention that draft notice 1535476 to vary the licence for the purpose of optimising the air quality monitoring network was sent to MCC on 18 November 2015...the EPA intends to no longer require mines to monitor air quality at nearby residences, but instead monitor at locations near the edge of each mine site. Monitoring is to be both upwind and downwind of the mine site to align with the predominant wind direction...The EPA is currently negotiating the variation with MCC, however the EPA considers that the proposed modification has not discussed or taken the optimisation of the air quality monitoring requirements into account.

The optimisation of the air quality monitoring network is not a matter specifically related to the modification. As noted by the EPA, a variation is being negotiated separately, irrespective of the modification. Furthermore, the modification does not propose a significant change to operations that would affect negotiations.

MCC stated in correspondence to the EPA (dated 21/12/15) that the variations to the monitoring network requested by the EPA raise issues for compliance, which is currently assessed against criteria applicable at receptors specified in the development consent, rather than at the site boundary. MCC has requested guidance from the EPA on the management of this compliance issue, as well as financial matters in respect of changes to the monitoring network. To date, MCC has not received a response on how the issue of compliance with the development consent is to be addressed.

iii Spontaneous combustion

> Section 9.2 of the AQIA discusses spontaneous combustion and details proposed management for the new mining area. Management is based on recent research, being the ACARP project 1609...The approach is comprehensive but has not been assessed for efficacy. Further information is needed to establish that the proposed approach is able to meet environment goals. Current operations have generated numerous odour complaints, so evidence is needed of improvement in current operation, reduced risk in the new area, or both.

It is acknowledged that there has been a recent modest increase in the number of complaints relating to spontaneous combustion and associated odours and air quality impacts. MCC has reviewed its management of spontaneous combustion on site and has proposed a number of actions to be implemented as a result (see Table 3.2).

It is noted that, based on a review of MCC's complaints database in light of the recent increase in complaints relating to odour from spontaneous combustion (see Figure 3.2), it is evident that seasonal factors may play a role in the perceived impacts. Increases in complaints are observed in the months of late autumn, winter and early spring. Therefore, the recent increase in complaints is not inconsistent with observations from previous years. Nevertheless, MCC acknowledges the concerns of the community and regulatory agencies and is working to address the matter in consultation with relevant agencies.

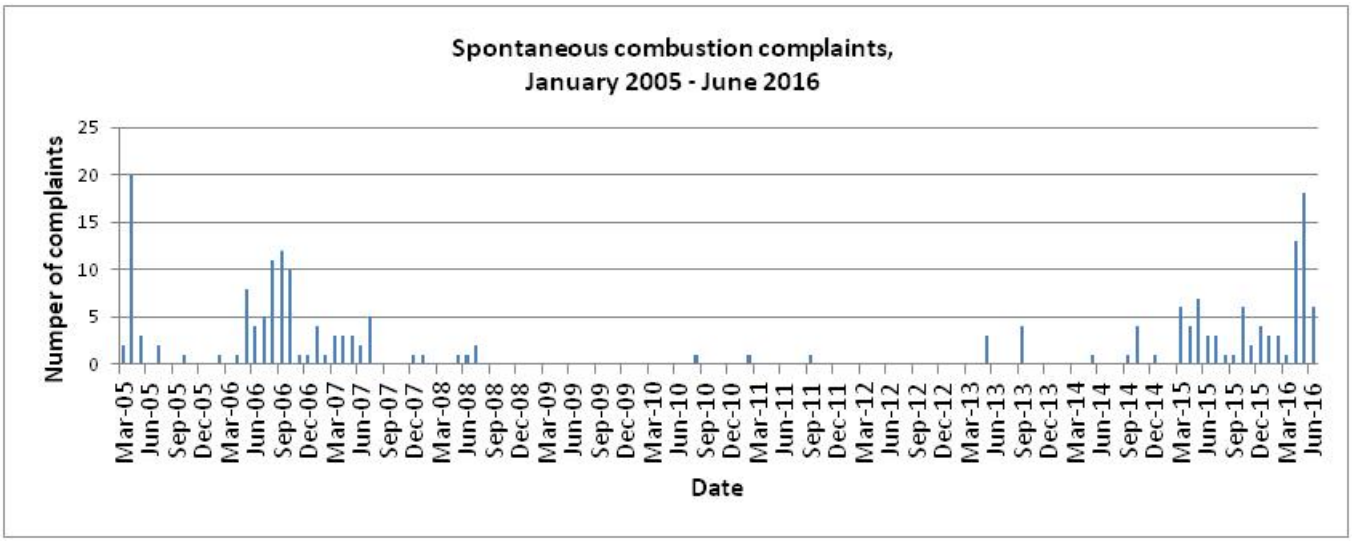


Figure 3.2 Spontaneous combustion complaints, January 2005 - June 2016

> Please note the EPA issued an Official Caution to MCC on 21 June 206 for an offence under section 129 of the Protection of the Environment Operations Act 1997 (POEO Act) for causing or permitting offensive odours to be emitted from a licenced premises on 29 May 2016 and which impacted members of the community. It is the EPA's intention to vary the license to require MCC to undertake a 'Pollution Study' to assess the impact of spontaneous combustion related gases and odours on sensitive receptors. The methodology of the Pollution Study will be drafted in consultation with Hunter New England Health, MSC and MCC.

The intention of the EPA to vary the EPL is acknowledged by MCC. MCC will liaise with EPA regarding the methodology of the pollution study to assess the impact of gases and odours resulting from spontaneous combustion.

> Furthermore the EPA is aware that the spontaneous combustion odour and air quality issue is of particular concern to the Muswellbrook community. The EPA's environment line has received 32 complaints relating to spontaneous combustion odours emitted from the premises between April 1 2016 and 17 June 2016.

The complaints received during the abovementioned period by the EPA are acknowledged. MCC has liaised with both the EPA and MSC in relation to further investigation of potential odour and air quality impacts related to spontaneous combustion.

3.5.2 Noise

> The current licence requires MCC to submit a noise compliance assessment report to the EPA on an annual basis with the Annual Return as set out in Condition R1. The condition does not stipulate the frequency of monitoring required. As detailed in the SEE, MCC proposes to increase frequency of attended noise monitoring from twice a year to quarterly.
>
> Should the modification be approved the licence will need to be varied to reflect the change in noise levels and the changes to monitoring frequency.

MCC acknowledges the changes required to the EPL, should the modification be approved.

3.5.3 Vibration

The matters raised by the EPA regarding vibration are replicated below, with responses provided to each matter.

> The blasting conditions require some variation to reflect the current standard blasting conditions that the EPA is rolling out across the industry. The EPA is likely to include these conditions in the next variation regardless of whether the proposal is approved. These include but are not limited to:
>
> - Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
> - Blasting at the premises may only take place between 9:00am-5:00pm Monday to Friday. Blasting is not permitted on public holidays.
> - Blasting outside of the hours specified in <insert condition number for line above> can only take place with the written approval of the EPA.
> - Instrumentation used to measure and record the airblast overpressure or ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006.
> - Note: A breach of the licence will still occur where airblast overpressure or ground vibration levels from the blasting operations at the premises exceeds the limit specified in conditions <insert relevant condition numbers> at any "noise sensitive locations" other than the locations identified in the above condition.

MCC acknowledges the changes required to the EPL, should the modification be approved.

3.5.4 Meteorological monitoring

> The EPA requires measurement of atmospheric inversions as a lapse rate in degrees Celsius per 100m. The SEE indicates that noise predictions were made for F stability class conditions. The EPA notes that should the modification be approved, the license will need to be varied to require measurement of sigma theta, allowing derivation of stability class. The license will also be varied to specify the location of the onsite station as a monitoring point.

MCC acknowledges the changes required to the EPL, should the modification be approved.

3.5.5 Environment protection licence

The EPA notes that, should the modification be approved, it is the responsibility of MCC to apply for a variation to the licence. MCC would apply for a variation to the EPL, should the modification be approved.

3.6 NSW Health – Hunter New England Local Health District

3.6.1 Air quality

The matters raised by NSW Health regarding air quality are replicated below, with responses provided to each matter.

> On 15 December 2015, the National Environment Protection Council (NEPC) agreed to vary the National Environment Protection (Ambient Air Quality) Measure (NEPM). The amending instrument took effect on 4 February 2016. The SEE uses the previous standard for PM_{10} of 30µg/m^3 annual average.

It is acknowledged that the NEPM standard has been amended. The goals established in the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (DEC 2005) was adopted for the purposes of the assessment. It is noted that the predicted emission concentrations presented in Appendix D of the *Air Quality Impact and Greenhouse Gas Assessment Muswellbrook Coal Continuation Project* (Todoroski Air Sciences 2016) (the AQIA) also meet the NEPM standard for PM_{10} of 25 µg/m^3 annual average.

3.6.2 Spontaneous combustion

The matters raised by NSW Health regarding spontaneous combustion are replicated below with a response provided.

> Ensuring that current operations and future proposed modifications do not further exacerbate spontaneous combustion emissions is imperative. Staff from this office have been in consultation with staff from EPA in relation to requirements for a pollution study at Muswellbrook Coal regarding spontaneous combustion issues at this mine. A suite of monitoring which includes SO2, H2S, PM10, PM2.5, and possibly NOx, would be appropriate for this situation. Monitoring would need to be sensitive enough to detect impacts on the most sensitive community members, for example asthmatics.

As discussed in Section 3.4.1(iii), the EPA has indicated its intention to vary MCC's EPL to require a pollution study in response to spontaneous combustion-related complaints. Regarding the suite of monitoring to be undertaken as part of the pollution study, MCC will continue to liaise with the EPA, NSW Health and MSC regarding the methodology for the pollution study, including monitoring parameters and locations.

3.6.3 Noise

The matters raised by NSW Health regarding noise are replicated below, with a response provided.

> The noise modelling data presented in the SEE indicates that no private residences will experience exceedances of noise criteria of greater than 5 dB(A) which would have triggered acquisition rights. There are, however, 6 private residences that will experience exceedances of 2-5 dB(A) above the PSNL, placing them in the noise management zone.
>
> The NSW Industrial Noise Policy details the response and mitigation measures required when noise trigger levels are met or exceeded. Effective community consultation is required throughout the project to facilitate public involvement and to allow for the community to participate in the mitigation selection process.

MCC acknowledges the need for community consultation, and specifically, the need for consultation directly with those residents directly impacted by the predicted exceedances. Should the modification be approved, MCC would consult directly with the affected residents regarding the process for mitigation selection.

3.6.4 Blast fume emissions

The matters raised by NSW Health regarding blast fume emissions are replicated below, with a response provided.

> In February 2015 the NSW Environment Protection Authority (EPA) announced the introduction of new conditions for open cut coal mines in NSW prohibiting the emission of blast fumes that are likely to cause offence to members of the public. The new licence condition states: "offensive blast fume must not be emitted from the premises". We emphasise the need to ensure strict control of blast conditions to protect the public from blast fume emissions.

MCC acknowledges the requirement to strictly control blast conditions to minimise blast fume emissions. Section 8 of the AQIA (Appendix F to the SEE) included an assessment of blast fume emissions and provided an overview of the management blast fume emissions. As stated in the AQIA and SEE, MCC implements a Blast-Vibration Management Plan (BVMP) which guides the management of blasting operations so they comply with relevant requirements particularly noise, overpressure, vibration, blast fume and dust effects. Blast-related air quality impacts are also addressed in the Dust Management Plan implemented by MCC.

Measures for drill and blast activities are outlined in the BVMP and Dust Management Plan to assist with the prevention of fume and odour generation. Management includes a focus on drill-hole placement, management of surface and ground water in the drill holes, loading of explosive material and stemming material to contain the blast.

The BVMP also applies a pre-blast environmental checklist procedure to guide operators on the suitability of various factors including the current weather conditions for blasting. The BVMP takes into consideration meteorological factors such as wind speed and direction which can affect the scale of potential blast impacts at assessment locations. In accordance with the BVMP and Explosives Management Plan, all blasts are video recorded, and each blast is rated for dust and/or fume using the visual gases rating scale from the Australian Explosives Industry and Safety Group Code of Practice for oxides of nitrogen (NOx). In the last 12 months all blasts have been rated as 0 (the lowest ranking) and as the material in the modification area is the same as the material currently being mined fume from blasting activities is not expected to be an issues in the modification area.

3.7 NSW Department of Industry, Division of Resources & Energy

DRE raised matters in its submission regarding rehabilitation and mine closure. Information responding to matters raised by DRE is provided in the sections below.

3.7.1 Consultation

DRE raised concerns in its submission that MCC had not consulted DRE regarding the requirements for the SEE (ie SEARs were not issued by DRE). DRE's submission states:

> The Proponent did not consult with the Division regarding requirements for the SEE (i.e. SEARS were not issued by the Division).

In respect of requirements for the SEE, the modification is sought under section 96(2) of the EP&A Act, and MSC is the consent authority. As the modification is not sought under Part 4, Division 4.1 of the EP&A Act (ie state significant development provisions), SEARs were not required to be issued. The MSC issued its requirements for the SEE in a letter dated 22 December 2015.

Subsequent to the SEE requirements being issued, MCC consulted directly with DRE. As stated in Section 6.2 (Table 6.1) of the SEE, MCC met with DRE personnel at DRE's offices in Maitland on two occasions, 21 January and 18 March 2016, to brief DRE on the proposed modification and discuss DRE requirements for the SEE. The relevant sections from the SEE are replicated below in Table 3.3.

Table 3.3 Consultation with DRE

Date	Description	Key issues for consideration	Section addressed in the SEE
21 January 2016	Meeting with DRE personnel in Maitland offices to give an introductory presentation on the modification and to get initial feedback on the proposal.	Key issues raised – visual impacts of operation including final landform, request for natural and useable final landform, aim for 10^{o} slopes in overburden areas, detailed rehabilitation designs in SEE, include basic economic assessment and resource utilisation information, not looking at significance of resource due to small nature of modification.	Visual impacts – Section 7.6. Final landform – Section 4.5, 4,6 and Appendix B Economic impacts – Section 7.7 and Appendix I.
18 March 2016	Meeting with DRE personnel in Maitland offices to provide information on options assessment for the final landform and MCC's preferred final landform.	Key issues raised – proposed final land use (no change to currently approved land use), final water level in voids, management of spontaneous combustion in highwalls, drainage controls on rehabilitation and clearly defined detail around the final landform.	Final landform and land use – Section 4.5 and 4.6 and Appendix B Spontaneous combustion – Section 3.5 and 4.3

3.7.2 Final land use and completion criteria

> More defined development of the sustainable final land uses are to be included that outline specific and measurable completion criteria such as land capability for grazing/pasture and target vegetation community type to be achieved for native vegetation woodland;

The approved conceptual final land use for the site comprises a combination of approximately 50 % pasture and 50 % native trees with a vegetation corridor between Bells Mountain and Skelletar Ridge. The proposed modification only affects a portion of the development consent boundary (ie the modification area). Rehabilitation is well progressed within parts of development consent boundary, and given the advanced stage of mining and limited life of mine, no changes are proposed to the overall final landform and land use.

The current approved MOP has been prepared for the period 2015-2020 and addresses closure requirements, final landform and land use. In relation to the modification area, the completion criteria for the final landform are detailed in the Rehabilitation and Closure Strategy which was included as Appendix B to the SEE, and remain consistent with the approved MOP.

i Completion criteria

The Rehabilitation and Closure Strategy included a detailed description of specific and measureable completion criteria for the modification area. Chapter 6 of the Rehabilitation and Closure Strategy included specific completion criteria for each stage of rehabilitation through to the Ecosystem and Land Use Sustainability Phase. The domain objectives and completion criteria for grazing/pasture and native vegetation presented in Chapter 6 of the Rehabilitation and Closure Strategy is replicated in Table 3.4.

Table 3.4 Rehabilitation objectives for ecosystem and land use sustainability phase for rehabilitated pasture and native vegetation domains

Domain	Domain objective	Performance indicator	Completion criteria
Rehabilitation Area – Pasture	Landforms, soils, hydrology and flora require no greater maintenance than the surrounding land. Rehabilitation is self-sustaining and ecologically diverse. Sustainable grazing of rehabilitation areas is maintained. Runoff water quality is considered clean. Final land use is not compromised by spontaneous combustion.	Rehabilitation areas require no greater maintenance than the surrounding land. Weeds are appropriately controlled and not impacting on rehabilitation areas. Species diversity consistent with relevant analogue sites. Vegetation is self-sustaining. The grazing land is productive and is economically and environmentally sustainable. Water quality monitoring results show the water is suitable for beef cattle consumption. Rehabilitation areas are not being adversely affected by spontaneous combustion.	The maintenance program on the rehabilitation areas is comparable to the maintenance program on surrounding land. Monitoring confirms, that after 5 years from planting, weeds represent <10% of total plant species and <10% of total plant cover or are comparable to analogue sites. Monitoring confirms that, after 5 years from planting, >80% of total plant species in rehabilitation areas are present in analogue sites. Monitoring confirms: - evidence of new growth of endemic species; - evidence of successive generations of endemic species; and - no further active weed control required (beyond that considered necessary at analogue sites). The stocking rates on the rehabilitated land are consistent with stocking rates on similar quality lands in the region. Water quality is suitable for livestock consumption. No visual evidence of spontaneous combustion.
Rehabilitation Area – Trees	Landforms, soils, hydrology and flora require no greater maintenance than the surrounding land. Rehabilitation is self-sustaining and ecologically diverse. Runoff water quality is considered clean. Final land use is not compromised by spontaneous combustion.	Rehabilitation areas require no greater maintenance than the surrounding land. Weeds are appropriately controlled and not impacting on rehabilitation areas. Species diversity consistent with relevant analogue sites. Vegetation is self-sustaining. Highly mobile fauna species are utilising the rehabilitation areas as wildlife corridors Water quality monitoring results show the water is suitable for beef cattle consumption. Rehabilitation areas are not being adversely affected by spontaneous combustion.	The maintenance program on the rehabilitation areas is comparable to the maintenance program on surrounding land. Monitoring confirms, that after 5 years from planting, weeds represent <10% of total plant species and <10% of total plant cover or are comparable to analogue sites. Monitoring confirms that, after 5 years from planting, >80% of total plant species in rehabilitation areas are present in analogue sites. Monitoring confirms: - evidence of new growth of endemic species; - evidence of successive generations of endemic species; and - no further active weed control required (beyond that considered necessary at analogue sites). Monitoring confirms that, after 10 years from planting, the number of highly mobile fauna species in rehabilitation areas are within 10% of the species in the analogue sites. Water quality is suitable for livestock consumption. No visual evidence of spontaneous combustion.

ii Pasture

In relation to DRE's comments on the land capability for grazing/pasture to be achieved, the Soils Assessment included as Appendix C to the SEE concluded that the land within the modification area had a land soil capability (LSC) of Class 6, and that no changes to the final LSC of the final landform would occur in the modification area as a result of the modification. In relation to Class 6 land, the guideline *The land and soil capability assessment scheme: second approximation* (OEH 2012) states:

> This land requires careful management to maintain good ground cover (maintaining grass or cover taller than 8 cm is a guide). Grazing pressures need to be lower than those used on Class 4 and 5 land. Rotational grazing systems with adequate recovery time for plant regrowth are essential. It is important to minimise soil disturbance, retain perennial ground cover and maintain high organic matter levels.

Section 5.3.4(ii) of the Rehabilitation and Closure Strategy appended to the SEE provides a description of the pasture mixtures used in rehabilitation. The species mix has been based on the pasture establishment recommendations for the Hunter Valley in the book *Mine Rehabilitation: A Handbook for the Coal Mining Industry* (Hannan, J.C. 1995). This seed mix has been modified over time based on site experience and monitoring results.

iii Native vegetation

In relation to DRE's comments on the target vegetation community type to be achieved for native vegetation woodland, Section 5.3.4(i) of the Rehabilitation and Closure Strategy appended to the SEE provides a description of the ecosystem establishment phase, including target vegetation communities. Species selection is designed to promote the development of forest and woodland with structured understorey, mid-storey and tree canopy coverage. This will enhance overall biodiversity values and promote survival of these vegetation types in the post-mining landscape.

Tree seed mixtures generally contain a combination of Acacia and Eucalypt species. Native vegetation areas are an important component of the site rehabilitation strategy for MCC with woodland corridors planned to provide connectivity with surrounding vegetation. Trees provide a stable long term landform and add to the visual amenity of the surrounding area. Trees also provide the necessary habitat for the reconstruction of valuable ecosystems that assist in the re-colonisation of fauna across the mine site and provide a corridor for movement into adjacent remnant vegetation.

A review of the native vegetation seed mix was undertaken in 2015, with the recommended native vegetation seed mix listed in Table 5.5. The native vegetation seed mix is based on species that were present in the area prior to mining and is based on the Central Hunter Grey Box-Ironbark Woodland.

3.7.3 Modelling of final landform

> 2. Provide detailed modelling of the final land form that address the following key issues:
>
> a. The integration of a natural landform, with macro and micro-relief integrated into the final landform;
> b. Maximise opportunities for external drainage away from final voids;
> c. Minimise reliance on linear drop structures;

As described in the SEE and Rehabilitation and Closure Strategy, the final landform will be hydrologically, geomorphically and visually compatible with the surrounding topography and will be designed in sympathy with the adjoining natural landscape.

The SEE committed to, where practical, designing the final landform to take advantage of microrelief through the use of concave slopes to better mimic natural flow patterns. However, it also stated that the volume of overburden material to be emplaced within the modification area and the resulting overall shape of the voids will impose limits on the potential for microrelief. Consequently, traditional drainage control structures will also be required to safely convey runoff over the final landform and into the relevant water management dams. The Surface Water Assessment (Appendix G to the SEE) stated:

> The final landform will have maximum slope gradients of up to 14 degrees within the final shaped voids with slope lengths of between 200 – 700m from the void crest to the base of the void. It is noted that the lower portion of the voids will fill with water over time...and, as such, the slope lengths will be reduced to a maximum length of approximately 600m.
>
> Based on the principles of the Blue Book, benching (contour banks) would be required at a spacing of 60 – 100m (depending upon the slope gradient) within the voids to safely convey runoff down the slopes. Subsequently, drop structures will also be required to convey concentrated flow captured by these contour banks into the base of the final voids. Without such drainage control structures, it is expected that rilling and gullying would occur on the landform which would destabilise the soils and reduce the overall effectiveness of rehabilitation.

As described above, MCC's ability to adopt microrelief across the final landform is restricted. Based on further review of the final landform and in consideration of the matters raised by DRE, MCC is likely to be unable to commit to implementing micro-relief to the extent requested by DRE.

> d. Geotechnical risks associated with high wall stability;

A geotechnical assessment would be prepared as part of detailed closure planning. Slope stability is managed in accordance with a Ground or Strata Failure Principal Mining Hazard Management Plan (GSFPMHMP). In accordance with the GSFPMHMP, all highwalls, low walls and dumps are designed by the Technical Services department and a qualified Geotechnical Engineer assesses the designs and approves them, providing guidance in their reports. Regular inspections are undertaken by site personnel and the Geotechnical Engineer. The stability of the highwall in Open Cut 2 is managed through the mining method to a current factor of safety of 1.3. The proposed final highwall for Open Cut 1 will be buttressed by fill required to cover coal seams to manage spontaneous combustion.

An appropriately qualified Geotechnical Engineer will be consulted on final highwall design as part of detailed closure planning.

3.7.4 Ability of final landform to sustain grazing

> e. Risks associated with the stability of the final void slopes and risks associated with the achievement of final landform in regards to its ability of sustaining the intended final land use (i.e. grazing);
> f. Justify that grazing on 14 degree slopes is sustainable long-term; and
> g. Include plans and cross-section to an appropriate scale.

As described in Section 4.7 of the SEE, the final landform design for the modification area focussed on achieving acceptable slopes and void sizes in the two final voids of Open Cut 1 and Open Cut 2 (see Section 3.7.5 below for further discussion). Option 3, which would enable slopes of equal to or less than 14 degrees to be achieved in both Open Cut 1 and 2, resulting in smaller voids in both open cuts, was determined to be the most favourable on this basis compared to the other options considered, in accordance with the requirements of MSC.

The proposed conceptual final landform has been modified from the approved landform such that all slopes, including final void batters, will be equal to or less than 14 degrees, except for the highwall in Open Cut 2, which would be up to 50 degrees.

The guideline *The land and soil capability assessment scheme: Second approximation* (OEH 2012) provides guidance on the slopes associated with respective LSC classes. Slopes of up to 14 degrees are equivalent to slopes of up to 25%. Therefore, some land will be Class 6 (greater than 11.3 degrees or 20%) and some land will be Class 5 (less than 11.3 degrees or 20%).

In the guideline Class 5 land is:

> Eroded lands that require earthworks for rehabilitation are included in this class. This land is usually best suited for grazing, especially with pasture improvement and fertiliser application. Windbreaks and ground cover should be retained in areas prone to wind erosion.

In the guideline Class 6 land:

> ... requires careful management to maintain good ground cover (maintaining grass or cover taller than 8 cm is a guide). Grazing pressures need to be lower than those used on Class 4 and 5 land. Rotational grazing systems with adequate recovery time for plant regrowth are essential. It is important to minimise soil disturbance, retain perennial ground cover and maintain high organic matter levels.

The land class post rehabilitation, regardless of whether it is Class 5 or Class 6 land, is suitable for grazing; however, Class 6 land will require land management and lower stocking rates. As part of its ongoing rehabilitation monitoring of progressive rehabilitation at MCM, MCC implements a rehabilitation monitoring program (refer to Chapter 7 of the Rehabilitation and Closure Strategy, Appendix B to the SEE). Rehabilitation performance is compared to analogue sites as part of the rehabilitation monitoring program. Throughout the remaining mine life and closure activities, MCC will continue to support feasible rehabilitation trials and research projects. Land management to support grazing on rehabilitated land will be reviewed as part of annual monitoring including consideration of:

- erosion control measures; and
- stocking rates.

The rehabilitation monitoring program would continue to be undertaken annually during spring, with results reported in the AEMR. To demonstrate compliance with the completion criteria, monitoring results will be compared to benchmarks derived by MCC through the monitoring of analogue sites, as described in Chapter 7 of the Rehabilitation and Closure Strategy.

3.7.5 Progressive rehabilitation

> 3. Further detail on the proposed mine layout and scheduling with the objective of maximising opportunities for progressive rehabilitation. This should include mapping the proposed rehabilitation schedules against production milestones in order to provide clear means of assessing future compliance with the mining lease and development consent modification in regards to progressive rehabilitation that is undertaken;

The need for progressive rehabilitation of the modification area has been identified. However, given the anticipated schedule of works for mining operations within the modification area, opportunities to adopt this approach will be limited. Nevertheless, progressive rehabilitation is presented on Figures 4.2-4.7 in Chapter 4 of the SEE. These have included progressive rehabilitation to the extent that it has been considered possible based on mine sequencing.

As mining operations progress north into the partially rehabilitated overburden dump, some of the overburden would be hauled to Open Cut 2 for emplacement, and the remainder to Open Cut 1. As mining operations move north in Open Cut 1, small areas would become available for rehabilitation on the southern end of the overburden dump. However, there will be limitations to the availability of these areas due to the necessary storage of inert material. This material will need to be stockpiled at the top of the dumps where it will be used as bulk and pushed over carbonaceous material that would be emplaced in the pit at the conclusion of active mining.

All remaining overburden material that requires disposal will be hauled to Open Cut 2, with the last of the required material dumped into the pit in Year 4. Bulk pushing for rehabilitation will then commence.

> Detailed options analysis of the final void landform that ranks the options to justify the proposed final landform design as opposed to other alternatives considered (e.g. void backfilling, concave final slopes etc.). Include a review of how the final void design has changed from the current approved landform

As part of the project's planning phase, the final landform was a significant consideration during determinations of the conceptual mine plan, overburden emplacement schedule and the sequencing of mine progression. In relation to final void design, MSC specified in its requirements for the SEE (letter dated 22 December 2015) that the EIS is to consider in detail the final void design with specific consideration of:

> Maximising to the greatest extent practicable the final void landform being in keeping with the natural terrain features of the surrounding landscape;
>
> Minimising to the greatest extent practicable:
>
> - the size and depth of the final void
>
> - the drainage catchment of the final void

Therefore, multiple final landform options were considered against the following key objectives:

- achieving acceptable slopes in both Open Cut 1 and Open Cut 2;
- minimising the haulage distance of overburden; minimising the amount of bulk shaping required after the cessation of coal extraction; and
- minimising the size and depth of the voids remaining at the end of mine life.

A brief summary of the options considered has been included in Table 3.3 below. These options were presented to DRE by MCC personnel at a meeting at DRE's Maitland offices and described in Section 4.7 of the SEE.

Table 3.5 Summary of final void landform options

Option	Advantages	Disadvantages
1. Slopes greater than 20 degrees	Involves the shortest haul routes for overburden emplacement Results in the smallest void in Open Cut 2	A large void will remain in Open Cut 1 Poor final void options for Open Cut 1 with slopes of greater than 20 degrees
2. Open Cut 2 at 10 degrees	Small Open Cut 2 void remaining Would achieve the optimal final slope of 10 degrees in Open Cut 2	A large void will remain in Open Cut 1 with voids comprising slopes of greater than 20 degrees Significant bulk shaping of 13 Mbcm at the end of coal extraction will be required
3. Open Cut 2 at 14 degrees	Would enable slopes of less than 14 degrees to be achieved in both Open Cut 1 and 2	Significant bulk shaping of 14 Mbcm at the cessation of mining will be necessary to achieve the 14 degree final slope in Open Cut 1
4. Open Cut 2 at 18 degrees	Results in the smallest void in Open Cut 1	Would leave a steep slope of 18 degrees in Open Cut 2 Results in a larger void in Open Cut 2 Would result in an increased height of the Open Cut 1 overburden emplacement of greater than RL 264 m

Of the options presented above, Option 3 was selected by MCC as the favoured option for the modification area, given that it would result in slopes of less than 14 degrees for both Open Cut 1 and Open Cut 2 final voids, and smaller voids overall. This was also considered to be the option that best met the requirements of MSC.

> Further development of objectives and completion criteria to achieve the final land use and landform must be developed in the MOP, including but not limited to, specific outcomes relating to vegetation communities and integration of macro and micro-relief. Based on constraints/opportunities of the final landform design, an evaluation of the proposed final land use and whether they can be sustained by the final landform.

The MOP contains detailed objectives and completion criteria for the final land use. Those relevant to the modification area are presented in the Rehabilitation and Closure Strategy included in Appendix B of the SEE. It is acknowledged that the MOP would need to be updated in accordance with the changes under the modification, if approved.

3.8 Mine Subsidence Board

The MSB provided advice to MSC which stated:

> …it appears there is no risk of mine subsidence likely to effect other surface development. Therefore, MSB has no objections to the proposal. However, consideration should be given to the compaction of the material if there is an intention to develop the site in the future.

Future development of the site post-mining will be subject to further approvals for the development (if required).

3.9 Ausgrid

> Ausgrid has several critical infrastructure assets located near and within the proposed development area. Any future blasting could introduce fly rock and vibration to the area which may affect Ausgrid's assets. The potential impact could affect Ausgrid's ability to maintain electricity supply to the Upper Hunter area safely and reliably. Ausgrid proposes a Blasting Management Plan be implemented to monitor the progress of the mine along with affected Ausgrid infrastructure. Ausgrid will be notified on a regular basis and when necessary perform visual inspections of its infrastructure.

The modification will not result in blasting occurring closer to Ausgrid's assets than currently occurs under approved operations. MCC will continue to implement its existing BVMP to manage impacts relating to blast vibration and overpressure.

> Access to Ausgrid's assets may be compromised as a 132kV feeder runs along one edge of the proposed modification area. Approximately five, 132kV poles may be affected. Access tracks to all pole locations must be maintained including pad areas for heavy vehicles at all poles.

The 132kV asset adjacent to the modification area will not be impacted by the modification. There will be no change to Ausgrid's existing access arrangements.

> The Eastern out-of-pit emplacement area suggests that overburden taken from the extraction areas will be placed within this area. The overhead line that runs along the edge of the modification area may have clearance issues if the land underlying this line is modified. If ground clearance is compromised, any augmentation work will be funded by the customer.

The eastern out-of-pit emplacement area is an established area of mine rehabilitation within MCC's development consent boundary. It is outside the modification area, and will not be impacted by the modification. The modification does not involve waste emplacement in this area.

4 Individual submissions

4.1 Air quality

Matters raised in relation to air quality include general impacts of odour, health impacts of odour, reductions to quality of life encountered due to odour, general impacts of dust emissions, health impacts of dust emissions and concerns regarding the management of, and mitigation measures implemented to address, air quality. Responses to each of these matters are provided below.

4.1.1 Odour

Submissions - 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 5.2, 5.3, 6.9, 6.10, 6.17, 6.18

Submissions raised concerns that the modification would contribute to existing odour issues. Residents noted that within the last 6-12 month period, the frequency and intensity of exposure to offensive odours has increased. Residents have expressed concerns that the proposed modifications will exacerbate existing odour issues and contribute to ongoing odour issues until such time as MCC operations cease. Residents believe that MCC should modify their processes to mitigate odour exposure and suggest that detailed conditions should be attached prior to approval that specifically address odour issues.

Submissions raised concerns related to the potential health effects of exposure to offensive odours. One submission noted an increase in medication and hospitalisation for asthma-related illnesses due to odour exposure, as well as, headaches, sinus-related issues and nose bleeds. One submission would like the long-term health effects from exposure to spontaneous combustion to be formally identified.

Submissions noted that ongoing exposure to offensive odours was reducing quality of life. Residents noted that offensive odours were having a significant impact on their lifestyle choices. This included modifications to, and cancellation of, outdoor activities to avoid offensive odours and closing windows and doors to prevent airflow and offensive odour circulation within their homes. One submission noted that family and friends did not want to visit their home due to health and safety concerns.

A number of submissions raised concerns regarding the management of, and mitigation measures implemented to address air quality impacts from odour related to spontaneous combustion.

Submissions note dissatisfaction with the degree of attention given to odour and gas level monitoring within the SEE. Residents would like to be made aware of MCC's intentions regarding the ongoing monitoring of odour and gas levels. Similarly, residents also noted that there was no discussion of how MCC intend to update and/or improve daily operations to minimise ongoing instances of spontaneous combustion. One submission has questioned whether MSC has the ability to apply restrictions and conditions on MCC regarding the monitoring of noxious gases and the maximum levels of exposure among neighbouring areas.

One submission has requested that they be reimbursed for heightened power bills encountered due to increased usage of air conditioning to allow for air flow through their house when outdoor odour is intense. If reimbursement is not provided, they would like a solution to ongoing odour issues to be put forward by MCC.

Response:

It is acknowledged that the EPA intends to vary MCC's EPL to require a pollution study. A method for the pollution study will be development in consultation with EPA, NSW Health and MSC. The outcomes of the pollution study will guide future requirements for the monitoring of spontaneous combustion emissions and potential impacts.

4.1.2 Dust emissions

Submissions: 6.4, 6.7

One submission noted that an increase in PM_{10} measurements would be expected as a result of the proposed modification. It also noted the potential for prolonged dust exposure.

One submission expressed concerns regarding MCC's attempts to minimise the potential for harm to the general public from both air-borne particles and fly rock.

Response:

It is acknowledged that increased PM_{10} concentrations are predicted as a result of the modification. One exceedance of the incremental 24-hour average PM_{10} concentrations at one assessment location, R25, is predicted, and this is predicted to occur over three days of the year. Notwithstanding, the impacts predicted in the SEE are considered to be conservative, maximum levels.

The potential for impacts to the public from dust and fly rock are avoided through the implementation of the BVMP and Dust Management Plan.

As previously stated, three additional receptors have been identified that were not assessed in the SEE. One of these receptors, R40, is estimated to experience 24-hour PM_{10} impacts greater than 50µg/m³ for several days per year. It is expected that impacts at R40 would be similar to those at R25 and would exceed 50µg/m³ for up to three days of the year. Dust levels at all other receptors would be below the applicable criteria.

4.2 Visual impacts

Matters raised in relation to the visual impacts of the proposed modifications include increased visibility of the active mining area and increased exposure to lighting associated with plant and equipment.

4.2.1 Increased visual impacts

Submissions: 5.5, 5.7, 5.9, 6.11, 6.12, 6.13

Submissions raised concerns that visual impacts experienced under current operations would increase under the proposed modification. It was noted that MCC have not acknowledged that the active mining area would become more visible from dwellings in Top Knot Place, Woodlands Ridge.

One submission (I-6) expressed concerns with regards to the line of site view from their residence to the proposed modification area, and that removal of the Open Cut 1 emplacement area would increase views of mining infrastructure.

Submissions questioned how MCC propose to address increased visual impacts in the future. One submission has also questioned MCC's compliance with the findings of the Independent Environmental Audit conducted in 2015, particularly, the external materials used in the relocated MIA are not perceived to have a colour and texture that blends with natural surroundings.

Response:

Section 7.6 of the SEE included an assessment of visual impacts. The assessment considered five representative locations which have views of MCM. Two of these locations (View A and View B, as shown in Figure 7.3 in the SEE) are located in Woodlands Ridge and are considered to be generally representative of the majority of dwellings in this area, including Top Knot Place. In relation to the visibility of mining operations from these locations, Section 7.6.3 of the SEE states:

> ...views of Open Cut 1 and the area into which mining would extend as part of the modification are currently possible from all viewpoints assessed, with the exception of View C (from Sandy Creek Road to the north)...the modification would enable progression of mining in Open Cut 1, thus prolonging the views already possible (from viewpoints A, B, D and E) of the active mining in this area by up to five years...
>
> ...With views currently possible of this rehabilitated emplacement area (views A, B, D and E), the earthworks required to reshape this dump upon completion of mining would also be visible during final rehabilitation works.

Further analysis of views from a newly identified receptor to the north of MCM who expressed concerns with changes to the line of sight, receptor R40, was undertaken. A surface profile cross sections has been prepared as shown in Figure 4.1, which is representative of the surface profiles in years 2017, 2019 and 2020 as viewed from receptor R40 and looking towards the mining infrastructure area. A portion of the Open Cut 2 rehabilitation area, which provides a visual barrier between the residence (R40) and the active mining area in Open Cut 1, would be mined through as a result of the modification. This would result in some temporary increases to visibility of the mining infrastructure area at times during the extended mining operations. However, the emplacement of overburden behind the advancing mining area is likely to provide some shielding of views from R40 to the mining infrastructure area.

4.2.2 Lighting

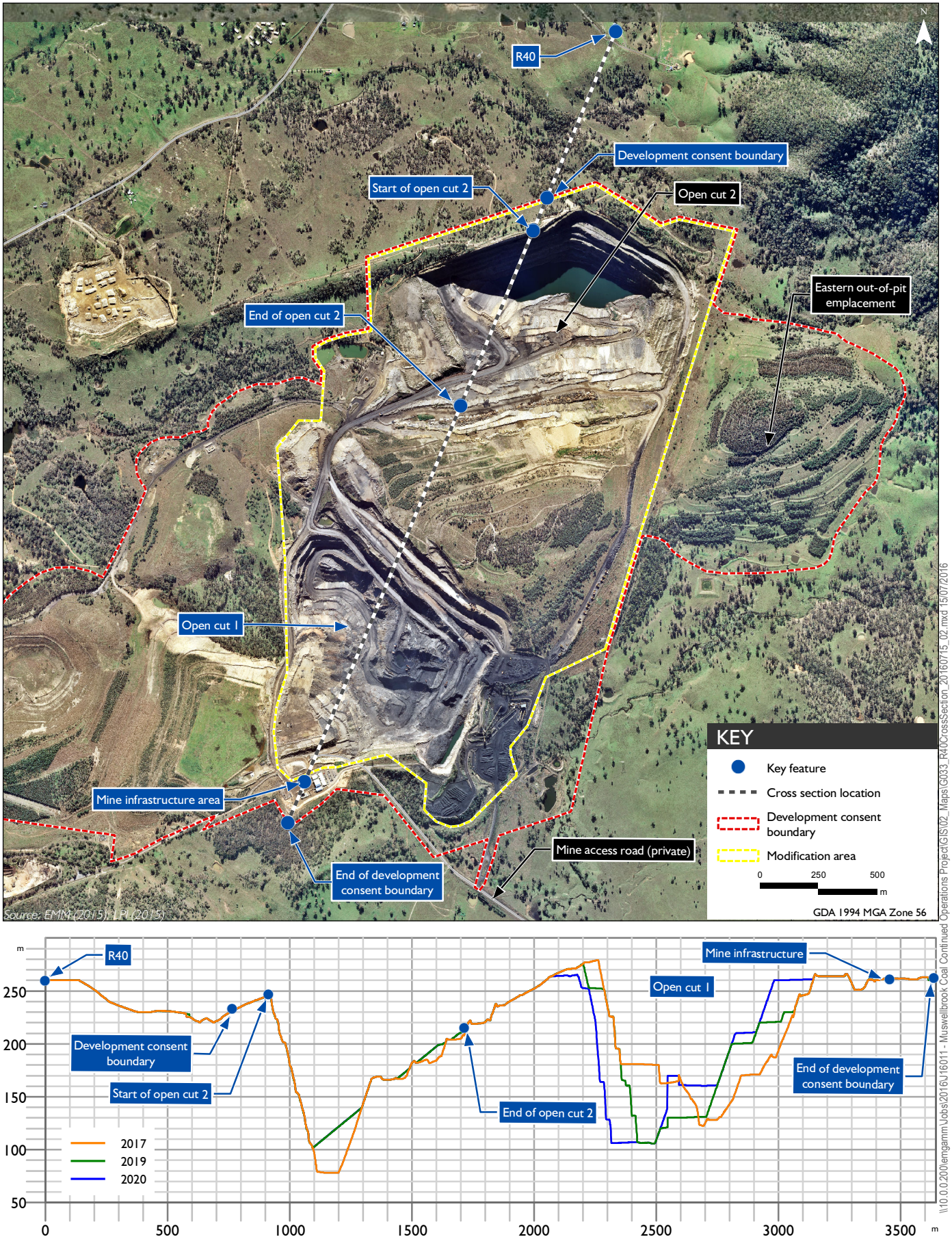
Submissions: 5.6, 6.14

One submission noted visual impacts to residents in Top Knot Place, Woodlands Ridge. Concerns included light from lighting plants and fixed area lighting, and that spoils of dirt are a visual eyesore.

One submission noted visual impacts from dwellings to the north of MCC; concerns were raised regarding visual effects due to similar elevation and line of site view to view the modification, identified concerns regarding lighting containment from swinging excavators, awaiting haul truck fleet and ancillary equipment, as well as, flashing beacons and headlights from light vehicles/support equipment.

Response:

In response to the concerns raised regarding lighting impacts from Top Knot Place, MCC undertook an inspection of light spillage from fixed plant emanating from MCM facilities at Top Knot Place. Based on the inspection, MCC is investigating options and mitigation measures to redirect selected lights to reduce light spill if possible.



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Surface profile - R40

Muswellbrook Coal Continued Operations Project
Response to submissions
Figure 4.1

4.3 Noise

Matters raised in relation to noise include dissatisfaction with proposed mitigation measures listed within the SEE, impacts of anticipated increases in noise levels on sleep and the implementation of the VLAMP.

4.3.1 General impacts

Submissions: 6.3

One submission raised concerns that noise impacts experienced under current operations would increase under the proposed modification. An increase in noise levels is anticipated and proposed mitigation measures listed under Section 7.1.6 of the SEE are not considered to be sufficient. Specific concerns were raised in relation to the use of equipment with little to no sound suppression and the operation of machinery outside of acoustically shield areas. Discontent with the proposed control measure to increase the frequency of noise monitoring to quarterly has also been expressed.

Response:

MCC proposes to offer mitigation measures to residences which are moderately impacted, being R11, R12, R13, R24, R25, R40, R41 and R42 (see Section 3.1.11 of this report). Mitigation measures would be negotiated with the landowners in accordance with the process outlined in Section 7.1.5 of the SEE.

4.3.2 Health impacts

Submissions: 6.16

One submission raised concerns over the impact of anticipated increases in noise levels on sleep.

Response:

As reported in Section 7.1.4(ii) of the SEE, noise levels are predicted to satisfy the adopted sleep disturbance criteria at all assessed receptor locations.

4.3.3 Management and mitigation

Submissions: 6.5

One submission has questioned whether the VLAMP will be implemented on affected properties.

Response:

The VLAMP states that it applies to “development applications and modification applications for mining, petroleum and extractive industry developments, subject to the State significant development [SSD] provisions of the Environmental Planning and Assessment Act 1979”. The modification application is not subject to the SSD provisions of the EP&A Act. Notwithstanding, the SEE (and accompanying noise impact assessment (NIA)) does recommend a negotiation process with relevant authorities and community given the predicted moderate noise impacts, which is consistent with methodology outlined in the VLAMP.

4.4 Blast management

Submissions: 6.6

One submission requested to know what the minimum allowable distance is between a blast zone and neighbouring residence.

Response:

Section 5.5 of the *Muswellbrook Coal Continuation Project noise and vibration impact assessment* (EMM 2016) (Appendix E of the SEE) included a blasting assessment. Based on the assessment, the minimum distance required between a blast zone and a residence is 360 m based on vibration criteria, and 1,000 m based on airblast overpressure criteria. This is based on a maximum instantaneous charge (MIC) of 500 kg. All sensitive receptors surrounding MCM are located at distances greater than the minimum, and therefore blast vibration and overpressure criteria would be met.

4.5 Social

Submissions: 5.10, 6.15

Submissions raised concerns in relation to the social impacts of the proposed modifications. One submission has noted that they were dissatisfied with MCC's conclusion that the financial benefits of their operations outweigh the negative social impacts. One submission also noted that the proposed modifications will likely have a direct impact on their family's quality of life.

Response:

The SEE (Section 7.8) included a detailed assessment of social impacts. Where potential impacts exceed relevant criteria (e.g. air quality and noise), mitigation measures would be offered to those residents.

4.6 Consultation

Submissions: 4.8, 6.21

Several submissions identified dissatisfaction with the level of consultation received from MCC.

Response:

MCC distributed a community newsletter to approximately 500 residents surrounding the operation and consulted with the MCC Community Consultative Committee (CCC) regarding the modification. As detailed in the community newsletter, interested residents were invited to contact Grant Clouten (Senior Operations Manager) or Julie Thomas (Environmental Coordinator) on 02 6542 2300 to discuss the modification, with no calls being received.

4.7 Other matters

A number of additional matters were raised within the submissions including dissatisfaction with information provided by MCC, impacts of the proposed continuation project on property values and degree of accountability for non-conformances with the Independent Environmental Audit conducted in 2015. Matters raised, summarised and indented, are addressed below.

4.7.1 Potential impacts inadequately identified

Submissions: 5.1, 6.2

One submission noted that potential impacts have not been adequately identified by MCC, nor have sufficient management strategies been put in place to address the potential impacts. Three properties were omitted from Figure 2.1 in the SEE.

Response:

The SEE has been prepared in accordance with relevant legislation, guidelines and standards for the preparation of environmental impact assessments in NSW.

It is accepted that three properties were not assessed in the SEE. These receptors have now been identified based on aerial photography as receptors R40, R41 and R42. Consideration of air quality and noise impacts at these receptors has been included in this document.

4.7.2 Property value and acquisition

Submission: 5.8, 6.19

One submission has requested that their property be purchased by MCC at an agreed value. Further, in addition to this request, a subsequent submission raised concerns over the reduced value of their residence and neighbouring properties if the proposed continuation receives approval.

One submission stated that property values would be reduced if residents were intending on selling.

Response:

The SEE and this response to submissions report have not identified any properties that would be subject to impacts that would necessitate acquisition.

In regards to property values, MCM has been operating for over 100 years. The modification represents a minor extension in the mine life and is not considered to have a significant impact on property values.

Appendix A

Summary of individual community submissions

Submission reference	Location	Name	Matter reference	Theme	Sub-theme	Matters raised
I-1	Woodlands Ridge	Daniel and Lisa Boyd	I-1.1	Air quality	Odour - general impacts	An increase in sulphur odour has been experienced over the last couple of months with greater regularity and intensity of odour noted (able to smell gas insider their closed home)
I-1	Woodlands Ridge	Daniel and Lisa Boyd	I-1.2	Air quality	Odour - general impacts	Residents believe that rehandling of old workings will exacerbate the frequency and intensity of sulphur odour
I-1	Woodlands Ridge	Daniel and Lisa Boyd	I-1.3	Air quality	Management and mitigation	Does MSC have the ability to apply restrictions and conditions on MCC regarding the monitoring of noxious gases and the maximum levels of exposure among neighbouring areas?
I-1	Woodlands Ridge	Daniel and Lisa Boyd	I-1.4	Air quality	Odour - general impacts	Residents believe that MCC need to modify their processes to minimise odour issue
I-2	Muscle Creek	Kim Stephens	I-2.1	Air quality	Odour - general impacts	Resident noted that the odour has become very offensive over the last six months
I-2	Muscle Creek	Kim Stephens	I-2.2	Air quality	Odour - general impacts	Resident expressed concerns that modifications will contribute to ongoing odour issues until MCC operations cease
I-2	Muscle Creek	Kim Stephens	I-2.3	Air quality	Management and mitigation	Little mention of odour/gas levels monitoring within SEE and intentions regarding ongoing monitoring of gas levels have not been identified
I-2	Muscle Creek	Kim Stephens	I-2.4	Air quality	Management and mitigation	No mention of how MCC will update/improve their way of handling/managing daily operations to minimise further instances of spontaneous combustion
I-2	Muscle Creek	Kim Stephens	I-2.5	Air quality	Odour - health impacts	Concern regarding potential health effects of exposure
I-2	Muscle Creek	Kim Stephens	I-2.6	Air quality	Odour - general impacts	Resident believes that detailed conditions should be attached prior to approval to ensure that offensive odours will not continue for the next 5 years
I-2	Muscle Creek	Kim Stephens	I-2.7	Air quality	Odour - reduced quality of life	Impact on lifestyle choices as preference to remain indoors and avoid offensive odours, unable to hang out washing on days when offensive odour exposure is high
I-3	Woodlands Ridge	Elita Moss	I-3.1	Air quality	Odour - general impacts	Resident believes that over the last six months, their neighbourhood has been severely affected by the smell of burning coal and associated smog/dust
I-3	Woodlands Ridge	Elita Moss	I-3.2	Air quality	Odour - general impacts	Resident believes that MCC operations have changed due to increased frequency and intensity of exposure to offensive odours
I-3	Woodlands Ridge	Elita Moss	I-3.3	Air quality	Odour - general impacts	Concern that approval of the modification (without consideration of current workings and related odour) could exacerbate issue and lead to it becoming an ongoing problem until operations cease
I-3	Woodlands Ridge	Elita Moss	I-3.4	Air quality	Management and mitigation	Little mention of odour/gas levels monitoring within SEE and intentions regarding ongoing monitoring of gas levels have not been identified
I-3	Woodlands Ridge	Elita Moss	I-3.5	Air quality	Management and mitigation	No mention of how MCC will update/improve their way of handling/managing daily operations to minimise further instances of spontaneous combustion
I-3	Woodlands Ridge	Elita Moss	I-3.6	Air quality	Management and mitigation	Resident believes that MCC's future plans should involve more substantial attention to addressing odour issues
I-3	Woodlands Ridge	Elita Moss	I-3.7	Air quality	Odour - health impacts	Concern regarding potential health effects of exposure - noted increased medication and hospitalisation for asthma-related illness, headaches, sinus-related issues and nose bleeds
I-3	Woodlands Ridge	Elita Moss	I-3.8	Air quality	Odour - reduced quality of life	Impact on lifestyle choices – closing windows and doors to prevent airflow and offensive odour circulation, modifications to, and cancellation of, outdoor activities
I-3	Woodlands Ridge	Elita Moss	I-3.9	Air quality	Odour - general impacts	Resident believes that detailed conditions should be attached prior to approval to prevent continuation of odour issues (exposure should be restricted to minimal, seasonal exposure events)
I-4	Woodlands Ridge	Richard and Tanya Darby	I-4.1	Air quality	Odour - health impacts	Concern regarding potential health effects of exposure
I-4	Woodlands Ridge	Richard and Tanya Darby	I-4.2	Air quality	Odour - reduced quality of life	Impact on lifestyle choices – closing windows and doors to prevent airflow and offensive odour circulation, modifications to, and cancellation of, outdoor activities
I-4	Woodlands Ridge	Richard and Tanya Darby	I-4.3	Air quality	Odour - general impacts	Residents expressed their dissatisfaction with ongoing and increasing level of exposure to offensive odour - "disgusting, toxic smell of disturbed spontaneous burning coal"
I-4	Woodlands Ridge	Richard and Tanya Darby	I-4.4	Air quality	Management and mitigation	Residents request the installation/implementation of an air quality meter to measure air toxins
I-4	Woodlands Ridge	Richard and Tanya Darby	I-4.5	Air quality	Management and mitigation	Residents request reimbursal for heightened power bills encountered due to increased usage of air conditioning to allow for air flow through the house when outdoor odour is intense
I-4	Woodlands Ridge	Richard and Tanya Darby	I-4.6	Air quality	Management and mitigation	If reimbursal is not provided, residents woud like a solution to be provided by MCC in relation to ongoing odour issues
I-4	Woodlands Ridge	Richard and Tanya Darby	I-4.7	General		Residents detest information contained within Table 1 of the MCC Continuation Project Summary, specifically, references to the following aspects: economic, social and rehabiliation and mine closure
I-4	Woodlands Ridge	Richard and Tanya Darby	I-4.8	Consultation		Residents are dissatisfied with the level of consultation they have received from MCC
I-5	Woodlands Ridge	Stephen Bridge	I-5.1	General		Based on information provided, resident believes that all predicted impacts have not been addressed by MCC, nor have sufficient management strategies been put in place to address these impacts

Submission reference	Location	Name	Matter reference	Theme	Sub-theme	Matters raised
I-5	Woodlands Ridge	Stephen Bridge	I-5.10	Social	Assessment approach	MCC has not aqequately addressed the minimisation of social effects on local residents - dissatisfaction with belief that financial benefits outweigh negative social impacts
I-5	Woodlands Ridge	Stephen Bridge	I-5.2	Air quality	Odour - general impacts	Resident has experienced daily exposure to offensive odour for the last 12 months with increased severity when predominant wind direction is north/north-west
I-5	Woodlands Ridge	Stephen Bridge	I-5.3	Air quality	Odour - health impacts	Concern regarding potential health effects of exposure
I-5	Woodlands Ridge	Stephen Bridge	I-5.4	Approval process		Resident believes that no decisions should be made by MSC until MCC has undergone further studies - involvement of an independent body has been suggested
I-5	Woodlands Ridge	Stephen Bridge	I-5.5	Visual	Visual - general impacts	Concern regarding visual impact of the extension from their residence - MCC have not acknowledged that the active mining area would become more visible
I-5	Woodlands Ridge	Stephen Bridge	I-5.6	Visual	Visual - lighting	Construction of visual bund will not eliminate light emitted via lighting plants, further, at night time, fixed area lighting shines onto the external wall of their residence
I-5	Woodlands Ridge	Stephen Bridge	I-5.7	Visual	Visual - general impacts	Resident would like to know how MCC propose to eliminate this issue (visual impact) in the future, as well as, spoils of dirt that are identified as a visual eyesore from their residence
I-5	Woodlands Ridge	Stephen Bridge	I-5.8	General	Property value	Concern regarding misinformation given when purchasing land - reduced value of residence and neighbouring properties if they were intending to sell
I-5	Woodlands Ridge	Stephen Bridge	I-5.9	Visual	Visual - general impacts	Resident believes that MCC have failed to acknowledge that the active mining area would become more visible to dwellings in Top Knot Place
I-6	McCullys Gap	David Goodhew	I-6.1	General		Resident believes that their close proximity to the northern boundary of the lease and their elevation will put them in direct contact with the proposed continuation project
I-6	McCullys Gap	David Goodhew	I-6.10	Air quality	Odour - general impacts	Concern that modifications will only exacerbate existing odour issues
I-6	McCullys Gap	David Goodhew	I-6.11	Visual	Visual - general impacts	Concern regarding visual effects due to similar elevation and line of site view to proposed project
I-6	McCullys Gap	David Goodhew	I-6.12	Visual	Visual - lighting	Resident has identified the dump between OC1 and OC2 as the only visual bund between their residence and the MIA - believe that its removal will lead to increased exposure to light emitted from the MIA
I-6	McCullys Gap	David Goodhew	I-6.13	Visual	Visual - general impacts	Resident believes that the MIA does not comply with the findings of the Independent Environmental Audit conducted in 2015 - "The relocated MIA did not have external materials that have a colour and texture that blend with natural surroundings"
I-6	McCullys Gap	David Goodhew	I-6.14	Visual	Visual - lighting	Concern with regards to lighting containment from swinging excavators, awaiting haul truck fleet and ancillary equipment, as well as, flashing beacons and headlights from light vehicles/support equipment
I-6	McCullys Gap	David Goodhew	I-6.15	Social	Quality of life	Direct impact on family's quality of life
I-6	McCullys Gap	David Goodhew	I-6.16	Noise	Noise - health impacts	Expected increase in noise levels and subsequent sleep loss
I-6	McCullys Gap	David Goodhew	I-6.17	Air quality	Odour - reduced quality of life	Noted that friends and family do not want to visit their home due to health and safety concerns
I-6	McCullys Gap	David Goodhew	I-6.18	Air quality	Odour - health impacts	Concern regarding potential health effects of exposure
I-6	McCullys Gap	David Goodhew	I-6.19	General	Property value	If the proposed continuation is approved, resident would like MCC to purchase the property at an agreed value
I-6	McCullys Gap	David Goodhew	I-6.2	General		Residence and two neighbouring properties omitted from Figure 2.1 within the SEE
I-6	McCullys Gap	David Goodhew	I-6.20	General		Resident believes that MCC should be held accountable to all non-conformances with the findings of the Independent Environmental Audit conducted in 2015
I-6	McCullys Gap	David Goodhew	I-6.21	Consultation		Resident dissatisfied with the level of consultation they have received from MCC
I-6	McCullys Gap	David Goodhew	I-6.3	Noise	Noise - general impacts	Expected increase in noise levels and dissatisfaction with proposed mitigation measures under Section 7.1.6 of the SEE - cited concerns regarding equipment with little to no sound suppression and the operation of machinery outside of acoustically shielded areas and discontent with proposed control measure to increase frequency of noise monitoring to quarterly
I-6	McCullys Gap	David Goodhew	I-6.4	Air quality	Dust emissions - general impacts	Expected increase in PM10 measurements and potential of prolonged dust exposure
I-6	McCullys Gap	David Goodhew	I-6.5	Noise	Management and mitigation	Resident would like to know whether VLAMP will be implemented on affected properties - it has been noted that assessment location R25 would be entitled to voluntary mitigation
I-6	McCullys Gap	David Goodhew	I-6.6	Blast management		Resident would like to know what the minimum allowable distance is between a blast zone and neighbouring residence?
I-6	McCullys Gap	David Goodhew	I-6.7	Air quality	Dust emissions - health impacts	Resident would like to know whether MCC have made a satisfactory attempt to minimise the potential for harm to the general public from both air-borne particles and fly rock?
I-6	McCullys Gap	David Goodhew	I-6.8	Blast management		Based on photographic evidence provided within their submission, resident would like to know whether MCC's Blast - Vibration Management Plan is being adhered to/upheld?
I-6	McCullys Gap	David Goodhew	I-6.9	Air quality	Odour - health impacts	Resident would like the long-term health effects from exposure to spontaneous combustion to be identified?

Appendix B

Updated noise modelling results

14 July 2016

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Re: Addendum to the *Muswellbrook Coal Continuation Project Noise and vibration impact assessment*

Dear Julie,

1 Introduction

This letter report has been prepared as an addendum to the *Muswellbrook Coal Continuation Project Noise and vibration impact assessment* (EMM 2016a) (the NVIA), which accompanied the *Muswellbrook Coal Continuation Project Statement of Environmental Effects* (EMM 2016b) (SEE).

The purpose of this addendum is to present the results of a noise impact assessment undertaken for three additional dwellings (referred to as assessment locations) which were not included in the NVIA. This assessment has been completed with reference to the *NSW Industrial Noise Policy* (INP) (Environment Protection Authority (EPA) 2000).

2 Noise assessment

2.1 Assessment locations

The coordinates for the three additional assessment locations, located to the north of Muswellbrook Coal Mine (MCM), are provided in Table 1.

Table 1 Assessment locations and coordinates

Assessment location	Locality	Easting (MGA)[1]	Northing (MGA)[1]
R40	Sandy Creek Road north	306507.43	6432669.19
R41	Sandy Creek Road north	306746.23	6432507.15
R42	Sandy Creek Road north	306824.37	6432868.64

Notes: 1. GDA 1994 MGA Zone 54.

2.2 Existing ambient noise levels

A key element in assessing environmental noise impact from industry is to quantify the existing background acoustic environment, including any existing industrial noise where present.

As described in Section 3.3 of the NVIA, background noise levels referenced in the original noise assessment prepared for MCM (HLA-Enviroscienes 2002) were referenced for the purpose of this assessment (refer Table 2). It is anticipated that these background noise levels would have remained the same for the majority of the monitoring locations and therefore are deemed representative of the current background noise environment. The location closest to, and representative of the additional assessment locations, is R7.

Table 2 Measured ambient noise levels (HLA-Enviroscienes, 2002)

Location (previous ID)	L_{Aeq}(day)	L_{Aeq}(evening)	L_{Aeq}(night)	RBL Day	RBL Evening	RBL Night
R7 (N1)	53	52	45	32	34	33
R15 (N2)	51	54	43	31	34	30
R16 (N3)	47	49	51	32	37	29
R17 (N4)	47	49	45	36	40	37
R20 (N5)	55	55	53	40	33	32

Notes: 1.Day: 7 am to 6 pm (*8 am on Sundays and public holidays), Evening: 6 pm to 10 pm, Night: 10 pm to 7 am* (*8 am on Sundays and public holidays).*

2.3 Meteorology

Predicted noise levels from MCM at the assessment locations have been calculated based on the meteorological parameters provided in Table 3. Prevailing conditions (winds and temperature inversion) based on the detailed weather data analysis described in Section 3.4 of the NVIA have been considered.

Table 3 Weather conditions considered in noise modelling

Assessment period	Meteorological condition	Air temperature	Relative humidity	Wind speed1	Stability category (temperature gradient)
Day	Calm	20°C	70%	0 m/s	D class
	Wind	20°C	70%	2.6 m/s^2	D class
Evening/night	Calm	10°C	90%	0 m/s	D class
Night	Temperature inversion	10°C	90%	0 m/s	F class

Notes: 1. Based on the 10th percentile wind speed of all winds present for 30% of the time during the relevant period.

2. Wind directions adopted are 112.5°, 135°, 157.5°, 180° from north (0°) based on data from the MCM on-site weather station.

2.4 Noise criteria

The adopted rating background level for the additional assessment locations are the same as assessment location R25 being the nearest previously considered assessment location. The project specific noise levels (PSNLs) determined for the project at this location for all assessment periods are the relevant intrusive criteria (as determined in accordance with the INP – refer to Chapter 4 of the NVIA) and are provided in Table 4.

Table 4 Project specific noise levels

Assessment location	Adopted RBL, dB			Intrusive criteria, $L_{Aeq(15\text{-}min)}$, dB		
	Day	Evening	Night	Day	Evening	Night
R40	32	32	32	37	37	37
R41	32	32	32	37	37	37
R42	32	32	32	37	37	37

Sleep disturbance noise goals for the additional assessment locations have been determined by applying the guidance provided in the INP Application Notes and are presented in Table 5. These have been based on the adopted RBLs presented in Table 4.

Table 5 Sleep disturbance criteria (night time only)[1]

Assessment location	Adopted RBL, dB	Sleep disturbance L_{Amax} criteria, dB
R40	32	47
R41	32	47
R42	32	47

Notes: 1. Night: 10 pm to 7 am Monday to Saturday; 10 pm to 8 am Sundays and public holidays.

2.5 Noise modelling method

Noise modelling was based on three-dimensional digitised ground contours of the surrounding land. Noise predictions were carried out using Brüel and Kjær Predictor Version 11 noise prediction software. 'Predictor' calculates total noise levels at assessment locations from the concurrent operation of multiple noise sources.

2.5.1 Modelling scenarios

As detailed in Section 5.2 of the NVIA, Year 3 of proposed mining operations was modelled for the purpose of the noise assessment. Based on information provided by MCC it is anticipated that operations associated with this acoustically worst-case scenario would occur for a period of approximately two months. The same scenario was modelled for the additional assessment locations.

Based on the results of initial modelling, further modelling of the night time period under temperature inversion conditions was completed. Two scenarios were modelled at all 37 assessment locations (34 as previously modelled in the NVIA, plus the three additional locations):

- Standard: all plant and equipment operating; and
- Modified: all plant and equipment operating, except for the following during inversion conditions:
  - dozers are operated in only first gear; and
  - the number of trucks hauling to Open Cut 2 is reduced from four to three.

Modelling was undertaken for the worst case meteorological conditions, which occur during inversion conditions in the night period.

2.5.2 Noise sources

Sound power levels used in the noise model were referenced from the latest on site sound power testing survey reports (refer to Section 5.2.3 of the NVIA), and are presented in Table 6.

Table 6 Operational plant and equipment sound power levels

Plant and equipment	Typical activities	Location	Quantity		Sound power level (Lw)1, dB(A)
			Standard	Modified	
CPP (washing plant)	Washing/screening coal	CPP area	1	1	119
Crushing plant	Crushing/screening coal	CPP area	1	1	116
Graders (CAT 16H)	Trimming haul roads	Haul roads	2	2	106-108
Track dozers (CAT D10T)	Organising overburden/coal	Pit/dump areas	4	4	123-126
Haul trucks (Hitachi EH35000)	Hauling overburden/coal	Haul roads	8	7	116-120
Haul trucks (CAT 777C)	Hauling within clean stockpile area/ Hauling rejects to dump areas	Clean stockpile area/ RoM/haul roads/dump areas	3	3	116-119
Water truck (CAT 777C)	Watering haul roads	Haul roads	1	1	117
Water truck (CAT 777D)	Watering haul roads	Haul roads	1	1	118
Drill (Ingersoll Rand DML)	Drilling blast holes	Pit/higher benches	1	1	115
Front-end loader (CAT 990H)	Loading/handling coal	RoM area	1	1	110
Excavator (Hitachi EX3600)	Stripping and loading overburden/coal	Pit/higher benches	1	1	117
Excavator (Hitachi EX2600-6)	Stripping and loading overburden/coal	Pit/higher benches	1	1	117

Notes: 1. Obtained from MCM sound power testing survey reports prepared by Global Acoustics (2013- 2015).

2.6 Noise modelling results

Predicted noise levels from MCM assuming standard operations at the additional assessment locations are provided in Table 7. Noise levels have been predicted based on the meteorological conditions provided in Table 3. Noise levels predicted to be above the PSNLs are indicated by shading.

Table 7 Predicted operational noise levels

Assessment location	Predicted operational $L_{Aeq(15\text{-}min)}$ noise levels, dB				PSNLs Day/Evening/Night $L_{Aeq(15\text{-}min)}$
	Day		Evening/Night	Night	
	Calm	Wind[1]	Calm	Inversion[2]	
R40	40	42	41	44	37/37/37
R41	40	42	41	44	37/37/37
R42	37	40	38	41	37/37/37

As described in Section 2.5.1, predicted noise levels at all 37 assessment locations have been re-modelled for the night time period during inversions under two operating scenarios (standard and mitigated). A comparison of results for each scenario is provided in Table 8.

Table 8 Predicted operational noise levels

Assessment location	Predicted operational LAeq(15-min) noise levels, dB					Change between standard and mitigated scenarios, dB	Noise criteria, LAeq(15-min), dB		
	Day		Evening/ Night	Night			PSNLs		
	Calm	Wind	Calm	Inversion - standard	Inversion - modified		Day	Evening	Night
R1	31	33	32	34	33	-1	35	35	35
R2	31	33	32	34	33	-1	35	35	35
R3	32	34	33	35	33	-2	35	35	35
R4	32	34	33	35	34	-1	35	35	35
R5	33	35	34	36	35	-1	35	35	35
R7	35	37	36	38	37	-1	37	37	37
R11	35	37	37	39	38	-1	35	35	35
R12	36	38	37	39	39	0	35	35	35
R13	37	40	38	41	40	-1	37	37	37
R14	34	37	36	38	37	-1	37	37	37
R15	34	36	35	37	37	0	36	36	35
R16	33	35	34	36	36	0	37	37	35
R17	31	33	33	35	34	-1	36	36	35
R18	<30	<30	<30	31	31	0	45	38	37
R20	30	<30	32	34	33	-1	45	38	37
R21	33	36	35	37	36	-1	35	35	35
R22	35	38	36	39	38	-1	37	37	37
R23	36	38	37	39	39	0	37	37	37
R24	37	39	38	40	40	0	37	37	37
R25	39	41	39	42	41	-1	37	37	37
R26	<30	<30	<30	31	30	-1	35	35	35
R27	<30	<30	30	31	31	0	35	35	35
R28	<30	<30	31	32	32	0	35	35	35
R29	30	<30	31	33	32	-1	35	35	35
R30	<30	<30	<30	28	28	0	35	35	35
R31	<30	<30	<30	26	25	-1	35	35	35
R32	<30	<30	31	33	32	-1	35	35	35
R33	<30	<30	31	33	32	-1	35	35	35
R34	<30	<30	<30	29	28	-1	35	35	35
R35	<30	<30	<30	27	27	0	35	35	35
R36	35	37	36	38	37	-1	35	35	35
R37	<30	31	31	32	31	-1	35	35	35
R38	31	32	32	34	32	-2	35	35	35
R39	30	32	31	33	31	-2	35	35	35
R40	40	42	41	44	42	-2	37	37	37
R41	40	42	41	44	42	-2	37	37	37
R42	37	40	38	41	40	-1	37	37	37

Predicted noise levels satisfy the relevant PSNLs at most assessment locations. The modified scenario resulted in a reduction of noise levels of 1-2 dB at some receptors during the night time period under inversion conditions.

A comparison of the results of the standard and modified scenarios for the night time period under inversion conditions is detailed in Table 9.

Table 9 Comparison of the results of the standard and modified scenarios for the night time period under inversion conditions

Noise modelling results	Number of assessment locations	
	Standard	Modified
PSNL satisfied	20	23
Negligible impact (up to 2 dB above the PSNLs)	8	6
Moderate impact (3-5 dB above the PSNLs)	7	8
Relevant acquisition criteria exceeded (greater than 5 dB above the PSNLs)	2	0

The level of impact from the modification for the modified scenario is summarised as follows:

- noise emissions are predicted to meet the PSNLs at 23 of the 37 assessment locations;
- a negligible impact (up to 2 dB above the PSNLs) is predicted at six assessment locations;
- a moderate impact (3-5 dB above the PSNLs) is predicted at eight assessment locations; and
- predicted noise levels satisfy the relevant acquisition criteria at all assessment locations.

2.7 Sleep disturbance

Predicted L_{Amax} noise levels from the modification at the additional assessment locations are provided in Table 10.

Table 10 Predicted night-time L_{Amax} noise levels

Assessment location	Predicted LAmax noise levels, dB	Relevant noise criteria, dB
	Inversion	LAmax
R40	42	45
R41	42	45
R42	40	45

Results of noise modelling have demonstrated that L_{Amax} noise levels would comply with the relevant sleep disturbance criteria at all assessment locations.

3 Management and mitigation

3.1 Feasible and reasonable noise management and mitigation

Results of noise modelling have indicated the combination of dozers, haul truck fleet and excavators to be the main contributors to offsite noise levels at most assessment locations, in particular the most affected locations. The most affected assessment locations are R40 and R41, being located between 600-700 m from the closest development consent boundary.

Given the proximity of these assessment locations to MCM, and the predicted noise levels for the standard operational scenario under worst case meteorological conditions, operations were reviewed to identify changes that could be made during night time inversion conditions to reduce the predicted noise levels at the most affected locations to the north of MCM. As described in Section 2.5.1, the modified operational scenario was adopted, and involves the following changes to operations during inversion conditions:

- dozers are operated in only first gear; and
- the number of trucks hauling to Open Cut 2 is reduced from four to three.

These changes were able to achieve a reduction of 2 dB at the most affected locations (refer to Table 8), and a reduction of 1-2 dB at a number of other locations. MCC would commit to implementing these operating conditions during inversion condition in the night time period, should the modification be approved.

3.2 Noise and blast monitoring

MCC currently undertakes operational noise and blast monitoring in accordance with the approved Noise Management Plan (MCC 2015) and Blast-Vibration Management Plan (MCC 2015).

3.2.1 Noise monitoring

Operator-attended monitoring to quantify noise contribution from MCM at the relevant assessment locations is completed on a bi-annual (six monthly) basis. Attended noise monitoring is undertaken at five locations (ie R7, R13, R15, R17 and R20) and noise data recorded at these locations is used to determine compliance at all other surrounding sensitive receivers.

The NVIA recommended that the frequency of noise monitoring be increased from bi-annual to quarterly (ie every 3 months), and that noise monitoring be undertaken at the nearest assessment location to the north of the mine. In addition, MCC has committed to undertake monthly monitoring during the night time period. The most affected assessment locations are now R40 and R41. MCC will consult with these residents regarding the location of noise monitoring, as these assessment locations are located on land accessible by a private road.

3.2.2 Blast monitoring

Blast monitoring is undertaken for all blast events at four residential locations. It is recommended that blast monitoring is continued for the life of the project and that MCC continues to actively manage and monitor blast overpressure and vibration in accordance with the blast management plan.

3.3 Negotiation process

As described in Section 6.3 of the NVIA, where noise emissions are predicted to be above the PSNL, the INP and the NSW Government's *Voluntary Land Acquisition and Mitigation Policy* (VLAMP) provide guidance regarding the process for negotiation with the relevant regulating authority and/or affected community. The main items for consideration in this process include:

- demonstrating that all feasible and reasonable avoidance and/or mitigation measures have been implemented;
- potential broader social and economic benefits of the project;
- the magnitude of predicted noise emission levels and noting that not all exceedances of the PSNLs will equate to unacceptable impacts;

- characteristics of the area and receivers likely to be affected including existing measures of community impact (eg complaints);
- characteristics of the proposal and its noise and vibration emissions; and
- negotiation of a package of benefits with potentially affected residences may include installation of glazing, insulation or air-conditioning, payment of compensation or contributions to improve community facilities and infrastructure.

MCC proposes to offer mitigation measures to residences which are moderately impacted (based on the revised noise modelling predictions in Table 7), being R11, R12, R13, R24, R25, R40, R41 and R42. Mitigation measures would be negotiated with the landowners in accordance with the process outlined above.

4 Conclusion

The level of impact from the modification for the modified scenario is summarised as follows:

- noise emissions are predicted to meet the PSNLs at 23 of the 37 assessment locations;
- a negligible impact (up to 2 dB above the PSNLs) is predicted at six assessment locations;
- a moderate impact (3-5 dB above the PSNLs) is predicted at eight assessment locations;
- predicted noise levels satisfy the relevant acquisition criteria at all assessment locations; and
- predicted noise levels satisfy the relevant sleep disturbance criteria.

Mitigation measures have been adopted for the night time period under inversion conditions to minimise noise impacts, which has achieved a reduction in noise levels of 2 dB at the nearest assessment locations.

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