Your Ref: PAE-50379722
Our Ref: DOC22/989416-28

Mr Iwan Davies
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By email: iwan.davies@planning.nsw.gov.au

21 December 2022

Dear Mr Davies

Shoalhaven Hydro Expansion Project – SSI-10033

I am writing in reply to your request for comment from the Environment Protection Authority (EPA) regarding the Shoalhaven Hydro Expansion Project (SSI-10033) Environmental Impact Statement (EIS).

The EPA has reviewed the EIS and determined that it will require further information or clarification to complete its assessment and to provide further advice on the proposal. These requirements (including comments and recommendations) are detailed in Attachment A and relate to:

- Level of protection of waterways
- Potential water pollution impacts and management
- Noise and Vibration Impact Assessment
- Air Quality Impact Assessment

This letter should be read in conjunction with our initial comments on the EIS (EPA Reference DOC22/989416-24, dated 2 December 2022).

If you have any questions about this matter, please contact Greg Frost on telephone 02 4224 4113.

Yours sincerely

PETER BLOEM
Manager Regulatory Operations

ATTACHMENT A

EPA INFORMATION REQUIREMENTS FOLLOWING REVIEW OF ENVIRONMENTAL IMPACT STATEMENT

LEVEL OF PROTECTION OF WATERWAYS

The assessment for waterways should adopt the appropriate level of protection

All States and Territories have adopted the National Water Quality Management Strategy (NWQMS) for managing water quality. The central technical reference document within the NWQMS is the *Australian and New Zealand guidelines for fresh and marine water quality* (ANZG 2018). The guidelines provide an agreed framework for assessing and conserving ambient water quality according to whether the water is suitable for a range of environmental values.

The NSW Water Quality Objectives are the environmental values and long-term goals for consideration when assessing and managing the likely impact of activities on waterways. The guiding principles are that:

- where the environmental values are being achieved in a waterway, they should be protected, and
- where the environmental values are not being achieved in a waterway, all activities should work towards their achievement over time.

Consistent with the NWQMS, the policy in NSW is that waterways that flow through relatively undisturbed national parks, World Heritage areas or wetlands of outstanding ecological significance are designated as being of high conservation value. The national water quality guidelines (ANZG 2018) recommend that for high conservation/ecological value ecosystems there should be:

- no change in biodiversity beyond natural variability (biological indicators)
- no change beyond natural variability using ecologically conservative decision criteria for detecting change (physical and chemical stressors). Any relaxation of the objective should only occur where comprehensive biological effects data clearly show that biodiversity would not be altered.
- for toxicants generated by human activities, detection at any concentration could be grounds for investigating their source and for management intervention. For natural occurring toxicants, background concentrations should not be exceeded. Where local biological or chemical data have not been gathered, apply the default values. Any relaxation of these objectives should only occur where comprehensive biological effects and monitoring data clearly show that biodiversity would not be altered.

Waterways in the ‘Upper Scheme’ (the upper study area along the plateau) including Trimbles Creek, Yarrunga Creek and associated unnamed tributaries are designated as high conservation value as they discharge directly into Morton National Park and form part of the Sydney Drinking Water Catchment.

Waterways within the ‘Lower Scheme’ (the lower study area within the Kangaroo Valley region) including lower Kings Creek, Bendeela Pondage and Kangaroo River could be considered a slightly to moderately disturbed ecosystem for the purposes of the assessment.

Recommendations

It is recommended that the proponent adopt an appropriate level of protection for waterways in completing the assessment and developing appropriate management and mitigation measures.

POTENTIAL WATER POLLUTION IMPACTS AND MANAGEMENT

1. Spoil management

The project is estimated to generate 420,000m^3 of spoil, with approximately 20% potentially acid forming (PAF). A permanent spoil emplacement area is proposed east of Bendeela Pondage.

The excavated material has not been appropriately characterised

Limited test samples were collected and tested for acid forming properties. The full stratigraphy of the site has not been sampled, with approximately 150m of the Berry Siltstone formation not sampled and likely to contain additional PAF material. The EIS has proposed an additional borehole to be constructed across the full stratigraphy of the site and for additional acid rock testing to inform the spoil management approach.

There has been no geochemical or leachate testing of the expected spoil. The physical and chemical characteristics of the excavated material is unknown.

An appropriate level of testing of the physical and chemical characteristics of the excavated material is required to develop suitable procedures for handling, storing, treating, and disposing of excavated material to avoid/minimise potential water pollution impacts associated with the emplacement area.

The spoil management approach is unclear

The EIS has not demonstrated that the proposed methods to manage spoil will prevent the generation of leachate which could contain pollutants at levels that cause harm.

Methods to manage the PAF spoil in Appendix I (Surface Water Quality, Hydrology and Geomorphology) are inconsistent with Appendix K (Spoil Management Strategy).

Appendix K indicates the proposed spoil management method has been deferred to detailed design, but options include:

- reuse stockpiles of material that is acceptable for re-use without additional treatment
- blending and co-disposal of acid consuming material (ACM) and PAF material within main spoil area
- blending and co-disposal of ACM and PAF in a containment cell
- blending of ACM and PAF for re-use
- neutralising treatment of PAF material prior to encapsulation (e.g. sodium carbonate, sodium hydroxide or magnesium oxide)

Excavation for the Project will begin with elements which are more likely to produce non-acid forming (NAF) and acid consuming material (ACM). These materials would be used as the base layer and capping material '*if encapsulation is required'*. Excavation of the vertical shaft has a higher potential to intersect PAF but would occur later in the program allowing time for establishment of an encapsulation area.

It is unclear:

- how PAF material would be stored and managed should it be encountered prior to the establishment of the encapsulation area.
- if the EIS has considered all reasonable and practical measures to improve water quality (e.g. clean water diversions).
- what the testing frequency of the excavated material during extraction and emplacement will be.

The EIS does not sufficiently characterise existing groundwater environment or probable impacts from permanent spoil emplacement area

The existing characterisation of the spoil and its leachate is unclear and its temporary and permanent management is insufficient to determine if the proposed lining and encapsulation measures in the spoil management strategy is sufficient to protect groundwaters at the proposed spoil emplacement site.

Further details on the spoil characterisation should inform the spoil management and emplacement strategy inclusive of suitable protections for groundwaters including for the siting, lining and/or encapsulation requirements for the pollutants identified.

Temporary stockpile management measures are unclear

Temporary stockpile areas are proposed at the Main Access Portal (445m^2) and the Tailrace Area (225m^2). It is unclear if any temporary stockpile areas are required in the 'Upper Scheme', noting that all excavated material in the 'Upper Scheme' will be transported to the emplacement area. The EIS does not address the potential for contaminated leachate during temporary spoil placement.

Recommendations

It is recommended that the proponent:

- *Undertake geochemical/leachability tests for the full stratigraphy of the site to develop suitable procedures for handling, storing, treating, and disposing of excavated material and inform the retention ponds discharge impact assessment (refer to Section 4 below)*
- *clarify where temporary stockpiling of material would occur in the Upper Scheme*
- *outline mitigation measures and contingencies to be put in place to manage runoff and potential pollution from excavated material yet to be classified*
- *identify the testing frequency for excavated material prior to emplacement*
- *consider and assess any potential risks and impact to receiving waters for all pollutants at non-trivial levels from the rock/spoil emplacements, including leachate, migration of sediment and surface water runoff. If any potential impacts are identified appropriate management and mitigation measures should be proposed.*
- *develop Trigger, Action, Response Plan(s) that includes (but is not limited to):*
    - *contingencies allowing for alternate spoil disposal in the case of unexpected volumes of material unsuitable for disposal*
    - *contingencies for inadequate treatment of leachate from the spoil/ rock.*

2. Process water and groundwater management

During construction, the vertical shaft, tunnels, and other underground works would generate process water consisting of groundwater inflow and water used in the tunnelling process ('process water'). After reuse, an average of 4.9ML/ month would require discharge. A water treatment plant will be designed during detailed design to treat groundwater seepage and tunnel process water.

The EIS does not characterise the groundwater inflow and process water influent quality

The groundwater characterisation is limited to total dissolved solids, calcium, potassium, pH, magnesium, chloride and sulphates. The concentration of other pollutants which may be present at non-trivial levels such as metals and nutrients is unknown. The EIS recommends further groundwater monitoring is required to understand what other contaminants (e.g., metals and nutrients) may be present in the groundwater.

As the EIS has not adequately characterised the influent quality it is unclear how the water treatment plant will be appropriately designed to treat the potentially contaminated water encountered during construction. It is also unclear if chemical additives (brine, coagulants, antifoulants etc) will be discharged from the plant.

The proposed discharge limits are unclear

The EIS indicates that site-specific trigger values will be developed during detailed design to set the water treatment plant discharge limits which *'ensure water will be treated to a level representative of baseline concentrations of a suitable reference site and/or the ANZG guidelines'*.

Consistent with the ANZG (2018) guidelines, if site-specific guideline values are proposed the applicant will need to demonstrate that the selected site(s) are appropriate to act as a site in

'reference condition'. The EPA notes that toxicants are usually compared with a default guideline value and less commonly with a reference distribution as the default values are prepared by analysis of a comprehensive set of available ecotoxicological data.

A discharge impact assessment is required to demonstrate that treated process water and groundwater inflows will be appropriately managed.

The EIS does not contain contingency measures

The EIS does not propose any contingency measures in the event excess process water/groundwater is encountered or the water treatment plant is offline.

Recommendations

It is recommended that the proponent prepares a discharge impact assessment for all groundwater/process water discharges, including but not limited to:

a) characterise the groundwater quality and expected process water quality for all pollutants at non-trivial concentrations

b) characterise each construction and operational groundwater/process water discharge in terms of the expected concentrations and loads of all pollutants that may be introduced into the water cycle by source and discharge point, including any chemical additives (e.g., brine, coagulants, antifoulants)

c) assess the potential impact of discharges on the environmental values of the receiving waterway(s), including typical through to worst-case scenarios with reference to the relevant guideline values consistent with the National Water Quality Guidelines

d) 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

e) demonstrate how the proposal will be designed and operated to:

i. protect the NSW Water Quality Objectives for receiving waters where they are currently being achieved; and

ii. contribute to achieving the NSW Water Quality Objectives over time where they are not being achieved.

f) propose additional or alternative treatment measures if non-trivial risks to waters are identified and contingency measures in the event of the water treatment plant being un-operational.

g) propose discharge criteria for any pollutants that have the potential to cause non-trivial harm based on the impact assessment. If site-specific guideline values are developed for Lake Yarrunga or Bendeela Pondage, these should be derived consistent with ANZG (2018), including being based on the 80th percentile of 24 months of data from an appropriate slightly disturbed reference site.

3. Erosion and sediment control

The EIS has provided a high-level, indicative erosion and sediment control strategy. A more comprehensive Erosion & Sediment Control Plan (ESCP) would be developed by the contractor prior to construction.

The EIS has proposed seven sediment basins which are sized to capture the 5-day 85th percentile rainfall depth. For sediment basins in the 'Upper Scheme', given the nature of the receiving environment and areas of high erosion risk around Trimbles Creek, consideration should be given to enhanced measures including, for example, installing large basins where practicable.

No specific erosion and sediment control details have been provided for the roadworks and access track upgrade, in particular the road widening, levelling, and vegetation removal along the Promised Land Trail within Morton National Park. The EIS indicates the access track '*can be*

sealed along steep or uneven sections of track and have appropriate road drainage which would be captured in drainage sumps'.

Recommendations

It is recommended that the proponent:

a) *provides further details and commitments on the erosion and sediment control approaches for both standard and high conservation value receiving environments with reference to practices and principles of Volume 2 of the Managing Urban Stormwater series and other industry best practice. This could include, but is not limited to:*
   i. *engaging a specialist soil and erosion control practitioner to oversee soil and erosion control for the site during construction*
   ii. *installing larger basins where practicable*
   iii. *prioritise reuse over discharge and pumping between storages to avoid a discharge*
   iv. *stage construction activities so that land disturbance is confined to the minimum area possible*
   v. *use timber windrows during clearing to assist erosion control*
   vi. *retain vegetation within flow lines for as long as possible*
   vii. *retain groundcover on soils to minimise the potential loss of sediment.*
b) *Provides further details of the soil and erosion control measures proposed for each access track in the study area.*

4. Discharges from sediment basins / retention ponds

The EIS has not characterised the expected sediment basin discharge quality

The expected discharge quality for each sediment basin is unclear. Some sediment basins may contain pollutants other than 'clean' sediment, for example runoff from temporary spoil and excavated rock stockpiles or dewatered into during instream works.

The EIS indicates controlled discharges of basins would occur within 5 days of a rainfall event when turbidity and pH concentrations are '*similar to existing water quality of the receiving waterways'.*

Flocculants are proposed if high levels of sediment remain after all reasonable and practical measures have been implemented to avoid discharge. Chemical additives including flocculants can contain toxicants such as aluminium that also have the potential to cause harm to the environment. Any discharges which contain flocculants would need additional consideration in the discharge impact assessment.

Site specific trigger values will be developed during detailed design to set the sediment basin discharge criteria ensuring water will be treated to a level that is representative of background concentration of a suitable reference site and/or the ANZG (2018) guidelines. The EPA notes that as the 'Upper Scheme' is considered a high conservation value receiving environment where the 99% ANZG (2018) species protection applies for toxicants, and 'no change beyond natural variability' applies for physical chemical stressors.

The discharge quality, volume and frequency from the emplacement sediment basin/retention pond is unclear

A retention pond ('Sediment Basin 5') is proposed to capture runoff and leachate from the spoil emplacement area. The EIS has not characterised the expected discharge quality from the spoil emplacement area as there has been no appropriate geochemical/leachability tests to characterise the excavated material. Furthermore, as the emplacement method has not been confirmed, the expected water quality outcomes are unclear.

The EIS indicates a pH dosing system and aeration may be required to neutralise acidity however it is unclear whether further treatment may be required. The EPA notes that changes to pH can

cause toxicants (e.g. metals) to be released from sediments and become bioavailable to aquatic plants and animals.

The expected volume of leachate generated from the emplacement area is unclear. It is also unclear if the emplacement sediment basin / retention pond has been appropriately sized to contain contaminated stormwater/leachate during testing and treatment.

Details of treatment and other practical mitigation measures and appropriate assessment of potential impacts of discharges from the sediment basin/retention pond is required.

Recommendations

Given the nature of the receiving environment, it is recommended that the proponent prepares a discharge impact assessment for all pollutants that may be present at non-trivial levels within each sediment basin/retention pond. The discharge impact assessment must include, at a minimum:

a) identification of all potential pollutants at non-trivial levels which may be present in a discharge from site (including flocculants/coagulants/ spoil/stockpile leachate)

b) estimation of the expected frequency and volume of discharges

c) details of any proposed treatment plant(s) and other measures to minimise potential impacts of discharges

d) assess the potential impact of discharges on receiving waters with reference to the ANZG (2018) guidelines. For sediment basins in the "Upper Scheme" the waterways should be afforded a high conservation value level of protection. Waterways receiving discharges from sediment basins/retention ponds within the 'Lower Scheme' should be afforded a 'slightly to moderately disturbed' level of protection

e) where pollutants have the potential to cause non-trivial harm in discharges, additional or alternate treatment measures should be developed to avoid, minimise and mitigate water pollution risks.

In addition to ANZG (2018), guidance on conducting a water pollution discharge impact assessment can be found at Water pollution discharge assessments (nsw.gov.au)

5. Other activities

Additional information is required for instream works including dredging

The EIS indicates dredging of Lake Yarrunga may be required (EIS Section 4.1). The EIS does not indicate where the dredged material will be placed or how material placed on land will be dewatered. Appendix I (Surface Water Quality, Hydrology and Geomorphology) does not indicate dredging will occur.

The impact assessment for instream works including dredging requires additional information to assess this risk and provide environment protection requirements if necessary.

Recommendations

It is recommended that the proponent provides further information on management of the proposed dredging to demonstrate that the water pollution risks will be appropriately managed. This should include, but is not limited to:

a) the proposed locations and methods of dredging and other instream works

b) the specific measures that will be implemented to mitigate the water pollution risks of these activities (e.g. specifications and locations of silt curtains, monitoring and management responses)

c) details of dredged material placement and dewatering

d) details of any sediment quality assessment.

The applicant should carry out an assessment of the potential impact of these proposed activities after mitigation measures have been implemented. This assessment should include predictions of the level and extent of water quality changes, the potential impact of these changes on the environmental values and uses of the water body (with reference to the relevant guideline values), including potential sedimentation impacts.

Additional information is required for 'mucking' activities

Excess spoil in the Upper Scheme and material would be transported to the spoil emplacement area either by road or through the headrace shaft and 'mucking' via the access tunnel. The EIS does not indicate what 'mucking' involves and whether it will generate excess 'dirty' water.

Recommendations

It is recommended that the proponent provides further information on the process and management of 'mucking' to demonstrate that the pollution risks will be appropriately managed.

NOISE AND VIBRATION IMPACT ASSESSMENT

Sleep disturbance

The sleep disturbance criteria for both construction and operational activities identified in Table 4.4 and Section 4.6.5 of the Noise and Vibration Impact Assessment (NVIA) refer to an external noise level of 65 dBA (55 dBA internal + 10 dB internal to external reduction with open windows) as being unlikely to awaken people from sleep. The most relevant guidance from which to draw sleep disturbance criteria is Section 2.5 of the Noise Policy for Industry (NPfI) as this addresses both awakenings and disturbance sleep stages.

Recommendations

It is recommended that the proponent should revise the sleep disturbance assessment to refer to these criteria and implement all feasible and reasonable mitigation measures and work practices to address any construction or operational noise impacts.

Construction blasting criteria

Section 4.5 of the NVIA discusses construction blasting criteria for vibration and blast overpressure, referencing both the ANZEC blast guidelines relating to human annoyance and AS2187.2-2006. It states that as a very small number of construction blasts would be involved, it is more appropriate to only consider criteria related to protection of buildings from structural damage.

Note: the EPA does not regulate matters relating to structural damage from blasting.

Recommendations

The EPA considers that the NVIA should assess human annoyance effects (vibration and blast overpressure) from all construction blasting activities, particularly from surface blasting. In recognition of the limited extent of the proposed construction blasting, suitable criteria could be drawn from AS2187.2-2006, broadly aligning with the underground blasting criteria put forward in Section 4.5.4 of the NVIA.

The NVIA should also identify all feasible and reasonable measures to address any potential annoyance impacts from blasting activities.

Construction hours of operation

Section 5.2.2 of the NVIA states that construction of the Upper Scheme and Lower Scheme would occur during the recommended standard hours in the Interim Construction Noise Guideline (ICNG) as well as from 1pm to 6pm on Saturdays. Underground activities are to take place on a 24-hour basis, and over-size, over-mass deliveries can also occur at any time.

Recommendations

Any construction activities taking place outside the recommended standard hours in the ICNG must be clearly and fully justified, for reasons other than convenience, in accordance with Section 2.3 of the ICNG.

Sound power levels

The sound power level (SWL) for the 'surge foundation' construction piling activity used in Table 5.3 of the NVIA appears low (103 dBA including a 5 dB penalty for annoyance). It is also unclear how the SWLs assigned to the water treatment plant and tunnel ventilation operational noise sources in Table 5.4 of the NVIA were determined, as no references were provided.

Recommendations

It is recommended that the proponent should review this information and further detail should be provided on the type of construction piling equipment used and the basis/reference for the construction and operational SWLs used in the assessment.

Noise impacts to sensitive receivers

The EPA notes that some construction noise impacts are predicted to surrounding sensitive receivers in Section 6.1 of the NVIA. These include airborne noise impacts for both the upper and lower schemes during daytime period, tunnelling and spoil handling/haulage works during standard hours and outside standard hours, some potential sleep disturbance impacts (pending revised sleep disturbance criteria), and during short term bulk delivery events outside standard hours.

Some potential ground-borne noise impacts are also predicted at nearby residential receivers during road header tunnelling activities at night, as well as some potential exceedances of the human comfort vibration criteria identified for road header tunnel construction.

Some construction traffic noise impacts are also predicted due to increases in traffic volumes along Moss Vale Road and Bendeela Road.

Recommendations

It is recommended that the proponent identify and implement all feasible and reasonable noise mitigation measures and work practices to minimise construction noise and vibration impacts at surrounding sensitive receivers, including those listed in Section 8 of the NVIA.

AIR QUALITY IMPACT ASSESSMENT

The EPA has several comments to make on the Air Quality Impact Assessment (AQIA) provided with the application. These comments are as follows:

- The closest BOM weather stations (Nowra, Albion Park and Moss Vale) are over 20km away from the project site. As such, the proponent has stated that they used meteorological modelling to determine climatic conditions. No further details of the model used are provided. It is important that accurate assumptions are made regarding wind speed and direction in the project area to determine potential dust impacts on surrounding sensitive receivers. Real world climatic data is preferable.
- The emissions inventory provided in Table 3-1 of the AQIA appears to neglect a number of potential emission sources. Section 3.4.3.3 of the EIS indicates that a concrete batching plant will be utilised in the lower scheme laydown area. The batching plant has not been included as a potential dust source. The EIS also indicates that processing of spoil may be required as part of construction. It is unclear what this processing would include (blending, crushing, screening etc).
- Section 5.1 of the AQIA indicates that construction activities are anticipated to contribute up to 10 $\mu g/m^3$ at the nearest sensitive receiver. However, it appears that the sensitive receiver at 407A Bendella Road, Kangaroo Valley is well within the 10 $\mu g/m^3$ contour on Figure 5-1.
- The proposed spoil emplacement area is 80,000m^2. If the anticipated 420,000m^3 of spoil is generated, it is likely that the height of this emplacement area will be significant. It is unclear whether the height of the emplacement area has been considered as part of air impact modelling. There are also no specific details on how potential dust impacts from this area will be managed (e.g. revegetation, automatic sprinkler systems etc).

Recommendations

It is recommended that the proponent update the AQIA in response to these comments.