DOC21/198007

Planning and Assessment Division
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Attention: Ms Tegan Cole

17 March 2021

Dear Ms Cole

EPA Advice on Environmental Impact Statement

Thank you for the request for advice from Public Authority Consultation (PAE-13879507), requesting the review by the NSW Environment Protection Authority (EPA) of the Environmental Impact Statement (EIS) for the proposed Mount Pleasant Optimisation Project (Application SSD 10418) located 3 kilometres north west of Muswellbrook in the Upper Hunter Valley of New South Wales.

The EPA understands the proposal is for the extraction of additional coal reserves within Mount Pleasant Operational Mining Leases and an increase in the rate of coal extraction, handling and processing of ROM coal up to 21 Mtpa (i.e. progressive increase in ROM coal mining rate from 10.5 Mtpa over the Project life).

Based on the information provided, the proposal is subject to an environment protection licence under the *Protection of the Environment Operations Act* 1997 (POEO Act) for Mining for coal, clause 28 of Schedule 1 of the POEO Act.

The EPA has reviewed the EIS and advises that, based on the information provided, the EPA is unable to provide recommended conditions of approval for the Project. Further details are provided below.

Air Impact Assessment

The EPA has undertaken a review of the report titled *"Mount Pleasant Optimisation Project, Air Quality Impact Assessment",* prepared by Todoroski Air Sciences dated 16 December 2020 (the AQIA).

The proposal constitutes a significant increase in operation from 10.5 Mtpa to 21 Mtpa of ROM coal extraction, and the location of the site is in close proximity to Muswellbrook. Additional exceedances are predicted at the closest receptors, the majority of which are already subject to acquisition rights, and reactive measures were required to be included in the modelling to reduce those additional exceedances.

In its current form, the AQIA is not adequate for decision making purposes, as the methodology and approach is not transparent enough to evaluate the robustness of the predicted impacts.

The EPA's review of the AQIA, recommendations and comments are provided in **Attachment A**.

Noise Impact Assessment

The EPA has undertaken a review of the report titled "*Mount Pleasant Optimisation Project – Noise and Blasting Assessment (Report No. 15402-H,Version A)"* prepared by Wilkinson Murray dated December 2020 (the NIA).

Following are the key issues from the review for consideration and clarification.

Meteorological conditions

The NIA presents an assessment of prevailing meteorological conditions in accordance with Fact Sheet D of the Noise Policy for Industry (NPfI) using data from the Mount Pleasant Operation M-WM2 Automatic Weather Station for the period 1/12/2016 to 31/8/2019. The analysis has determined that "standard meteorological conditions" are relevant for the day and evening period and that "noise enhancing meteorological" conditions are relevant for the night-time period. However, the NIA presents an additional layer of assessment to determine the frequency of occurrence of light drainage winds during F class inversion conditions. The analysis suggests that light winds up to 2m/s occur for less than 5% of the time in any direction during moderate to strong inversions. On this basis modelling for night-time conditions has only considered F class inversions with a 0.5m/s drainage flow as opposed to 2m/s recommended by the NPfI.

While the EPA accepts this approach for noise modelling purposes, noise limits will require compliance with night-time levels under F class inversions with a 2m/s drainage flow. This will require the proponent to apply careful mine noise management techniques during these relatively infrequent metrological conditions. Equally so, F class stability with a 0.5m/s wind is similar in noise propagation to stability category A-D with 3m/s source to receiver wind. Consistent with the NPfI, the EPA does not generally recommend evening limits lower than night or daytime limits lower than evening. Accordingly, limits will reflect what is achievable under night-time adverse conditions. The EPA therefore proposes that day, evening and night noise limits will be required to be met under adverse meteorological conditions as set out in the NPfI.

The EPA recommends that the proponent be invited to comment on this proposal as it will require active noise management.

Annoying noise characteristics

The NIA has only considered low frequency noise (LFN). While tonality and intermittency are unlikely to be relevant for a large scale mine, they should be considered in the NIA. In terms of low frequency noise, while the assessment methodology is considered acceptable, the following points require clarification:

- The results are atypical for a large-scale mining operation. The low frequency noise assessment should be confirmed with specific attention as to why low frequency content appears to be significantly lower than comparable mining operations with receivers at similar offset distances; and,
- The LFN assessment has relied upon measurement data acquired in the village of Bulga, which is an acceptable approach for a greenfield site. However, Mt Pleasant is a brownfield site. An explanation is required as to why data from Mt Pleasant has not been used to assist in the low frequency analysis. The applicability of the "LF tail" used in the assessment should be validated against measurements from existing Mt Pleasant operations. For example Wilkinson Murray undertook measurements in April 2020 to assist in model validation. These measurements could also be used to assist in low frequency noise validation.

Residual impacts under VLAMP

The current development consent (DA92/97) for Mt Pleasant Operations includes residences that are subject to voluntary acquisition and mitigation under the VLAMP. The NIA indicates that modelled noise impacts warrant two additional receivers being allocated voluntary acquisition rights i.e. receivers 154 and 154b.

Similarly, the NIA indicates that no additional receivers require additional voluntary mitigation rights. However, it appears that receivers 35 and 35b qualify for additional mitigation and are not currently listed in DA92/97. We expect that Planning will confirm receivers that have rights under the VLAMP as part of their assessment.

Further to this, the EPA expects that voluntary acquisition and mitigation rights under DA92/97 will be carried over to any revised SSD approval.

Road noise assessment

The EPA's regulation of this project does not extend to impacts from road transport. It is recommended that Planning carefully considers feasible and reasonable mitigation measures for potential road transport impacts.

Rail noise assessment

The following points require clarification by the proponent:

- Were noise-sensitive receivers identified within the offset distances outlined in the NIA (Table 8-3) for the section of network line between Muswellbrook Junction to Anteine Rail Spur?

- The NIA (Table 8-3) identifies required RING compliance offset distances to sensitive receivers from the section of network line between Mt Pleasant Operations Rail Spur to Muswellbrook Junction. Table 8-4 presents predicted noise levels for four (4) receivers identified as being within the compliance night-time offset distance of 83m. The predicted noise levels in Table 8-4 are between 4-8dB above the night-time criteria of LAeq,9hrs 60dB. However the offset distances nominated for these receivers in some cases closely approaches this minimum distance of 83m e.g. receiver 631 @ 74m. Based on acoustic attenuation from a quasi-line source one would expect the exceedance at receiver 631 to be within 1dB of the criteria and not 4dB above it. These anomalies need to be fully explained.

The EPA's detailed review of the NIA, further recommendations and comments are provided in **Attachment B**.

Surface Water Assessment

The EPA has undertaken a review of the report titled *"Mount Pleasant Optimisation Project Surface Water Assessment"* prepared by Hydro Engineering and Consulting Pty Ltd, dated 16 December 2020 (the SWA), and relevant sections in Appendix C (Groundwater Assessment), Appendix E (Aquatic Ecology Assessment) and the main EIS.

Following are the key issues from the review for consideration and clarification.

Amendments to the water balance are required to ensure it reliably predicts discharge frequency and volume

The Mount Pleasant Operation is located in the Upper Sector of the Hunter River (for the purposes of the HRSTS). The location chosen as the input to the modelling for Hunter River flows is in the Middle Sector which affects the accuracy of the predicted discharge volume and frequency.

The Mount Pleasant Operation is predicted, at times, to accommodate a workforce of 600. This will generate significant demand for drinking water and generate a significant volume of wastewater. The demand for drinking water and treatment and reuse of wastewater has not been considered in the water balance.

Water quality impact assessment is not consistent with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* ANZG(2018)

The proponent has approval to construct a discharge dam for the controlled discharge of water under the conditions of the HRSTS. However, the proposed works under the Optimisation Project will increase the water volume and pollutant load to be discharged from this dam. The assessment of the water quality impacts of this discharge and potential overflows from other storages in the SWA does not use adequate data for pollutants such as metals, and the consideration of impacts on receiving waterways is not consistent with ANZG (2018).

It is recommended that the proposal is revisited to ensure the water quality risks are appropriately assessed and managed consistent with section 45 of the *Protection of the Environment Operations Act* 1997.

The EPA's review of the Surface Water Assessment is provided in **Attachment C**.

If you require any further information regarding this matter please contact Karen Gallagher on 4908 6822 or by email to RegOps.MetroRegulation@epa.nsw.gov.au .

Yours sincerely

MEGAN WHELAN
Manager Regulatory Operations Metro North
Environment Protection Authority

Encl: Attachment A – EPA's Review of Air Impact Assessment
Attachment B – EPA's Review of Noise Impact Assessment
Attachment C – EPA's Review of Water Assessment

ATTACHMENT A

Review of Air Quality Impact Assessment

Modelled mitigation measures not described

The assessment of particulate impacts using the dust mitigation measures in table 6-6 of the AQIA indicate that several receptors surrounding the site would have numerous (up to 14 days) additional exceedances of both $PM_{2.5}$ and PM_{10} for the multiple scenarios modelled. The AQIA then considers the predictive/reactive measures used for the project to reduce particulate impacts. The AQIA states that these measures can include temporarily ceasing on-site activities or ceasing those activities that are likely to have significant off-site impacts due to adverse weather conditions. EPL 20850 includes specific conditions under which operations must cease. However, the specific actions and how those actions were applied in the modelling of impacts is not clear in the AQIA. The AQIA includes table 7-9 that indicates the reactive measures reduce the impacts such that only receptors immediately east of the site (112, 118, 120, 120c and 121 already subject to acquisition rights) are predicted to have one additional exceedance. It appears that the modelling of reactive measures has included additional actions or assumptions other than those included as licence conditions, which are likely only to influence impacts to the east of the site. Further, cumulative results with and without these reactive measures are presented only for receptor 147 (north west boundary of site). This receptor is not downwind of the mine in the direction stipulated in licence condition O3.5(b) and the background data used is from Aberdeen and not Muswellbrook NW as the station which PM_{10} concentrations relate to licence condition O3.5(c).
As the reduction of particulate impacts to below the criteria relies on reactive measures, the AQIA has not provided any information regarding the ability of the modelled measures to be successfully implemented in practise. With the proposal seeking to significantly increase the extraction rate, there is uncertainty as to whether the reactive measures are capable of ensuring no additional exceedances in Muswellbrook and at other receptors.

The EPA recommends the AQIA includes details of how the reactive measures were modelled, including, but not limited to:

a) **What specific activities were and were not included in the model,**
b) **What meteorological conditions were used and what number of hours/days this was applied to,**
c) **What monitoring data was used and what number of hours/days this was applied to,**
d) **Adequate justification of which receptors would be reasonably affected by the reactive measures undertaken,**
e) **What meteorological and PM_{10} conditions in addition to the current licence conditions are required to mitigate the additional exceedances (for all receptors that have additional exceedances),**
f) **Details and evidence of the historic use of the proactive and reactive measures in mitigating dust impacts**

Incomplete assessment of particulate impacts

The AQIA presents a 24-hour cumulative assessment as predicted exceedances for only a select number of private receptors (Appendices F and G), the majority of which already have acquisition rights. These private receptors were selected for their proximity to the site, however they are unlikely to represent the complete extent of impacts to private receptors as a result of the proposal and do not adequately represent those receptors that will not be subject to acquisition rights. Appendix D lists the maximum predicted 24-hour $PM_{2.5}$ and PM_{10} incremental impacts for all receptors for each modelled scenario. There are numerous private receptors that have predicted

incremental impacts that are a significant proportion of the impact assessment criteria. This includes 32 private receptors that have incremental impacts that are 50% or greater than the relevant impact assessment criteria for $PM_{2.5}$ or PM_{10}, that are not subject to acquisition rights and that have not been considered for further detailed assessment (cumulative impacts and contemporaneous assessment).

The EPA advises that the level of information provided does not allow for adequate determination of the potential short-term impacts at private receptors that are not subject to acquisition or mitigation rights.

The EPA recommends the proponent present a more detailed assessment of 24-hour cumulative impacts for the privately owned receptors, inclusive of receptors in Muswellbrook and isolated rural receptors, that are not subject to acquisition rights.

Inadequate discussion of background air quality data used

Annual

The AQIA describes an approach to determine the contribution from annual non-modelled dust sources. The background air quality of non-modelled dust sources was estimated by modelling past mining activities for 2012-2015 and comparing model predictions with actual measured data. The average difference for PM_{10} and TSP between the modelled and measured concentrations was then considered the contribution from non-modelled sources and then added to future predicted values to account for background.

The EPA has not provided a discussion regarding the methodology used to model all the mine emissions and impacts, whether the past mining activities modelled considered maximum activity based on consent or actual operations and the monitor stations and their concentrations used to compare the against the modelled data.

The EPA recommends the proponent:

- **Clarifies the methodology used to model the past mining activities, and that the methodology (emission estimation and model setup) is the same as that used to model the impacts from the proposal. Where there are differences in the methodology, the AQIA must robustly justify those differences and account for any implications on the final assessment results and conclusions,**
- **Clarifies and justifies the activity rate used to model past mining activities and discussion that the non-modelled background is representative,**
- **Provides the details of all monitoring stations and particulate concentration data used to compare the modelled concentrations against.**

24-hour

For 24-hour background PM_{10} data, the AQIA states that there are 3 suitable monitoring stations and the closest monitor is used in the cumulative assessment, with the exception for receptors west of the site in which Aberdeen station has been used. With the exception of the contemporaneous assessment presented for receptor 147, it has not been identified which monitor was used for background air quality, particularly for the receptors east of the site.
Further, receptors that are closer to mining operations than the monitor used for their background 24-hour concentrations are likely to experience greater particulate concentrations than the monitoring station.

The EPA recommends the proponent clarifies which monitor was used to assess 24-hour cumulative impacts for each receptor and that all receptors have representative background concentrations.

Receptors subject to acquisition rights - PM10 incremental exceedances

The AQIA predicts that for project only (incremental) 24-hour PM_{10} impacts there will be exceedance of the impact assessment criteria (IAC) of 50 µg/m^3 for eight private receptors for the scenarios modelled (Tables 7-2, 7-3, 7-4, 7-5 and Appendix D). As many as 19 days of additional exceedances are predicted from incremental PM_{10} impacts with concentrations up to 104 µg/m^3. The receptors that currently have acquisition rights are 143b, 147, 153a, 154, 154b, 156a, 157a and 159. The AQIA states that these receptors already have acquisition rights under the development consent due to noise impacts.

The EPA identifies that there are inconsistencies within the AQIA (Section 7.1.2 and Appendix A) regarding which receptors have acquisition rights.

The EPA recommends that the AQIA clearly identify all the receptors that already have or as a result of this project will have acquisition rights.

ATTACHMENT B

Review of the Noise Impact Assessment

Noise assessment criteria

Premises based noise assessment criteria

The SEARs for the proposal require an assessment against the Noise Policy for Industry (NPfI – EPA, 2017). The NPfI, Implementation and transitional arrangements for the Noise Policy for Industry indicates that where a modification requires an NIA and/or where a significant change to plant equipment or processes is proposed that an assessment of the operation against the NPfI is required. The extension of mine life by some 22 years and the increase in production is considered significant and hence an assessment against the NPfI is considered appropriate. This has been adopted in the NIA.

Off-site transport noise assessment criteria

The SEARs require an assessment against the NSW Road Noise Policy (RNP - DECCW, 2011) and NSW Rail Infrastructure Noise Guideline (RING- EPA, 2013). This is considered appropriate and has been adopted in the NIA.

Blasting

The SEARs require an assessment of blasting noise and vibration impacts against the ANZEC, Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990). This is considered appropriate and has been adopted in the NIA.

The SEARs and NIA have also considered the Voluntary Land Acquisition and Mitigation Policy (VLAMP - DP&E, 2018) and the Assessing vibration: A technical Guideline (DECC, 2006).

Premises based noise assessment

The NIA has considered over 900 receiver locations in the assessment. The NIA, Appendix B provides details of all receiver location considered in the assessment.

The NIA has reassessed and defined Noise Assessment Groups (NAGs) for the project. This has resulted in a simplification to previous assessments as only two (2) NAGs have been defined i.e. **NAG1** - Residences within Muswellbrook, in particular those close to the centre of town, Bridge Street, Aberdeen Street, Sydney Street and New England Highway; and, **NAG2** - Rural residences located within approximately 90 m of the New England Highway between Muswellbrook and Aberdeen.

The premises-based noise assessment criteria for NAGs 1 & 2 have been derived on the basis of two background noise surveys undertaken in 2018 and 2020. The 2018 survey consisted of sixteen (16) locations and was undertaken before Mt Pleasant began evening / night operations and included both unattended and attended measurement. The 2020 supplementary noise survey consisted of five (5) locations in and around Muswellbrook and included both unattended and attended monitoring techniques. The background monitoring analysis and reporting in the NIA is extensive and well explained and justified. The derived rating backing noise levels (RBLs) for NAGs 1 and 2 are therefore well justified and accepted. The derived project noise trigger levels (PNTLs) for **NAG 1** are LAeq,15min (day/evening/night) 40/38/36dB and for **NAG2** LAeq,15min (day/evening/night) 42/41/35dB. All residential receiver locations outside of the identifies NAGs have been assessed against the NPfI default minimum criteria of LAeq,15min (day/evening/night)

40/35/35dB respectively which is a conservative approach. The triggers for night-time maximum event level assessment are LAeq,15min 40dB and LAFmax 52dB and satisfy the NPfI requirements. PNTL's for non-residential sensitive receivers have been derived using the amenity levels in the NPfI.

Meteorological conditions

The NIA presents an assessment of prevailing meteorological in accordance with Fact Sheet D of the NPfI using data from the Mount Pleasant Operation M-WM2 Automatic Weather Station for the period 1/12/2016 to 31/8/2019. The analysis has determined that "standard meteorological conditions" are relevant for the day and evening period and that "noise enhancing meteorological" conditions are relevant for the night-time period. However, the NIA presents an additional layer of assessment to determine the frequency of occurrence of light drainage winds during F class inversion conditions. The analysis suggests that light winds up to 2m/s occur for less than 5% of the time in any direction during moderate to strong inversions. On this basis modelling for night-time conditions has only considered F class inversions with a 0.5m/s drainage flow as opposed to 2m/s required by the NPfI. While the EPA accepts this approach for noise modelling purposes, noise limits will require compliance with night-time levels under F class inversions with a 2m/s drainage flow. This will require the proponent to apply careful mine noise management techniques during these relatively infrequent metrological conditions. Equally so, F class stability with a 0.5m/s wind is similar in noise propagation to stability category A-D with 3m/s source to receiver wind so limits should also apply under these conditions to allow compliance to be determined under a broader range of meteorological conditions.

Annoying noise characteristics

The NIA has only considered low frequency noise. While tonality and intermittency are unlikely to be relevant for a large scale mine, they should be considered in the NIA. In term of low frequency noise, while the assessment methodology is considered acceptable, the following points require clarification:

- The results are atypical for a large scale mining operation. The low frequency noise assessment should be confirmed with specific attention as to why low frequency content appears to be significantly lower than comparable mining operations with receivers at similar offset distances; and,
- The LFN assessment has relied upon measurement data acquired in the village of Bulga, which is an acceptable approach for a greenfield site. However, Mt Pleasant is a brownfield site. Why has data from Mt Pleasant not been used to assist in the low frequency analysis. The applicability of the "LF tail" used in the assessment should be validated against measurements from existing Mt Pleasant operations. For example Wilkinson Murray undertook measurements in April 2020 to assist in model validation. These measurements could also be used to assist in low frequency noise validation.

Premises based operational noise modelling has undertaken using the Environmental Noise Model (ENM). This model is commonly used in mining noise assessments. The modelling has considered the following mine life years: 2026, 2028, 2031, 2034, 2041, 2044 and 2047. In term of model validation / calibration, the EPA notes the NIA presents a rigorous model validation study. The EPA notes that the operational noise model was iterative taking into account feasible and reasonable noise mitigation measures in s.6.3 of the NIA.

Residual impacts under VLAMP: Development Consent 92/97 includes premises that are subject to voluntary acquisition and mitigation under the VLAMP for current Mt Pleasant operations. The NIA indicates that modelled noise impacts warrant two additional receivers being allocated voluntary acquisition rights i.e. receivers 154 and 154b. The NIA indicates that no additional receivers require additional voluntary mitigation rights. However, it appears that receivers 35 and 35b qualify for additional mitigation and are not currently listed in DA92/97.

Process to develop premises-based noise limits once other issues are resolved / confirmed

Once the required additional information is received that confirms the modelled noise levels, the EPA recommends that noise limits be set following the following protocols:

- EPA will not set EPL limits to receivers that have impacts more than 5dB above the PNTL. EPA expects that impacts at these receivers will be managed through the development approval through implantation of the VLAMP.
- EPA expects that receivers who have impacts between 3-5dB over the PNTL will be afforded voluntary mitigation rights under the VLAMP. Noise limits should be stipulated at these locations.
- Specific noise limit should be set for receivers that have residual noise impacts (i.e. noise levels above the PNTLs) after all feasible and reasonable mitigation is considered.
- Night-time noise levels are highest due to the meteorological conditions considered i.e. F class inversions with 0.5m/s omnidirectional wind. The night-time levels should be set for daytime and evening in accordance with NPfI requirements. As these levels consider noise enhancing conditions under the NPfI for night-time, noise enhancing conditions should be set for day and evening i.e. Stability category A-D with 3m/s omnidirectional wind.
- For receivers with predicted noise levels below the PNTLs, the limits should be set for NAG1, NAG2 and all other residential receivers at the PNTLs.
    - On the basis of the NPfI Implementation and transitional arrangements https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/17p0293-implement-transition-arrange-noise-pol-industry.pdf where the proponent has indicated that daytime levels below 40dB but equal to or above 35dB can be met, those levels shall be applied as limits where they can be feasibly and reasonably achieved.

Road Traffic Noise Impacts

- Road traffic noise has been assessed for Wybong Road and Kayuga Road for both peak construction (2026) and operation (2036) years.
- For the 2026 scenario the EPA notes that only one receiver will experience noise levels over the relevant RNP criteria together with a change in noise levels greater that 2dB i.e. receiver 43. This receiver is subject to mitigation upon request under DA92/97.
- For the 2036 scenario thirteen receivers (13) will experience noise levels over the relevant RNP criteria together with a change in noise levels greater than 2dB (i.e. 43, 67, 74, 77, 526, 96, 102, 120, 120c, 121, 147, 156a and 159).
- EPAs regulation of this project will not extend to impacts from road transport. It is recommended that planning carefully considers feasible and reasonable mitigation measures for potential road transport impacts.

Rail Traffic Noise Impacts

- The assessment of the spur between the project and the ARTC network has indicated two negligible exceedances at receivers 20 and 21. The NIA identifies both receivers as eligible for voluntary mitigation under the terms of DA92/97.
- In terms of the network rail noise assessment, the following points require clarification by the proponent:
    - Were sensitive receivers identified within the offset distances outlined in the NIA, Table 8-3 for the section of network line between Muswellbrook Junction to Anteine Rail Spur?
    - The NIA, Table 8-3 identifies required RING compliance offset distances to sensitive receivers from the section of network line between Mt Pleasant Operations Rail Spur to Muswellbrook Junction. Table 8-4 presents predicted noise levels for four

(4) receivers identified as being within the compliance night-time offset distance of 83dB(A). The predicted noise levels in Table 8-4 are between 4-8dB above the night time criteria of LAeq,9hrs 60dB. However the offset distances nominated for these receivers in some cases closely approaches this minimum distance of 83m e.g. receiver 631 @ 74m. Based on acoustic attenuation from a quasi-line source one would expect the exceedance at receiver 631 to be within 1dB of the criteria and not 4dB above it. These anomalies need to be fully explained.

Blasting Assessment

The EPA's regulation of blasting does not extend to structural or cosmetic damage and expects that suitable conditions will be included in any project approval for these impacts. The NIA has indicated that blasting activities can be managed to within human comfort thresholds outlined in the ANZEC, Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990). The EPA can recommend standard conditions when other matters have been resolved.

ATTACHMENT C

Review of Surface Water Assessment

Operational water and salt balance modelling

The operational water balance modelling assumes discharge can occur during "high" flow events (as defined under the HRSTS) and uses Hunter River daily flows at Denman to assess discharge opportunities and volumes. The Mount Pleasant Operation is located in the Upper Sector of the Hunter River for the purposes of the HRSTS and this sector starts upstream of Denman. To ensure that the discharge opportunities are accurately reflected in the modelling, the model should use Hunter River daily flows at a location in the Upper sector, and not at Denman which is located in the Middle Sector.

The Upper Sector has few opportunities to discharge during high flow events under the HRSTS. The modelling indicates that the main storages (the mine water dams) maintain a high and relatively constant water storage volume leaving little capacity for storing additional water if discharge opportunities are not available. In addition, the discharge dam (DW1) has a capacity of 363ML which is less than the estimated average annual release volume from DW1 of 469ML. While the modelling estimates total volume of discharges it does not indicate frequency. Modelling of overflows from storage ED3 shows that it does not achieve the 1% AEP spill risk design criterion. The proponent should revise the storage capacity of ED3 and demonstrate achievement of the 1% AEP spill risk design criterion.

The source of drinking water for the site has not been identified and the treatment and disposal of wastewater from amenities has not been accounted for in the water balance.

To ensure that the water balance reliably predicts the likely frequency and volume of discharges (including mine water overflows and controlled discharges and any managed overflows from sediment basins) it is recommended that the proponent revises the water balance model to ensure that it:

- **reflects the location of the site in the Upper Sector of the Hunter River (for the purposes of the HRSTS)**
- **considers other water uses and disposal on site such as amenities and wastewater from on-site sewage treatment plants**
- **optimally uses all available storages to eliminate or minimise discharges, including but not limited to the mine pits and the fines emplacement area**
- **provides the frequency of any overflows, discharges and spills**
- **achieves the 1% AEP spill risk design criterion for all storages.**

Following the revision of the water balance model it is recommended that the proponent appropriately size their water infrastructure considering the potential to eliminate discharges and minimise the need to draw water from the Hunter River using WALs.

It is also recommended that the applicant clarifies the source of drinking water for the site.

Water quality impact assessment

The *Surface Water Assessment* is not consistent with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG2018). There are a number of issues with the assessment including:

- failure to identify the appropriate NSW Water Quality Objectives for the waterways affected by the proposal
- inadequate data for many pollutants in storages and the controlled discharge (up to 3 samples only)
- inappropriate method used for deriving site specific guideline values

- the reason for a mixing zone assessment and the method used is unclear
- impacts are determined to be negligible based on comparing water quality in the discharge to that recorded at surface water monitoring sites instead of the appropriate (default) guideline values

The minimal data that is available for pollutants such as metals indicates that aluminium exceeds the default guideline value in all storages and warrants further investigation. Exceedances are also observed for chromium, copper, lead, nickel and zinc in various storages. A more comprehensive set of pollutant data is required for all storages and discharges before the water quality impacts of the proposal can be assessed.

If, following revision of the water balance and re-sizing of water infrastructure, discharges are unavoidable it is recommended that the proponent revises the water pollution impact assessment to identify the level of pollution and potential impacts on receiving waterways. The assessment would also inform EPA consideration of the relevant matters under s45 POEO Act. The assessment must, at a minimum:

- **characterise the discharge(s) for the concentrations and loads of all pollutants with the potential to cause non-trivial harm using a comprehensive set of data**
- **assess the potential impact of discharge(s) on the environmental values of the receiving waterway, including typical through to worst-case scenarios, with reference to the relevant guideline values for a slightly to moderately disturbed waterway consistent with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality ANZG(2018) or reference to a site specific guideline value derived using a reference site agreed to by the EPA**
- **where a mixing zone is required, demonstrate how the National Water Quality Guideline criteria for relevant chemical and non-chemical parameters are met at the edge of the initial mixing zone of the discharge**
- **demonstrate how the proposal will be designed and operated to:**
  - **i protect the Water Quality Objectives for receiving waters where they are currently being achieved;**
  - **ii contribute towards achievement of the Water Quality Objectives over time where they are not currently being achieved; and**
- **demonstrate that all practical and reasonable measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented.**

Monitoring

Ongoing monitoring of pollutants in the discharge water (from DW1) should not be limited to pH, EC and TSS. Following revision of the water quality impact assessment a full range of appropriate pollutants should be included in the monitoring program, including but not limited to metals and nutrients of concern.