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9 March 2023

Subject: Hunter Valley Operations North Continuation Project (SSD-11826681) and Hunter Valley Operations South Continuation Project (SSD-11826621) – Environmental Impact Statement

Dear Joe Fittell

I refer to your request for advice sent on 27 January 2023 to the Department of Planning and Environment (DPE) Water about the above matter.

The project comprises the continuation of the life of Hunter Valley Operations (HVO) - North and South. This includes optimising resource recovery through mining previously mined areas and extracting coal from deeper seams at HVO North. Activities at HVO South include a change to mining sequence and a reduction in coal extraction.

DPE Water has reviewed the Environmental Impact Statement and has identified a number of recommendations to be addressed prior to and post determination of the project. Of note the proposed change to the location and timing of construction of the Carrington West Wing Pit low permeability barrier poses significant risk to the water source, unless the pit is set back further from the alluvium than currently approved. Other recommendations include refining the groundwater modelling to improve the understanding of project impacts and to reduce the error margin, and providing a consolidated water balance that addresses maximum water take and demonstrates the ability to hold entitlement.

Please see attachment A for a comprehensive list of recommendations and supporting detailed explanations. DPE Water can be available to provide further detail on how the advice applies to the individual North and South projects if required.

Should you have any further queries in relation to this submission please do not hesitate to contact DPE Water Assessments water.assessments@dpie.nsw.gov.au or to the following coordinating officer within DPE Water: Tim Baker – Senior Project Officer E: Tim.Baker@dpie.nsw.gov.au M: 0428 162 097

Yours sincerely



Mitchell Isaacs
Chief Knowledge Officer
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Attachment A

Detailed advice to DPE Planning & Assessment regarding the HVO North Open Cut Coal Continuation Project (SSD-11826681) and HVO South Open Cut Coal Continuation Project (SSD-11826621) – Environmental Impact Statement

1.0 Water Take and Licencing

1.1 Recommendation – Prior to Determination

That the proponent provides Water Access Licence numbers that are to be used to account for water take due to the project and that the corresponding points of water take are defined.

Explanation

The documentation has included totals of entitlements held, however details of the specific Water Access Licences and which is to be used to account for what component of water take has not been provided. This is required to understand the adequacy of the water licencing approach.

1.2 Recommendation – Prior to Determination

That a consolidated water balance be provided for a range of climatic scenarios during the project life and post closure until equilibrium is reached for all relevant sources (both surface and groundwater) including any direct and indirect take.

Explanation

The water balance figures provided are generally for median/average take which is insufficient to determine the maximum water take (surface and groundwater) for the project. This is also required for the post mining period and includes the need to revise the groundwater inflow data which is currently presented as stabilised inflow estimates. Further to this, variable water volumes were presented for some areas of water take in different sections of the documentation which require clarification, eg. groundwater inflows of 1136ML/yr in one section and in excess of 2000ML/yr in another.

The water balance is also expected to clearly define the source of water volumes held or captured in storages or excavations, the storages capacities, whether this water requires licencing or is exempt, and its movement and use around the site. Baseflow losses also need to be quantified in the water balance.

1.3 Recommendation – Prior to Determination

That the proponent demonstrate sufficient entitlement can be acquired in all relevant water sources to account for the maximum predicted water take.

Explanation

A review of the site water balance following an assessment against a range of climatic scenarios is recommended to confirm the maximum water take. Should these predictions exceed the water entitlement currently held, the ability to obtain the necessary entitlement will need to be demonstrated and/or to confirm if any take is covered by relevant exclusions/exemptions.

Water held or captured in storages on minor streams (first and second order watercourses) can be considered under the Maximum Harvestable Rights Dam Capacity

(MHRDC), or potentially as an excluded dam under Schedule 1 of the Water Management (General) Regulation 2018. Further information can be accessed from the factsheet, “Interpreting excluded works dams (DPE 2022) available at the following link: https://water.nsw.gov.au/_data/assets/pdf_file/0008/554444/excluded-work-exemption-fact-sheet.pdf

When interpreting the presence of a watercourse and its stream order for licensing purposes the hydroline layer available from the Departments website is the appropriate tool to use. This is accessible at the following link: <https://www.dpie.nsw.gov.au/water/licensing-and-trade/hydro-line-spatial-data> Please note no exemptions were deemed relevant to the water take associated with Lake James. Both Lake James and Parnell Dam are located on third order watercourses and need to be considered for licensing purposes.

Water runoff captured and used from dams constructed on third or higher order watercourses, or harvestable rights dams that exceed the MHRDC need to be quantified and accounted for by holding sufficient water entitlement.

Baseflow losses must also be accounted for.

2.0 Groundwater Impacts and Monitoring

2.1 Recommendation – Prior to Determination

That the proposed change in location and design of the currently approved Carrington West Wing Pit low permeability barrier not be supported due to potential increased risk to the Hunter River, the alluvium and water users. It is recommended one of the following two options be implemented to mitigate this risk:

1. Implement a 150m setback between the West Carrington Pit and the edge of the Hunter Regulated River Alluvial Water Source. This would be consistent with the guideline, “*Management of stream/aquifer systems in coal mining development – Hunter Region (DIPNR 2005)*” and remove the requirement for the installation of a low permeability barrier.
2. If a low permeability barrier is to be maintained, that its construction occur prior to mining as currently approved, and that this include a demonstration of its performance consistent with current consent requirements in conditions 23 and 24 of development consent DA 450-10-2003.

Explanation

The current proposal is to construct the low permeability wall on the benches of the highwall that intercept the alluvium after mining. This differs from the approved barrier wall design which requires excavation of a trench prior to mining across the inferred extent of the paleochannel alluvium and keyed into unweathered rock.

The existing approval for mining at Carrington West Wing requires the barrier wall to be constructed prior to mining, and that mining should cease within 100 metres of the paleochannel should the barrier be identified to not be achieving its performance objectives and measures. This requirement is a key mitigating measure during and post mining to reduce the extent of drawdown and protect the alluvial aquifer, Hunter River and their dependent ecosystem and other water users. This approach is consistent with the avoid/prevent strategy to mitigate impacts and should be implemented where possible. DPE Water considers a significant risk exists of a hydrological connection between the Hunter River/alluvial aquifer and the mine pit that requires a precautionary approach.

The proposal to construct the barrier wall after mining is of significant concern to DPE Water. This is because it will not provide the opportunity to establish a mechanism to

mitigate impacts to the alluvium and the Hunter River prior to the activity occurring. This represents a significant risk to a key water source in the Hunter Valley. Instead the proposal will enable inflows to the mining area to occur during the mining period which will potentially result in additional water loss from the alluvial groundwater system and connected Hunter River. Further to this, the placement of the barrier on the mining pit benches raises significant concern in terms of its stability and long term management in comparison to a barrier installed and maintained within in-situ material.

The proposed barrier wall will not stop the drawdown in the alluvium completely as depressurisation of the Permian aquifer underlying the alluvium allows drawdown to occur beneath the barrier wall. Uncertainty analysis conducted by the proponent shows it is very likely (90-100% probability) that the Project will result in more than 2 meters of drawdown around the barrier wall which will result in associated drawdown in the alluvial groundwater system and loss from the Hunter River.

It is noted implementing the 150m buffer from the edge of the Hunter Regulated alluvium is a minor change in the scale of the overall project, however would represent a significant measure to mitigate short and long term risk to the alluvium and the Hunter River. Adopting this precautionary approach would also negate the need to construct a low permeability barrier wall and enable a review of the levee design and location which has the potential to reduce potential flooding consequences.

Condition 23 and 24 of development consent DA 450-10-2003 states:

23. The Applicant must design the Carrington West Wing LPB to the satisfaction of DPI Water and the Secretary. The detailed design must:

(a) ensure that negligible movement of water can occur through the barrier in either direction over the long term; (b) be prepared by a suitably qualified and experienced expert/s; (c) be endorsed by DPI Water and approved by the Secretary, prior to construction of the LPB; (d) achieve the relevant performance measures including:

- **applicable permeability of 10-8 metres/second or less;**
- **applicable Australian Standards (including AS 3798-2007);**
- **hydraulic, geomorphologic and seismic stability which will withstand any blasting related vibrations, mining operations, fluvial and weather events, decay corrosive and biological attack."**

24. Prior to undertaking any mining within 100 metres of the western arm of the Hunter River paleochannel, the Applicant shall:

a) install the LPB in the western arm of the paleochannel.....

If there is evidence after its installation that the LPB is not achieving the performance objective and performance measures in Condition 23 of Schedule 4, mining operations within 100 metres of the western arm of the Hunter river paleochannel must cease until approval to recommence is granted by the Director-General.

2.2 Recommendation – Post Approval

That the proponent prepares a Water Management Plan to prescribe comprehensive monitoring, management and mitigation options that minimise groundwater losses from the Hunter Regulated River and alluvium.

Explanation

DPE Water hold residual concerns that with mining proposed in close proximity to the Hunter Regulated River and with the interception of the floodplain, there is the risk of a significant hydrological connection being generated that would permit interflow of surface water and groundwater between the Hunter Regulated River/alluvial aquifer towards the mine pit. This is due to the coal seams that are being mined also subcropping beneath the Hunter Regulated River and alluvium.

The Water Management Plan must present a descriptive strategy that will monitor and evaluate groundwater ingress into the mine originating from the Hunter Regulated River and alluvial aquifer.

3.0 Groundwater Modelling

3.1 Recommendation – Prior to Determination

That the proponent completes refinements to the groundwater modelling as follows:

- Design and run additional model scenarios to assess the impacts of the proposed HVO Project (the Project) separately from other ongoing/historical mining operations, in addition to the provided cumulative impact assessment. This is also to include the aim of reducing the scaled root mean squared error (SRMS) of the model to within guideline limits. It is to include:
 - an assessment of the Project's direct and cumulative groundwater level drawdown impacts at all bores and Groundwater Dependent Ecosystems (GDEs) in the area. The assessment should be presented from the onset of HVO to the year 2100. This can be provided in graphical form (hydrographs) and/or table format for key years. It must include an assessment of uncertainty analysis.

Explanation

DPE Water has identified several limitations in the modelling work used to inform the proponent's impact predictions. This includes not specifically presenting the impacts of the proposed project and that the scaled root mean squared error (SRMS) exceeds the recommended guideline value. Consequently, there remains concern over the level of accuracy in aquifer drawdown, water take and impact to GDEs and water quality. The longer-term consequences with mining activities being located within or near these high value water dependent assets of the Hunter Regulated River, Wollombi Brook and associated alluvial aquifers warrants further modelling investigation along with consideration for a more precautionary approach to the boundary limits of mining.

The groundwater modelling prepared by Australasian Groundwater Environmental (AGE) presented in Appendix A of Appendix K to the EIS includes results and predictions that are reported as cumulative impacts from all mining operations in the area. The distinct effects of the historic HVO mining and potential impacts of the proposed Project are not explicitly and specifically presented. The modelling has not provided a clear, direct, quantitative assessment of groundwater level drawdown impacts on users (bores and groundwater dependent ecosystems (GDEs)). This is required to assess compliance with the NSW Aquifer Interference Policy (AIP).

The modelling has been undertaken following best practice guidelines and using state of the art technology and techniques. A significant dataset is used to adequately characterise the hydrogeological system and calibrate the model. However, the reported model has relatively high scaled root mean squared error (SRMS). The SRMS is 9.2% considering all available data, increasing to 13% considering HVO data alone. According to the Australian Groundwater Modelling Guidelines (Barnett et al. 2012), SRMS should not exceed 10%. The current model's SRMS is generally elevated and noticeably exceeds the acceptable limits in the Project area. Groundwater modelling is an iterative process. Model validation and updating using new data from existing and new monitoring sites could reduce the models SRMS, increasing confidence in its predictions. Within this context, progressive model development should guide the development of investigation and a monitoring plan.

Carefully designed model scenarios should be run to assess the impacts of the Project separately from other mining operations. This is required in addition to the cumulative

impacts presented in the Groundwater Modelling Technical Report, the Groundwater Impacts Assessment, and the Water Assessment report. Additional model scenarios could reduce the models SRMS.

Groundwater level drawdown effects from the Project and groundwater level drawdown from all projects in the area must be assessed to be able to address the minimal impact considerations and make-good provisions as required by the AIP. The assessment must also include an adequate uncertainty analysis as required by the Australian Groundwater Modelling Guidelines (AGMG 2012) and the NSW SSD minimum groundwater modelling requirements (DPE 2022).

3.2 Recommendation – Prior to Determination

That the proponent undertakes a modelling review independent of the project joint venture partners and their consultants.

Explanation

The Project documentation includes a peer review of the groundwater model that is described to be ‘independent’. However, it is undertaken by an employee of EMM, the company that commissioned the modelling to AGE. Hence, the review is not independent as required in the Australian Groundwater Modelling Guidelines (AGMG 2012), the NSW Aquifer Interference Policy (AIP 2012) and the NSW SSD minimum groundwater modelling requirements (DPE 2022).

3.3 Recommendation – Prior to Determination

That the proponent revise the title of Table D13 in Appendix D (Groundwater modelling technical report) of the AGE Groundwater Impact Assessment report and check all relevant documents to ensure the use of proper units for determining water take for the project.

Explanation

The title of Table D13 refers to ML/day whereas the information included in the table is based on ML/year.

3.4 Recommendation – Post approval

That the proponent validate (post-audit) and update the groundwater model over time as follows:

- every three years until the end of the mining operations; and
- every five years thereafter until 2060.

4.0 Waterfront Land

4.1 Recommendation – Prior to Determination

That the proponent confirm how the Guidelines for Controlled Activities on Waterfront Land (DPE 2022) have been applied to the proposed activities and that a clear assessment of impacts on watercourses has been provided.

Explanation

The expansion area of Lake James and the area between the Mitchell and Carrington Pits appears to cover mapped watercourses ranging from 1st to 3rd order. It is unclear what the impacts on these proposed watercourses are and whether appropriate setbacks to these watercourses are being applied to meet the requirements of the Guidelines for Controlled Activities on Waterfront Land (DPE 2022).

4.2 Recommendation – Prior to Determination

That works which will result in alterations to the hydrology of the Hunter River or its floodplain and tributaries be reviewed to ensure no impact to the structural integrity of Hunter Valley Flood Mitigation Scheme bank stabilisation works shown in Attachment B.

Explanation

DPE Water is aware there are a number of old Hunter Valley Flood Mitigation Scheme bank stabilisation works on the Hunter River, Bowmans Creek and Wollombi Brook. These are depicted in Attachment B. Identification and assessment of these works in terms of potential impacts due to the project and mitigation is required.

4.3 Recommendation – Post approval

That works within waterfront land are in accordance with the Guidelines for Controlled Activities on Waterfront Land (DPE 2022).

Explanation

A range of proposed activities are within waterfront land. This includes several watercourse crossings for the Lemington access road re-alignment and transmission line corridor access roads. All crossings should be in accordance with the Guidelines for Controlled Activities on Waterfront Land – Watercourse Crossings. Transmission line corridors will also include transmission line pole pads which should be setback from any watercourses in accordance with the Guidelines – Riparian Corridors. The proposed spillway for Parnells dam should show due consideration to the Guidelines for Controlled Activities – Outlet Structures and ensure appropriate scour protection is in place.

End of Attachment

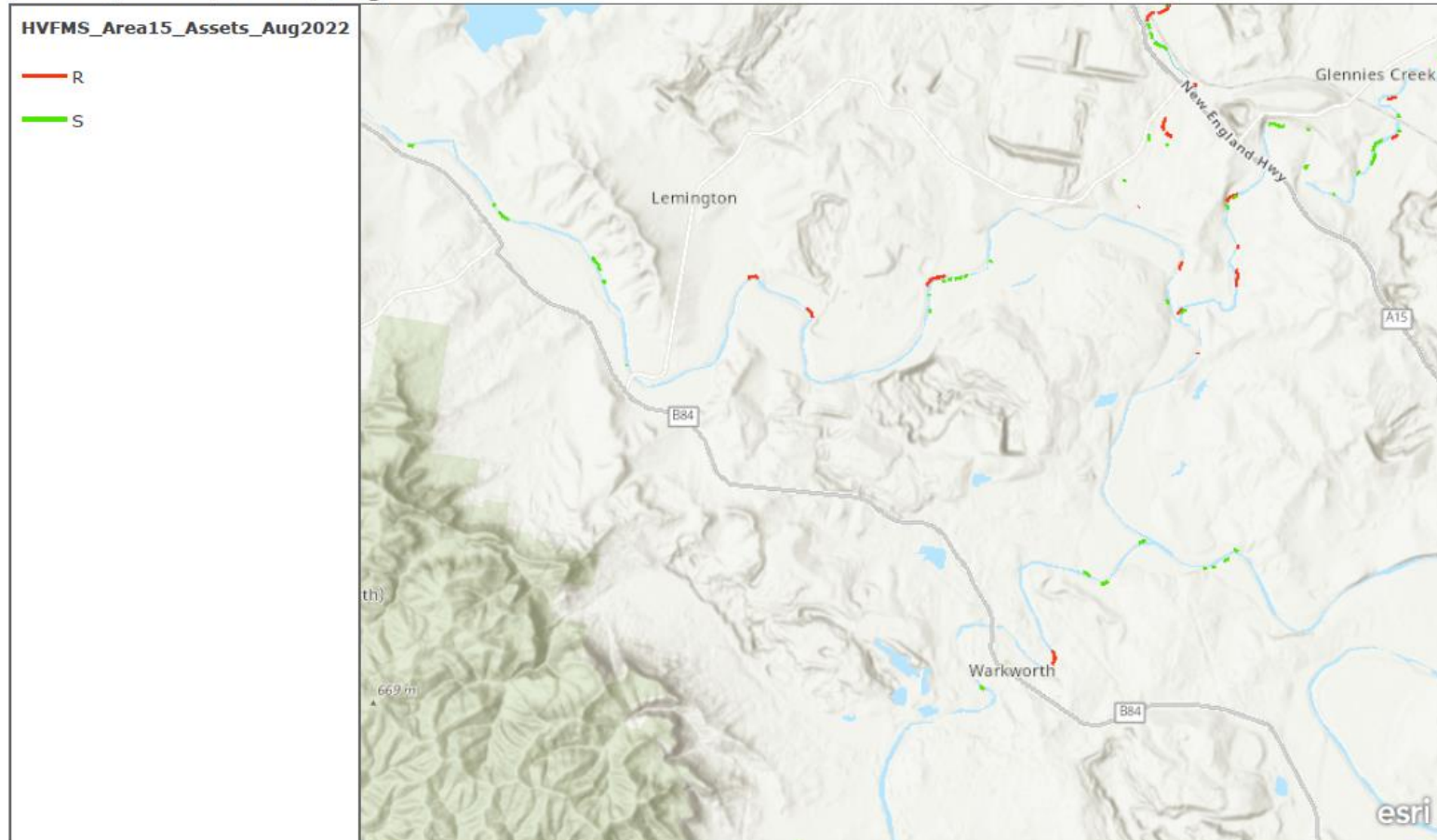
Attachment B

Hunter Valley Flood Mitigation Scheme Assets

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ArcGIS - HVFMS_Area15_Assets_Aug2022

HVFMS_Area15_Assets_Aug2022



Aug 2022 version of HVFMS Area 15 assets (inc. SAP codes) & attributes, plus attachments

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