9 December 2022

Contact: *Justine Clarke*
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Our ref: *D2022/164830*

Iwan Davies
Department of Planning & Environment
4 Parramatta Square
12 Darcy Street
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Dear Mr Davies,

Shoalhaven Hydro Expansion Project - Main Works – EIS Review (SSI-10033)

Thank you for your Major Projects Planning Portal referral dated 9 November 2022, requesting WaterNSW's advice in relation to the Environmental Impact Statement (EIS) for the proposed expansion to the existing Shoalhaven Pumped Hydro Energy Storage (PHES) scheme.

WaterNSW's main interest in the Proposal arises from the fact that WaterNSW owns and manages the majority of the land and water supply infrastructure within the project area. This includes the Fitzroy Canal, Fitzroy Falls Reservoir, Kangaroo Pipeline, Bendeela Pondage, Tallowa Dam, and Bendeela Recreation Area. In addition, the proposal will occur within the declared Sydney Drinking Water Catchment (defined under State Environmental Planning Policy (Biodiversity and Conservation) 2021) and the Shoalhaven and Fitzroy Falls Special Areas.

The key factors WaterNSW considered when reviewing this proposal included:

- No intensification of risk applied to State critical infrastructure.
- WaterNSW infrastructure remains safe and serviceable at all times.
- No damage should occur to the water supply infrastructure at any stage of the development and that all mitigation measures are included in the design, construction and operation of such projects.
- Vibration impacts.
- Heritage impacts (Aboriginal & non-aboriginal).
- Water impacts (surface and groundwater).
- Biodiversity impacts.
- Changes in flow arrangements and impacts on biodiversity.
- Traffic and transport impacts (including spoil haulage routes).
- Waste and spoil management.
- Contamination.
- Land use impacts (including on our recreational areas and water supply infrastructure).
- Increases in bed and bank erosion and project sediment and erosion controls.

- Access impediments for operation and maintenance activities, as well as to future augmentation initiatives.

Given the early stage of project development, the concept engineering appears reasonably well developed for the construction stage of the project. Although, due to the nature of the open loop PHES, it is foreseeable that the project will disturb sensitive terrestrial ecology, land uses, recreation, visual resources, and cultural resources in both Fitzroy Falls reservoir and Lake Yarrunga. While the intent of the EIS was to assess the project based on worst case environmental impact, it is WaterNSW's view that **the EIS does not adequately assess all the potential impacts to worst case and that the assessment is not sufficient in the following areas**, but not limited to:

- vegetation clearing extent (specifically for operation and maintenance requirements)
- impacts to aquatic biodiversity from fluctuating water levels from water transfer requirements
- traffic impacts, and
- amenity.

We have thoroughly reviewed all documents associated with the project and provided a consolidated response at Attachment 1.

As the project design is evolving, all of the potential impacts on WaterNSW assets are still to be fully risk assessed. However, we acknowledge the ongoing consultation between the project team and WaterNSW. It must be noted by the Department that WaterNSW is separately negotiating landowner access to the project site, and these comments are not to be considered landowner's consent. This response is our assessment of the potential environmental impact only. Overall, WaterNSW is seeking comfort that the project will not adversely impact on our lands or operations and that the existing environment can support the changed conditions with minimal impact.

All WaterNSW lands within the project area are integral to the supply of Sydney's drinking water. It is essential this water supply and water supply infrastructure are protected from the potential impacts. If the Project proceeds, WaterNSW representatives must be engaged and consulted with regards to assessing and controlling risks to WaterNSW lands and assets arising from the design, construction and commissioning, operation and maintenance of the Scheme. WaterNSW requests that the proponent addresses our commentary in any response to submissions and that we are given the opportunity to comment on and contribute to any draft Conditions of Approval.

If you have any questions regarding this letter, please contact Justine Clarke at justine.clarke@waternsw.com.au.

Yours sincerely

Daryl Gilchrist

DARYL GILCHRIST
Manager Catchment Protection

ATTACHMENT 1 – WATERNSW COMMENTS – SHOALHAVEN PUMPED HYDRO EXPANSION PROJECT EIS (CSSI-10033)

Key Issue Area	WaterNSW comment	Recommendation
General	EIS - 3.3.1 – Project Components - Fitzroy Canal - The EIS refers to new penstock connection to the existing intake control structure. Clarification is required regarding arrangements between the new penstock connection, new control gate and the trash rack to be installed in the existing structure (as shown on concept drawings). EIS – 4.1 – Table 4.1 – *Dam Safety Act 2015* – It must be noted by the proponent that the existing control gate is subject to dam safety requirements, therefore any changes to the control gate structure to accommodate the expanded scheme will also be subject to *Dam Safety Act 2015* requirements. Mitigation Measures (Appendix E) – In general the mitigation measures proposed address the generic impacts and safeguards required for the construction of projects of this magnitude. However, WaterNSW believe that site specific mitigations are lacking, that address the potential impact to the environment, lands and the community from construction through to operation. Where a known or potential Project impact is identified, there must be a corresponding safeguard to mitigate the impact.	• Further explanation be provided to EIS section 3.3.1 • That additional Dam Safety Act requirements be included for consideration. • That further consideration be given to include site specific mitigation actions to mitigate potential or known impacts.
Risk assessment	An assessment of the risks to the integrity and security of WaterNSW lands, assets and infrastructure that may result from the proposal, and the proposed measures to mitigate against those risks and impacts is required. It is noted that the preliminary risk assessment (Appendix P) is heavily focussed on underground works. Surface works such as penstock and gate construction/ installation and risks during operation are only generically addressed at this early stage. The EIS does not address in a substantive manner risks associated with the following construction aspects; transport and storage of explosives; construction of the vertical shaft; construction of the surface penstock; construction of the new control structure at the Fitzroy canal; spoil haulage at night (24/7); integration of the new control system into the existing control system. It is expected that WaterNSW will be involved in any future detailed risk assessments in relation to construction and operation of new infrastructure where it interfaces with WaterNSW Assets. We note the proponent's commitment to consult with WaterNSW.	• It is expected that a separate risk assessment ensues where interaction between the existing scheme and new scheme occurs or is expected to impact on WaterNSW lands or assets. • Further clarity is provided around the identified construction risks and how they will be addressed.

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Biodiversity	The ecological integrity of declared Special Areas and WaterNSW lands is of paramount importance to WaterNSW. WaterNSW must ensure that the project will not impact on our land and water management capabilities and our objectives under the *Water NSW Act 2014*. - WaterNSW is concerned that the EIS concludes that there will be no significant impact to biodiversity (especially aquatic biodiversity) related to operational impacts from the increased changes in water level. It is unclear whether potential breeding areas of threatened species will be impacted. Essentially a tidal zone will be created that will impact on breeding cycles of aquatic and macroinvertebrates. This has not been considered. - Further detailed assessment is required on the expected land degradation and impact to threatened species breeding areas and habitat from operation of the scheme. - Further, what impact will the Project operations, have on fish, fish eggs and hence fish populations that are pumped up/pumped down the dams? Has this been considered and how would it be managed to avoid adverse impacts on their populations? Fisheries have undertaken studies on barometric trauma (Dr Craig Boys) from pumped hydro. WaterNSW suggests that detailed design specifications on project be reviewed by DPI fisheries, to remove any future impacts at the design stage. - The EIS notes that construction works will be undertaken in the Shoalhaven Special Area, however the impact on the Fitzroy Falls Reservoir Special Area is not mentioned. Some work will be undertaken alongside the canal and on the intake structure to Fitzroy Canal which has potential to impact on water in Fitzroy Falls Reservoir. However, the effects of the water transfer on the ecological integrity of the Special Area, especially at the foreshore have not been considered. The EIS determines that the impacts of the Project on water quality, flow and water level would be avoided at Fitzroy Falls Reservoir. This statement is unjustified, due to the lack of specific assessment at this location. Overall, the impact to biodiversity (terrestrial and aquatic) at Fitzroy Falls Reservoir is underestimated and further detailed assessment of the impacts to biodiversity specifically at Fitzroy Falls Reservoir are required. - Further investigation should be undertaken on the presence of threatened aquatic species, including critically endangered Fitzroy Falls Spiny Crayfish and Macquarie Perch. WaterNSW suggests that Environmental DNA (eDNA) samples be collected in known or potential locations of threatened species to confirm or eliminate presence. - The EIS lacks assessment of impacts on macroinvertebrate species. There is real potential for the habitat of these species to be impacted from the fluctuations in water levels. WaterNSW requires that further assessment on the impact to macroinvertebrates be completed.	• Supplementary assessment is undertaken on the potential impacts to ecology at and around the Fitzroy Falls Reservoir Special Area. • That DPI Fisheries review the system design to ensure impacts of fish being transferred through the system are eliminated. • That Environmental DNA (eDNA) samples be collected in known or potential locations of threatened species to confirm or eliminate presence. • That the nature, extent and duration of biodiversity impacts (post construction) are further assessed. • That macroinvertebrate surveys are completed, with an assessment of the potential impact.

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	Anecdotally, the Giant Dragonfly (*Petalura gigantea*) may be present within the project area. Additional surveys required to confirm or exclude its presence. - The prescribed impact assessment completed as part of the Biodiversity Development Assessment Report (BDAR) on water bodies, water quality and hydrological processes is narrow in focus and does not consider the nature, extent and duration of all the impacts to this assessment area, nor provide mitigation strategies outside of Project construction. The clear lack of consideration of impacts and mitigations during operation of the Project is evident. Therefore, WaterNSW is not convinced that a significant impact will not occur.	
Noise and Vibration	Construction and operational vibration have the potential to significantly impact on WaterNSW assets. Noise and vibration impacts should be effectively managed to minimise adverse impacts on the structural integrity of our assets. The Noise Assessment appears to be quite comprehensive and conducted in accordance with relevant regulations and guidelines. WaterNSW accepts Line 1 of Table 3 from the current German Standard DIN 4150 – Part 3 - "Structural Vibration Part 3: Effects of vibration in structures" as the maximum allowable limit of vibration acceptable at WaterNSW assets. WaterNSW requests that the Project confirm expected velocity limits and the impact the works will have on WaterNSW assets and specify any required mitigation measures. It is expected that this will be included in any Construction Noise and Vibration Management Plan (CNVMP) developed. Consideration should be given to implementation of continuous monitoring at sensitive locations to enable a pro-active response to exceedances as well as intermittent attended monitoring. In line with the above comment, we support the re-assessment of noise and vibration impacts once the construction contractor is awarded and in line with proposed mitigation measure NV01.	• That the above requirements are incorporated into the mitigation measures or a standalone mitigation measure is included to manage noise and vibration impacts. • Continuous noise monitoring to occur at sensitive receivers to ensure prompt response to any exceedances. • That a specific assessment of the construction and operation vibration impacts of the proposal on WaterNSW infrastructure is included in the Construction Noise and Vibration Management Plan (CNVMP).
Soils and Water	It is critically important that all ground disturbing works are designed and undertaken in a manner that will not impact on the WaterNSW lands, waterways or water bodies and the environment. - It is unclear from the EIS how the increased frequency of intake/ offtake to Lake Yarrunga will be prevented from eroding the banks / bed at the outlet, mobilising sediment and impacting water quality. Section 6.5.5 identifies that slightly a higher risk of erosion on Lake Yarrunga is expected and that the Project would be designed and operated to reduce this	• Further clarity is required around the reuse of water and soil (particularly spoil). • That a more detailed assessment of the soil and

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	risk. Assessment of the impact and impact area is inadequate and not quantified, as such mitigation measures cannot be designed to suitably address the impact. - Due to the conceptual nature of the project, the EIS is vague on the capture/ collection of water and soil for the project. Further advice should be provided on the reuse of spoil and water from all sources (surface and groundwater). **Management of soil erosion and surface runoff during construction** Appendix I - Section 5 - provides details on water quality controls related to stormwater runoff during the construction phase. The preliminary assessment identified a need for seven sediment basins and described design criteria based on the Blue Book (size, design, location). Further, the proposed erosion and sediment control strategy will be updated, and an erosion and sediment control plan (ESCP) developed for the detailed design. WaterNSW must be consulted in the preparation of the ESCP. EIS - 6.5.4.1 – "All wastewater will be removed from site and disposed of" – This statement is inconsistent with other statements in the EIS regarding capture, treatment and discharge off site of construction water. Clarification is required on the wastewater discharge and treatment for the entire project.	water impacts is undertaken from the water transfers. • During detailed design, all surface water management systems (including at the spoil emplacement area) should be refined to maximise the separation of clean and dirty water across the project site. • A Soil and Water Management Plan (SWMP) must be prepared to address stormwater management and sediment and erosion control (ESCP). The plan should address the requirements of the guideline Managing Urban Stormwater: Soils and Construction (Landcom 2004) and the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018). • WaterNSW is consulted during the development of the SWMP and ESCP.
Hydrology, Groundwater and Flooding	Developments, especially major construction projects, have the potential to impact on the integrity of the water supply infrastructure. These impacts include changes in drainage and stormwater, that may increase flooding and waterlogging, water velocity and quantity, surface erosion and direct damage to the infrastructure supporting the pipelines. As this is an open system, water quality will be affected by many factors such as pumping/discharge rates, stratification, and density-temperature differences between reservoirs.	• That a more detailed assessment of water quality impacts is undertaken on the water transfer effects, which includes a review of available data collected during more than 40 years of operation.

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	Water transfer effects As stated in the EIS (section 3.5.2, page 51), Origin has a license to transfer a total of 4,021 ML (4.021 GL/day) of water between the upper and lower reservoirs for the Existing Scheme and are updating this licence to facilitate combined use by the Project. Clarification is required as to the meaning behind "combined use". Section 7.2.1 (Appendix i) states that water transfers between Fitzroy Falls Reservoir and Lake Yarrunga will continue to be undertaken under the water allocation for the existing pumped hydro scheme and in accordance with the water access licence (WAL). It is recognised that the Project would operate independently from the Existing Scheme with the implications of concurrent operations resulting in the existing water allocation being drawn and returned over shorter cycles. While this will not change the maximum and minimum water levels in either Lake Yarrunga or Fitzroy Falls Reservoir, the rate at which water levels change will increase. This means that the total volume transferred in any cycle would not increase, but the rate of transfer would approximately double if both the existing scheme and the new scheme are operated at the same time. The minimum time for transfer of full allowance of 4 GL is about 13 hrs. This would result in change in water levels in Lake Yarrunga by 0.5m and Fitzroy Falls by 0.8 to 1 m. The water level declines for the minimum operation level within the WAL are 2.13 m in the Fitzroy Falls reservoir and 4.18 m for Lake Yarrunga. This information was not provided in the EIS. The faster extraction rates and more frequent cycles will have an impact on water quality, with greater potential for more contaminants (algae, nutrients) to be transferred between reservoirs. WaterNSW does not believe that the impacts of this water level fluctuation have been adequately assessed and further justification of the expected impact be provided.	
	Water quality impacts (Appendix I) It is stated in Section 6.1.3 (page 89), that all waterways in the study area have the potential to be impacted, however the waterways at most risk are those located near the work areas and where more significant earthworks would be occurring, including at Trimbles Creek and Lake Yarrunga. It is also recognised that significant earthworks are also proposed near the Bendeela pondage (Section 6.1.5 – 6.1.6), that provides water supply to nearby Kangaroo Valley township. There is potential for water quality impacts from a range of construction activities including establishment of Area 5 works, excavation of underground portal access, temporary stockpiling of excavated material near the portal access, proposed haulage route for transport of spoil, earthwork, clearing and construction of the main spoil emplacement facility, treatment and disposal of PAF spoil. Further water quality impacts to Bendeela pondage could occur if treated	• That further consideration and the inclusion of additional mitigation measures is required to ensure that a neutral or beneficial effect (NorBE) can be met for the project. • That the risk rating derived from the impact assessment, associated with the transfer of algae and cyanobacteria be justified.

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	groundwater collected during construction of the tunnels and shaft will be discharged directly into the lake (Table 6.4, page 102).	
	Neutral or Beneficial Effect (NorBE) on water quality As the development is located within the Sydney Drinking Water Catchment, the proponent must consider if the project will have a Neutral or Beneficial Effect (NorBE) on water quality. An assessment of whether the project would have a NorBE on water quality is presented in Table 9-1. Item 4 (page 122) states that under standard conditions all discharges will be contained onsite and not reach any waterways, but during and following the large rainfall event controls may fail. These would be minor and temporary and rectified as soon as practicable. Therefore, it is likely that NorBE won't be achieved during large rainfall events. Further consideration is required, and the inclusion of additional mitigation measures is required to ensure that NorBE can be met for the project.	• Further assessment is required to ensure that NorBE can be met for the project under all circumstances.
	Algae According to Section 7.1.4 (page 105) the main water quality risk during the operation phase is transfer of algae between reservoirs. The experience from the existing scheme suggest that Fitzroy Falls Reservoir has higher cyanobacteria and toxic algal biovolume compared with the other reservoirs. As discussed in the risk assessment (Table 7-4, page 111), the more frequent pumping increases the risk of poor water quality being transferred between reservoirs. This contrasts with the other statement in Section 7.1.1 (page 105) that the increased rate of transfer within the new scheme is not expected to increase the risk of algae occurring as the volume transferred would not change. This is a significant risk to WaterNSW and our ability to supply high quality drinking water. We believe that there is a real potential for this risk to be increased from the expansion of the scheme, and that it has not been adequately considered or demonstrated to the contrary in the EIS. It is proposed that to manage the algae risk, the existing and the new scheme will continue to operate in accordance with the Water Supply Work and Water Use Approval where transferring water between storages is not permitted when Cyanobacteria counts are above 50,000 cells/mL toxic Microcystis aeruginosa or toxic Cyanobacteria biovolume is >4 mm^3/L. This measure does not address the risk or moderate its occurrence. In addition, the cessation of water transfers may impact on water security. In addition, it is also stated that the Project does not involve additional transfers of water to Bendeela Pondage from which the Kangaroo Valley WTP draws water (Section 7.1.4, page 105).	• Further detailed risk assessment is required regarding the transfer of algae between operating systems.

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	However, this does not eliminate potential for water quality impacts on Bendeela Pondage if the existing scheme will be operated at the same time.	
	Water quality monitoring It is indicated throughout the document where water quality treatment is to occur, but does not detail the treatment type, method or application. A mitigation measure is required to address all aspects of water quality treatment (also groundwater treatment requirements). The EIS has proposed that monthly surface water monitoring will be conducted at all nominated monitoring sites that is reflective of the work being undertaken at that time (Section 11.2.3, page 134). After construction is completed, water quality monitoring will continue monthly for about a year at selected sites. WaterNSW considers the monitoring frequency to be insufficient. It is recommended that field water quality monitoring during the construction phase (turbidity, pH, EC and ORP) is undertaken more frequently depending on the type/scale of surface works and identified potential for contamination. Further consideration is required as to water quality monitoring during operation. Including monitoring of the spoil emplacement.	• That clarity is provided around the water quality monitoring program and the methodology applied. • That the water quality monitoring frequency is increased.
Groundwater	While the EIS concluded that the project will not result in detrimental change in groundwater quality or change to beneficial use of groundwater, it is considered that the groundwater report does not sufficiently address all the project SEARs, with very little data or investigation to support the assessment conclusions. **Groundwater quality** There are currently no groundwater quality data from the Wandrawandian and Snapper Point Formations to understand potential groundwater quality impacts during construction and operation. Both Formations are noted as being potentially acid forming (Section 8.1.7). Tunnelling, excavation and spoil emplacement have the potential to result in acid drainage. The disturbance of Potential Acid Forming (PAF) material may cause water quality impacts during excavation and dewatering in the vicinity of the outlet structure (box cut) and above drained underground structures. It is not clear if the emplacement area is in the proximity of the fault zone with potential for enhanced seepage into groundwater?	• Further clarity is required around if the emplacement area is in the proximity of the fault zone with potential for enhanced seepage into groundwater? • Assess groundwater quality before and during construction that impacts are detected, and appropriate mitigation measures implemented.
	Groundwater dependent ecosystems It is noted that for the Aquifer Interference Policy (AIP) and Water Sharing Plan (WSP) requirements, the desktop study did not identify any high value Groundwater Dependent Ecosystems (GDEs) within the project area.	• To note

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	Groundwater discharge Groundwater inflows to tunnels and excavations are likely to range in quality from relatively fresh, in the vicinity of the outlet structure box-cut and shallow tunnelling operations, to brackish at depth in the vicinity of the main cavern. The EIS states that all groundwater seepages to excavations will be managed by appropriate collection, treatment, and disposal to prevent contamination of the environment and meet with relevant discharge criteria. Treatment of groundwater discharges and reinjection into the tailrace tunnel is proposed for groundwater seepages during operation. Section 9.1.3 (Construction Impacts) and 9.2.3 (Operation Impacts) identifies that 'All controlled groundwater discharges will be treated to suitable quality prior to being discharged', however no mitigation measure exists for the treatment or indication of the treatment method. Therefore, we are unable to determine applicability of this statement, and if this safeguard is adequate.	• Further clarity is required around how acid drainage will be captured and treated. • That further information is provided as to the proposed treatment and management of leachate. • That mitigation measures are included to address the management of groundwater discharges. • The detailed design needs to address the potential water quality impacts due to injection of treated groundwater into the water transfer system. • Clarify methodology for development site specific triggers to setup the water treatment plant described in SW6 mitigation measures.
	Seepages from the spoil emplacement area The spoil management plan (Appendix K) outlined handling, stockpiling and long-term emplacement of acid generating material near the Bendeela pondage. Additional borehole will be drilled, and samples tested to inform the Spoil Management Plan (Appendix K, 3.2, page 13). Options for treatment of PAF material will be further investigated in the detail design (Appendix K, 3.2, page 13). It is understood that the spoil emplacement will be specifically designed to prevent seepage of leachate to either groundwater or surface water. Further information is required as to how this discharge will be treated and managed into the future.	• Further information is required as to how potential seepages from the emplacement will be managed into the future.

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	Groundwater drawdown It was concluded that groundwater drawdown from the drained power station cavern will propagate under areas of mapped medium value GDEs, but groundwater drawdown would be confined to deeper formations and not propagate vertically. The maximum drawdown of 1.3 m was predicted for 2 bores at 2.8 km distance from the power-house cavern (for 100 years of operation). The current groundwater monitoring network (4 boreholes) is not sufficient to assess predicted groundwater impacts. WaterNSW supports the EIS recommendation for installation of shallow boreholes in the vicinity of the tailrace box cut to monitor groundwater response to dewatering and drawdown propagation in the vicinity of Kings Creek (predicted 67% reduction in baseflow) and installation of vibrating wire piezometer near the power station cavern to monitor drawdown during construction and operation. It is recognised that there will be ongoing dewatering of the cavern power station during operation, therefore the assessment of groundwater drawdown should also consider the worst-case scenario assuming that there could be zones of enhanced vertical connectivity. WaterNSW support the EIS recommendation for installation of shallow boreholes in the vicinity of tailrace box cut to monitor groundwater response to dewatering and drawdown propagation in the vicinity of Kings Creek and installation of vibrating wire piezometer near the power station cavern to monitor drawdown during construction and operation.	• That the assessment of groundwater drawdown considers the worst-case scenario, assuming that there could be zones of enhanced vertical connectivity.
Heritage	- The design, construction and operation of the project must facilitate the long-term protection, conservation and management of items of known aboriginal and historic heritage items of significance. - It is noted that Bendeela Hydro AS01 (AHIMS ID 52-4-0729) is on WaterNSW land, and that this site will be subject to harm by the proposal, resulting in a partial loss of value. WaterNSW supports the proposed salvage excavation program proposed in the Aboriginal Cultural Heritage Assessment Report (ACHAR) and can provide suggested locations for the reburial of objects if required, to ensure their protection. - WaterNSW accepts that the unexpected finds procedure in the ACHAR be followed for any unidentified Aboriginal heritage objects found during the works. WaterNSW requires we are notified of any unexpected finds that occur on our lands.	• That WaterNSW are given the opportunity to review and comment on the Construction Cultural Heritage Management Plan.
Contamination	- Construction of the Project could result in soil and contamination from accidental leaks and more likely leachate from the spoil emplacement. This has the potential to pollute the local environment, including waterways.	• That further clarity is provided on the contamination management strategies to be

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	- WaterNSW is concerned for the long-term management of the spoil emplacement and potential contamination of nearby sensitive receivers (including Lake Yarrunga). - It is unclear from the EIS what long-term monitoring will be included. - It is expected that contaminated sediment will be found in water treatment systems. It is unclear how this contamination will be managed?	developed and initiated for the project.
Traffic and Transport	From a WaterNSW perspective the main risks we see related to traffic and transport are around increased truck movements, heavy haulage and haul/spoil trucks, along with turn treatments, and their interaction with WaterNSW operations, visitors to the Bendeela Recreation Area, and pedestrians/ cyclists. In general, it is felt that the assessment does not sufficiently address all the introduced hazards and potential risk management strategies. - The EIS lacks detailed consideration of the suitability and current condition of all transport routes proposed to be used for the project. Road user safety is paramount. Further detailed assessment is required as to the suitability of the roads for the duration of the project. - Further detail and analysis are warranted with regard to construction traffic impacts. The traffic volume counts were taken outside of peak usage periods (February 2019, for one week). This is significant, especially for Bendeela Road, with high volumes of traffic visiting the recreational area and businesses along the road. With traffic volumes fluctuating and increasing at certain times of the year, an accurate representation of the expected volumes, expected impacts and mitigation is required. - WaterNSW would expect that a mitigation measure is included to ensure the completion of a dilapidation report / condition assessment of all routes used for the project, prior to construction, and that any damage be remediated. - It is noted that some of the assumptions made for proposed haul routes are not acceptable to WaterNSW. The current concept indicates a potential haul route around Bendeela Pondage. In order to maintain dam safety, WaterNSW will not accept any construction vehicle/ haul route access around Bendeela pondage (prescribed dam). This preference must be removed from future detailed design plans. - It is unclear if the proposed laydown areas have sufficient capacity to expand for parking and storage of construction plant and equipment, and workers private vehicles if bussing in workers is not available. - A detailed Construction Traffic and Access Management Plan (CTAMP) must be prepared for construction activities within and outside the project area. This plan should detail	• That further detailed assessment is provided as to the suitability of the roads to sustain the increased load/ usage for the construction phase of the project. • That the right-hand turn upgrade off Moss Vale Road onto the Promised Land Trail is retained for future operation and maintenance benefit. • That if approved, a condition is included to undertake a dilapidation report / condition assessment of all routes used for the project, prior to construction, and that any damage be remediated. • That WaterNSW is consulted on any Construction Traffic and Access Management Plan (CTAMP) developed. • That the use of Bendeela Pondage access road is removed from any further consideration as a project haul route. • That WaterNSW and other stakeholders such as

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	construction haulage routes, number of trucks, hours of operation, access arrangements, changed traffic arrangements, car park provision, pedestrian and cyclist access management plan, and traffic control measures. - The proponent should note and include 24/7 access requirements for WaterNSW to operate and maintain water supply infrastructure during project construction.	Bendeela Recreation Area user groups are consulted on the preparation of a detailed site-specific construction traffic management plan and access management plan during construction. • That the spoil haulage route is further investigated and confirmed in consultation with WaterNSW.
Land use	The conflict between transport and land use has been understated in the EIS. It is unclear how the significant number of vehicle movements will have a negligible impact on the performance of roads, pedestrians and cyclists, parking and road safety? (section 6.7.4.5)	• Further justification is required to demonstrate the negligible impact assessment. • Include a mitigation measure to manage the conflict between land use and transport interactions.
Bushfire **Appendix O - Bushfire Assessment**	**General** - The bushfire safety report and delivery of bushfire safety for the site is hindered by the fact that the description of the works on page 1 do not relate well to the location of works depicted on Figure 1-1. Many of the proposed works, such as tunnels, are provided as indicative locations or are missing from Figure 1-1. This problem then carries across to the risk assessment and mitigation measures put forward in Table 4-2 of the report, making it very difficult to reconcile whether bushfire safety considerations have been addressed for all aspects of the activity. (Project Overview; p.1) provides a detailed description of the key project components (Upper scheme works, underground works, lower scheme surface components). Many of the descriptors used are not carried across to Figure 1-1 and the project works being described differently on the Figure, with many of the works not being presented. This makes it very difficult to reconcile what works are occurring where. Ideally Figure 1-1 should depict the location of the works described on page 1 using the same descriptors provided on page 1. That said, the works described on page 1 are generally mostly catered for in the bushfire risk and mitigation analysis provided for the project	• That further clarity is required around the project elements and the location and nature of the safety measures that will be adopted to protect people and property. • For buildings in isolated or critical areas, the project must demonstrate how it can deliver for special fire protection purpose equivalent outcomes for building/ staff protection and meet evacuation requirements.

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	infrastructure on Table 4-2 (Pages 26-29). The bushfire report needs to be strengthened in relation to identifying the location of the elements of the project and the nature and location of the safety measures proposed to be adopted, this includes the language and descriptors used. - The EIS is lacking consideration with regards to ensuring critical and isolated areas meet special fire protection standards. - The bushfire report is generally conceptual regarding bushfire risk and non-committal regarding a range of bushfire protection measures proposed (e.g. water, construction standards). The details of the proposal and protection measures appear to be deferred to when the location and nature of the infrastructure is known in more detail. This approach does not secure effective bushfire safety for the project. The report discusses what controls might be required and provides evidence of enough space / opportunities to provide them rather than specifying what the controls will be. - Environmental impacts associated with vegetation clearing required for bushfire protection, bushfire safety and to safeguard buildings seem extensive for what is needed. Protection appears to be able to be achieved without the need for so much clearing. It is recognised that bushfire protection measures such as Asset Protection Zones (APZs) and Bushfire Attack Level (BAL) ratings are not driving the requirements for vegetation clearing, rather it is the construction footprint. Bushfire protection measures (e.g. APZ setback distances based on BAL ratings) are then considered within that footprint. Clarification is required as to the extent of clearing required for the project construction and for the protection of assets. - Bushfire protection measures and commitments need to be clarified and strengthened to address smoke and ember attack risks.	• That further advice be obtained from the RFS on the suitability of the bushfire report and the approach adopted in the bushfire assessment report. • That clarification is provided as to the extent of vegetation clearing required for the project's construction and for the protection of assets. • That the bushfire risk from any foreseeable new or relocated buildings/ structures be assessed, including the potential relocation of the WaterNSW depot to facilitate the project.
	Bushfire risk factors The bushfire information presented in Chapter 3 of the report is not compiled to give an overall risk map for the site at a site-specific scale or demonstrate how the new and existing project elements/ structures inter-relate with that risk. The inclusion of topographic maps (NB. no actual slope map) and vegetation types are not combined to identify those areas of highest and lowest risk to bushfire attack across the full site and to inform appropriate responses.	• That the overall bushfire risk to the project is demonstrated.
	Asset Protection Zones and Bushfire Attack Level Assessment The Bushfire Attack Level (BAL) assessment, presented in section 4.2 and depicted on the BAL plan in Figure 4.1, demonstrates the capability of the site to provide adequate setbacks for two new buildings – a new ventilation building and new water treatment infrastructure, rather than	• That the assessed BAL-19 rating is further justified. • Further clarification is required around the reliance on the

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	identifying the actual location of the APZs for the new buildings and demonstrating how they will be protected. This is because the location of the new buildings is not yet known, a matter which is problematic in reconciling bushfire safety and environment (vegetation clearing) impacts. The bushfire report takes the approach that the outer edge of the predetermined construction footprint forms the boundary with the vegetation and then the BAL plan (Figure 4.1) depicts the different BAL ratings occurring at various distances from the boundary, with BAL ratings decreasing as the distance to the bush increases. The approach assumes the construction footprint will be totally cleared of vegetation. The report indicates that new buildings will be positioned to achieve an APZ to BAL-19 and demonstrates that the construction footprint has enough room to achieve this. While this approach demonstrates the capability of the footprint in providing necessary APZs for new buildings, it does not minimise vegetation clearing that might otherwise be achieved. Section 4.2 also incidentally depicts the existing Kangaroo Valley Power Station and administration building occurring within an APZ to BAL 12.5. What is not indicated is the potential for additional buildings, due to the relocation of existing, non-project related structures and how the impact at new locations will be assessed. The approach adopted does not commit the proponent to delivering buildings where the APZ will not extend beyond the construction footprint. There is still a chance that buildings will be sited nearer to outer edge of the construction footprint forcing further vegetation clearing for APZs. It is very difficult to assess the safety aspects of the proposal without knowing where the new buildings will be located. Essentially, the location of the new buildings needs to be known in order to ensure that adequate bushfire protection measures in the form of APZs can and will be provided, and to ensure that vegetation clearing associated with the APZs is minimised. We do not object to the selection of the BAL-19 outcome, but further justification is needed as to why it has been selected. In one sense, the report discusses personnel assisting in property defence, elsewhere it is based on evacuation. If evacuation is desired, then a wider APZ distance to BAL-12.5 may be required particularly if buildings are being located in critical and isolated areas as sufficient space will be needed for evacuation. Based on Table 4-2 (page 27), it appears that the existing Kangaroo Valley Power Station is being relied upon to provide the site for the new proposed underground hydro power station and associated administration, with the KVPS housing up to 4 additional staff. The assessment of project infrastructure (Table 4-2) relies upon an existing bushfire management plan to protect the existing KVPS building and existing emergency management planning for the existing administration building which is located inside the existing concrete underground station. For the administration building, the Table also states that it is expected only those directly involved in defending against the fire would be at the site. So, the report anticipates people may be present	existing Kangaroo Valley Power Station (KVPS) bushfire management plan and existing emergency management plan and whether these documents meet contemporary bushfire safety standards.

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	to act in bushfire defence. If this is the case, the building will need to be relied upon to provide safe refuge for any staff or firefighters actively engaged in firefighting at the site. This then potentially raises whether the building needs to comply with necessary structural and bushfire safety standards. There is no appraisal as to whether the building meets contemporary bushfire safety standards and no BAL plan based on edges of the current buildings. This raises the question as to whether the existing KVPS & admin building need to be re-appraised in terms of bushfire safety measures resulting from the additional staff and works from this proposal? Given new staff will be housed in the complex, it is not unreasonable to request an assessment of whether the current building meets appropriate standards. The report recommends that 'Water NSW and RFS be consulted in the finalisation of the bushfire protection measures such that bushfire risks to the Project area and any impacts to habitat values are balanced' (p 34). While we support this consultation, this approach defers the resolution of the APZs, construction standards and vegetation clearing and retention outcomes to a later point in the process. This lacks certainty and does not resolve the bushfire safety and environmental protection outcomes for this activity.	
Social Economic Impact	It is recognised that communities, businesses, visitors, and community facilities closest to the project may experience impacts (both positive and negative) from construction and operation. This may occur from; proximity to construction works and project infrastructure; changes in amenity from construction noise and dust; access changes and use of local roads for construction access and spoil removal; and the presence of construction workers. WaterNSW has significant concerns regarding the economic impacts to local business, recreational users and tourism operators from short term closures and inhibited access to the Bendeela Recreational Area. This specifically relates to construction impacts. These businesses have suffered from bushfires, floods, road closures and Covid and any further impacts to operations could have significant implications for the viability of these businesses. These impacts must be explored further to ensure the impact is adequately assessed and mitigated. Proposed mitigation measure (SE1) suggests consultation with affected businesses and local industry will occur after the approval. WaterNSW considers that post approval consultation (alone) will not capture community concerns or allow for adequate mitigation. How will the project address community concerns post approval? It is unclear how any commitments made by the proponent to address the impacts raised post approval will be actioned.	• That further clarity is provided around community consultation outcomes post approval.
Operational maintenance	There is insufficient consideration of and inadequate area to undertake maintenance along the entire length of the penstock.	• The proponent is to demonstrate maintenance

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	The EIS covers in great detail the constructability of the project; however, it is considered that the operational maintenance of this expanded scheme with the existing scheme is lacking. The EIS defers future operational constraints and lacks proposed mitigation measures. While reviewing the project holistically, it is unclear if the project can be operated without impacting on existing infrastructure and receiving waterways. It is understood that access for maintenance to the pipeline will be provided at four locations along the alignment and that the finished minimum pipeline-to-pipeline distance between the Project and Existing Scheme will be in the order of 2.1m. As such, access for maintenance will only be achievable at 4 points along the expanded scheme, leaving the existing scheme isolated and inaccessible. The EIS states that some of the areas utilised for construction (and cleared of vegetation) will be rehabilitated. This contradicts any requirement to keep these areas clear for maintenance access. Further clarification is required as to the areas to be left cleared for maintenance, and if other areas require clearing to facilitate maintenance.	access and any impacts expected from the creation of this access (such as vegetation clearing). • The proponent clarifies future maintenance requirements for the scheme, including interaction with the existing scheme.
Asset management and assessment	**Intake Structure** The existing intake structure is aging, and the condition of the embedded pipe and the concrete structure where the new gate will be installed is unknown. WaterNSW requires a detailed assessment condition of this structure to ensure it is fit for service, as refurbishment would be a major task.	• That a detailed condition assessment occurs (prior to construction) on any WaterNSW asset impacted by the project.