OVEN MOUNTAIN PUMPED HYDRO ENERGY STORAGE

Amendment Report

August 2024

OVEN MOUNTAIN PUMPED HYDRO STORAGE | EMM creating opportunities

Oven Mountain Pumped Hydro Energy Storage

Amendment Report

Oven Mountain Pumped Hydro Storage Pty Ltd

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August 2024

Version	Date	Prepared by	Reviewed by	Comments
1	2 August 2024	Daniel Nugent and Alex Frolich	Ruth Kelly	Final for lodgement
2	19 August 2024	Daniel Nugent and Alex Frolich	Ruth Kelly	Updated Final for lodgement

Approved by

Ruth Kelly
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20 August 2024

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Executive Summary

ES1 Background

OMPS Pty Ltd (the Proponent) is proposing to develop the Oven Mountain Pumped Hydro Energy Storage Project (the Project), an off-river pumped hydro energy storage system located approximately half-way between Kempsey and Armidale, adjacent to the Macleay River in northern NSW. The Project is located within the New England Renewable Energy Zone (REZ) and the Armidale Regional Local Government Area (LGA), proximate to its border with Kempsey Shire LGA.

At a basic level, the Project will consist of upper and lower water reservoirs and an underground tunnel connecting them via a hydro-electric power station.

The Project is State significant infrastructure (SSI) and critical State significant infrastructure (CSSI) in accordance with the provisions of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). A single Environmental Impact Assessment (EIS) was prepared are required by Part 5, Division 5.2 of the EP&A Act, to address the requirements set out by the NSW Department of Planning, Housing, and Infrastructure (DPHI) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). The EIS was placed on public exhibition between 19 September 2023 to 20 October 2023.

This Amendment Report outlines amendments which have been made to the design of the Project following exhibition of the EIS (the Amended Project). This Amendment Report outlines the Project design and construction changes, clarifies some matters in the EIS and assesses the environmental impacts of the Amended Project. Where required, the Amendment Report has included additional or revised environmental management measures to manage or minimise environmental impacts.

Some of the amendments outlined in this report are a response to submissions received on the EIS. However, this report is not a formal response to submissions and does not include responses to submissions generally. A Submissions Report has been prepared separately and provided concurrently with this Amendment report, with both reports to be publicly available on the DPHI Major Projects website (www.planningportal.nsw.gov.au/major-projects).

ES2 Summary of proposed amendments

The proposed amendments to the Project provide functional improvements to the Project design, confirm elements of the Project that were highlighted as opportunities in the EIS, takes into account ongoing development of the construction methodology, and aim to provide for ongoing impact minimisation principles. They have resulted from ongoing design, and amendments requested by some stakeholders during EIS preparation.

Table ES1 summarises the Project amendments and why they are needed. Appendix A incorporates these amendments into a revised project description, to replace Appendix G of the EIS. An updated Project Description is provided at Appendix A of this Amendment Report.

Table ES1 Overview of the Project amendments

Project Element	Description of amendment	Reason(s) for amendment
Internal roads and bridges		
Eastern Access Road (EAR) refinement	Realignment of the EAR	• To reduce need for earthworks, improve road safety and address drainage issues. • Improve cut and fill balance to reduce requirements of permanent spoil emplacement associated with road works. • Reduce the period of internal road construction and therefore overall construction period • Improve effectiveness of emergency response measures (access and egress).
Bridges	A temporary bridge will be utilised prior to the construction of the two permanent bridges near Smiths Bluff (referred to as Eastern Access Temporary Bridge). A secondary, temporary access is proposed via the construction of a new, temporary bridge crossing of the Macleay River about 600 m north-east of Georges Junction (referred to as Western Access Temporary Bridge).	
Upper Dam Access Road (UDAR) refinement	Realignment of the UDAR (including removal of a large north-south connecting section of road).	• Avoid direct impacts on the habitat of the brush tailed rock wallaby and in response to submissions from Biodiversity, Conservation and Science (BCS) Directorate of NSW DCCEEW.
Construction methods and requirements		
Temporary or fly camps	While fly camps were previously anticipated for the project, up to three fly camps are confirmed to be required and will be located near Smiths Bluff (Eastern fly camp), the intersection of the Main Access Road and the EAR (Western fly camp) and the upper reservoir (within spoil emplacement area) (Southern fly camp). The camps will each accommodate about 20 workers and up to 90 workers depending on the ultimate configuration, and would be established within the first year of construction.	• To reduce pressure on local accommodation sources.
Blasting and rock crushing/processing	Allowing blasting as a construction method for road works and other above-ground works. Rock processing/crushing facilities will be required in the lower reservoir (LR) and upper reservoir (UR) areas to process rock for use in dams.	• To optimise construction timing • Additional blasting and rock crushing/processing is likely to be required based on findings of more recent geotechnical investigations
Construction water requirements	Increasing the estimated water requirements for use in construction (e.g. dust suppression, concrete batching, etc) from 1 ML/day to 3 ML/day.	• Additional water requirements based on updated design and construction methods
Spoil and materials		
Laydown/stockpile areas	There will be four areas used for stockpiling and material laydown instead of two. One area is located along the main access road (between transmission towers 14–16), one area is located in proximity to the batching plant, one area is located near Georges Junction, and one is located near the Eastern Access Temporary Bridge on the eastern side of the Macleay River. The largest of the four areas has also been flagged as available for other ancillary uses.	• To accommodate construction processes safely • To ensure construction process can be organised efficiently to support construction scheduling

Project Element	Description of amendment	Reason(s) for amendment
Spoil emplacement	Two permanent spoil emplacement (PSE) areas are now proposed instead of three, with the two areas both having increased in size to accommodate revised spoil estimates, reduced stockpile heights and slope angles.	• To take into account spoil quantities generated from an optimised 900MW design • To respond to stakeholder feedback regarding landform and erosion risks • To avoid direct impacts and further minimise indirect impacts to Pultenaea sp. Werrikimbe NP (*Pultenaea rubescens)*
Underground arrangement and sizing		
Underground arrangement and sizing for improved generation capacity	An amended underground arrangement and tunnel sizes to reflect up to around 900 MW generation and at least eight hours of storage capacity. Re-location of MAT portal is proposed to align with amended arrangement.	• The EIS presented a preliminary design initially based on a 600 MW generation capacity, with intent to optimise the design up to 900 MW capacity. • To confirm a 900 MW generation scheme with at least eight hours energy storage, an increase in the cavern size of the powerhouse is needed.

ES3 Assessment of impacts of the proposed amendments

This Amendment Report assesses the environmental and social impacts of the Amended Project. Some environmental aspects would be unchanged from those assessed in the EIS and, therefore, are not assessed further in this Amendment Report. A summary of the predicted changes to impacts as a result of the Amended Project is provided in Table ES2, and detailed in Section 6 of this report.

Table ES2 Summary of impacts of proposed amendments

Assessment matter	Summary of impacts of the proposed amendments
Land	To address government agency concerns, revised designs for permanent spoil emplacement has been provided as part of the Project amendments. These designs provide for improved conceptual landforms that are sympathetic to the natural terrain and reduces erosion risks compared to the EIS design. This is because the overall height has been reduced, slope angles have been improved to ensure stability, and specific water management measures have been identified for each emplacement. Additional leach testing was completed to determine if spoil is likely to generate acid drainage. The findings are consistent with the conclusions in the EIS and indicate the material contain low concentrations of and low variability of leachable metals and metalloids, however are likely to be relatively unreactive. The revised spoil emplacement design has been assessed by relevant technical studies and these impacts are considered in those respective sections of this report.
Water	The groundwater model was updated and updated modelling was completed to provide an understanding of any changes in predicted groundwater drawdown extent and volumes due to the change in underground arrangement and sizing of caverns. While a change in drawdown extent was identified, the conclusions remain consistent with the EIS where the Amended Project represents a low risk to groundwater receivers. A review of groundwater quality and contaminant mobilisation also concluded a low risk. No material change to the surface water management approach is proposed for the Amended Project and there is no change to the assessment of water availability. The assessment of residual impacts were consistent with those presented in the EIS. A slight increase in impact is identified to streamflow during construction water extraction and a reduction in impact to streamflow is identified during operation top-up. Flooding assessment for the temporary bridges identified short duration impacts during construction which will cease once the bridges are removed. Overall, consistent with the EIS, extracting water for construction, the one-off initial storage fill, and operations is not expected to impact the security of water supply to downstream water users, or availability of water to environmental receptors.

Assessment matter	Summary of impacts of the proposed amendments
Biodiversity	The Amended Project will result in an increase in the loss of native vegetation and threatened species habitat due to the overall increase in the disturbance footprint to accommodate Project changes. Direct impacts to threatened species and their habitat are due to clearing of native vegetation within the disturbance footprint and updated assessments were completed, including for the six serious and irreversible impacts (SAII) candidate species recorded within the Project area. Impacts to Brush-tailed Rock-wallaby denning and refuge habitat has been reduced due to the Amended Project. The Amended Project will impact two individuals of Wandering Pepper Cress. Other SAII species including *Pultenaea rubescens,* Scrub Turpentine, Little Bent-winged Bat and Large Bent-winged Bat will not be directly impacted by the Amended Project.
Aquatic ecology	Potential impacts to aquatic ecology due to the Amended Project are related to inclusion of temporary bridge structures on the Macleay River. The updated surface water assessment was also considered, for any changes to streamflow. The impact to fish movement across the temporary structures will not be significantly impeded, as the spanning structure is an open structure however will result in additional impact to aquatic and riparian habitat compared to the EIS. To account for modifications to flow and water quality impacts, an additional range of species have been reviewed for how the Amended Project construction and operation may affect the various life stages for more common species found within the MacLeay River catchment. No significant impacts are predicted. The initial fill of the reservoirs presents the most risk to fish however it is considered fish friendly intake and screen designs will further limit the potential impacts to small, bodied fish, eggs and larvae within the Macleay River system.
Aboriginal heritage	Additional consultation, survey and test excavation has been completed for the Amended Project which has allowed refinement of potential impacts and management of Aboriginal heritage of the Amended Project. The updated assessment identifies the presence of some 22 discrete identified sites, 19 areas of cultural deposits and a discontinuous and distribution of surface and shallowly buried stone artefacts (OMPS-BS1 [#21-5-0178]. Of these, 12 sites and 18 areas of cultural deposits are entirely or partially within the construction envelope. Another 13 sites (when including the additional findings from Section 5.2 of the ACHA addendum) are considered to have formed through natural processes and are considered non-cultural. . Consistent with the EIS, an Aboriginal Cultural Heritage Management Plan will be prepared to guide the process for management and mitigation of impacts to Aboriginal objects, with additional mitigation identified such as the need for a cultural values mitigation offset package and ensuring consultation with RAPs is maintained during finalisation of the assessment process, prior and during construction.
Traffic	Transport impacts are associated with an increase of construction traffic on the local road network. Consistent with the EIS, the Austroads design standards are met for the majority of the roads along the haulage route. Road sections that have not met Austroads design standards are predominantly near the Project area where it is recommended to implement traffic control measures or road widening treatments, identified with consideration of the Project Road Safety Audit findings and recommendations. Some external road upgrades are required to sections of Kempsey Armidale Road to accommodate construction traffic access and these requirements are being progressed separately through a HoA with local councils.
Noise and vibration	No change to the noise impacts are predicted as a result of the Amended Project, with some minor exceedances of construction noise levels under noise-enhancing weather conditions and sleep disturbance were predicted at two residential receptors, attributed to temporary construction traffic. Additional blasting assessment concluded impacts to residences are highly unlikely and no impacts to heritage items are predicted.
Air	An updated assessment of air emissions was completed for the Amended Project and concluded predicted incremental TSP, PM_{10}, $PM_{2.5}$ and dust deposition results at all assessment locations were lower for the Amended Project compared to the EIS. Predicted cumulative results were the same or lower.
Social	Potential social impacts have reduced primarily as a result of the confirmation of three temporary fly camps to accommodate workers on site. There is still a shortfall of four months where additional accommodation would be needed and updated mitigation measures have been identified to further reduce impacts and avoid any shortfall in accommodation on site.

Assessment matter	Summary of impacts of the proposed amendments
Other impacts	Visual: Consistent with the EIS, the Amended Project is expected to have negligible to moderate landscape character impacts. As the overall height of spoil emplacement areas has been reduced, it is considered that the landform will blend well into the natural topography and no additional visual impacts have been identified. Built and natural heritage: No change to historical heritage impacts were identified as a result of the Amended Project however the impact and mitigation measures were clarified in response to submissions. Consistent with the EIS, the Amended Project would not have a significant impact on the World and Nationally listed Gondwana Rainforests of Australia. Hazards and risk: There are no anticipated changes in EMF impacts. The addition of three temporary fly camps for early works will increase the number of emergency access points and fire safety protocols required onsite. This change will also accommodate a greater number of workers on site than presented in the EIS during early works. No refuge buildings are currently proposed as part of the indicative layouts for fly camps however are recommended due to the sites isolated location. Greenhouse gas: Given changes in how emissions have been calculated for the Amended Project, a direct comparison of the GHG emissions estimated for the EIS cannot be made. The revised GHG emissions estimates include 179,406 t CO_2-e for Scope 1 and 2 during construction and 307,051 t CO_2-e during operation. Scope 3 emissions are estimated at 62,802 t CO_2-e for construction and 1.402 t CO_2-e for operation.

ES4 Updated mitigation and management

Following public exhibition of the EIS and after consideration of the issues raised in the submissions, revisions to the mitigation measures included in the EIS have been identified (as described throughout this Section 6). Mitigation measures have been revised in order to provide further guidance on the overarching environmental management approach, further minimise environmental impacts, and meet the expectations and requirements of stakeholders. The full list of mitigation measures including all revised environmental mitigation measures is provided in Appendix C.

ES5 Conclusion

The Project will provide an additional 900 MW of dispatchable generating capacity, will be capable of delivering approximately 2,500 GWh annually[1] of long duration energy storage available to the NEM, and capable of meeting the needs of approximately 600,000 to 900,000 NSW households.

The declaration of the Project as CSSI acknowledges that the project is critical to the State for environmental, economic or social reasons.

Although the disturbance footprint has increased to accommodate the Project changes, the construction envelope has been reduced to confirm avoidance of key threatened species and habitat. The impacts of the Amended Project have been assessed and are generally consistent with the EIS, noting that overall disturbance and loss of native vegetation has increased. Impacts however have also been reduced in some instances, through the introduction of three temporary fly camps to alleviate pressure on local accommodation and additional site access to improve emergency management and overall duration of construction.

[1] Based on one pump-generation cycle per day, less an allowance for maintenance.

The Project has been designed to avoid and minimise impacts where possible in accordance with the principles of ecologically sustainable development. These principles were implemented through an iterative design approach, supported by consultation with relevant technical advisors and government agencies. Updated mitigation measures have been provided to manage construction and operation of the Project and its impacts. The Proponent will continue to engage with government agencies and to refine mitigation measures where required.

There is a critical need to develop large-scale, renewable energy Projects to respond to the accelerated energy transition of the NEM. A do-nothing option would mean to forego the benefits of the Project and not satisfy this critical need. Through the implementation of proposed mitigation, management and offsetting measures, the EIS and Amendment Report demonstrates that the Project could be undertaken without any significant long-term impacts on the local environment.

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1 Introduction

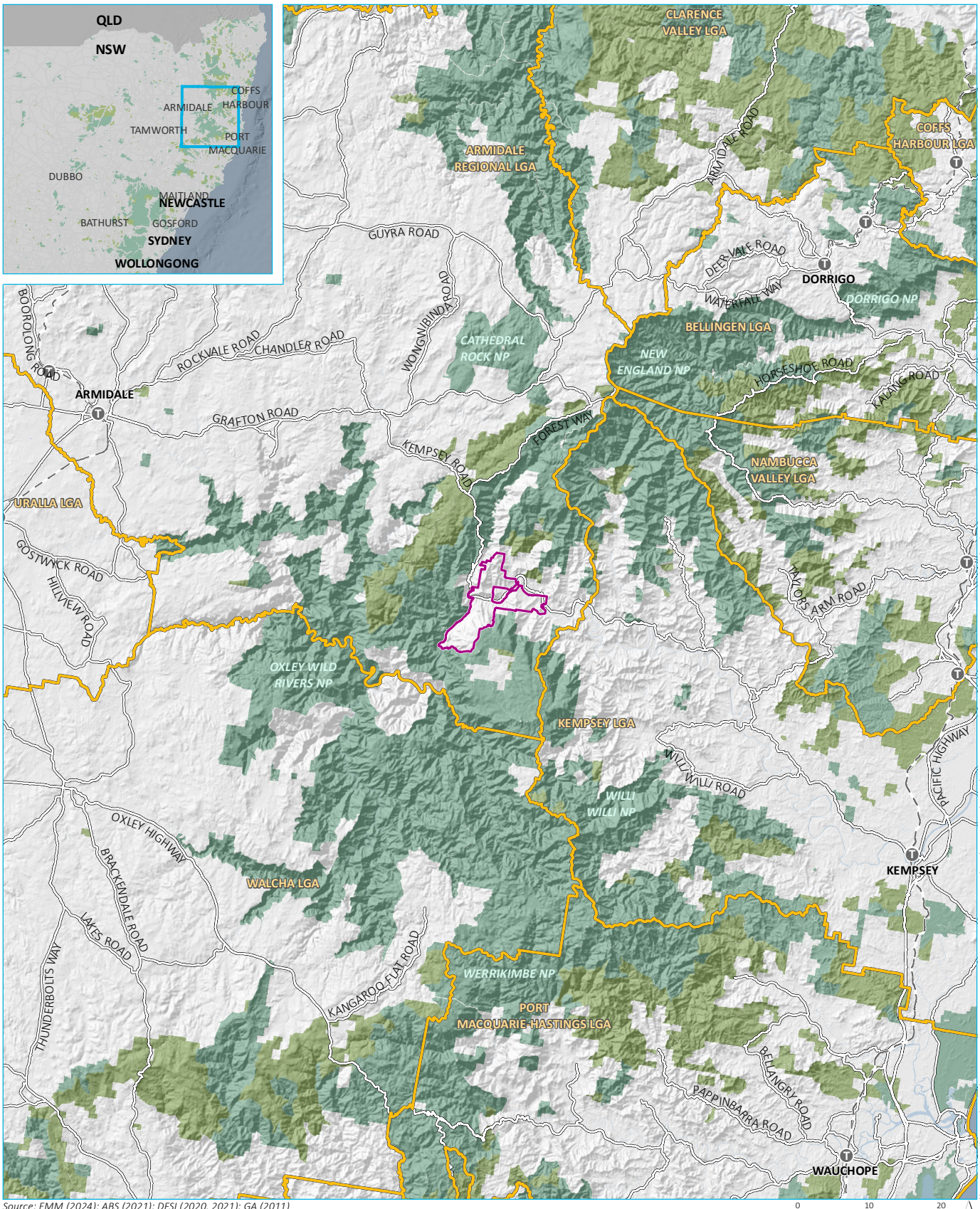
1.1 The Project

OMPS Pty Ltd (OMPS) (the proponent) is proposing to develop the Oven Mountain Pumped Hydro Energy Storage Project (the Project), an off-river pumped hydro energy storage system (referred to as the 'pumped hydro system') located approximately half-way between Kempsey and Armidale, adjacent to the Macleay River in northern NSW. The Project is located within the New England Renewable Energy Zone (REZ) and the Armidale Regional Local Government Area (LGA), proximate to its border with Kempsey Shire LGA. Figure 1.1 and Figure 1.2 provide the regional and local context of the Project respectively.

At a basic level, the Project will consist of upper and lower water reservoirs and an underground tunnel connecting them via a hydro-electric power station.

The Project involves building two 'off river' water containment structures to create an upper and a lower reservoir (referred to as 'the upper dam and reservoir' and 'the lower dam and reservoir' respectively), on an ephemeral tributary of the Macleay River. An underground hydro-electric power station complex will be connected to the reservoirs by infrastructure including a power waterway and tunnels. Other components of the Project will include the construction of, and upgrades to, internal access roads, the construction of an electrical substation, and the construction of up to two high voltage transmission lines (132 kilovolt (kV) and 330 kV) that will connect the pumped hydro system to the high voltage transmission lines that connect Kempsey and Armidale (known as Line 965).

Consistent with the objectives of the NSW Electricity Strategy, Electricity Infrastructure Roadmap and the *Electricity Infrastructure Investment Act 2020* (EII Act), the Project will play a key role in building the capacity of the NEM and the NSW renewable energy system to reduce the risk of blackouts and electricity price volatility. It will provide vital long duration energy storage, electricity network benefits and services directly to the transmission backbone in the New England REZ. The Project will aid in the transition of the NEM towards cleaner, more reliable and affordable electricity by supporting around 1,600 megawatts (MW) of new renewable energy projects and placing downward pressure on power prices.



Source: EMM (2024); ABS (2021); DFSI (2020, 2021); GA (2011)

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KEY

- Project area
- Train station
- Rail line
- Major road
- Named waterbody
- Local government area
- NPWS reserve
- State forest

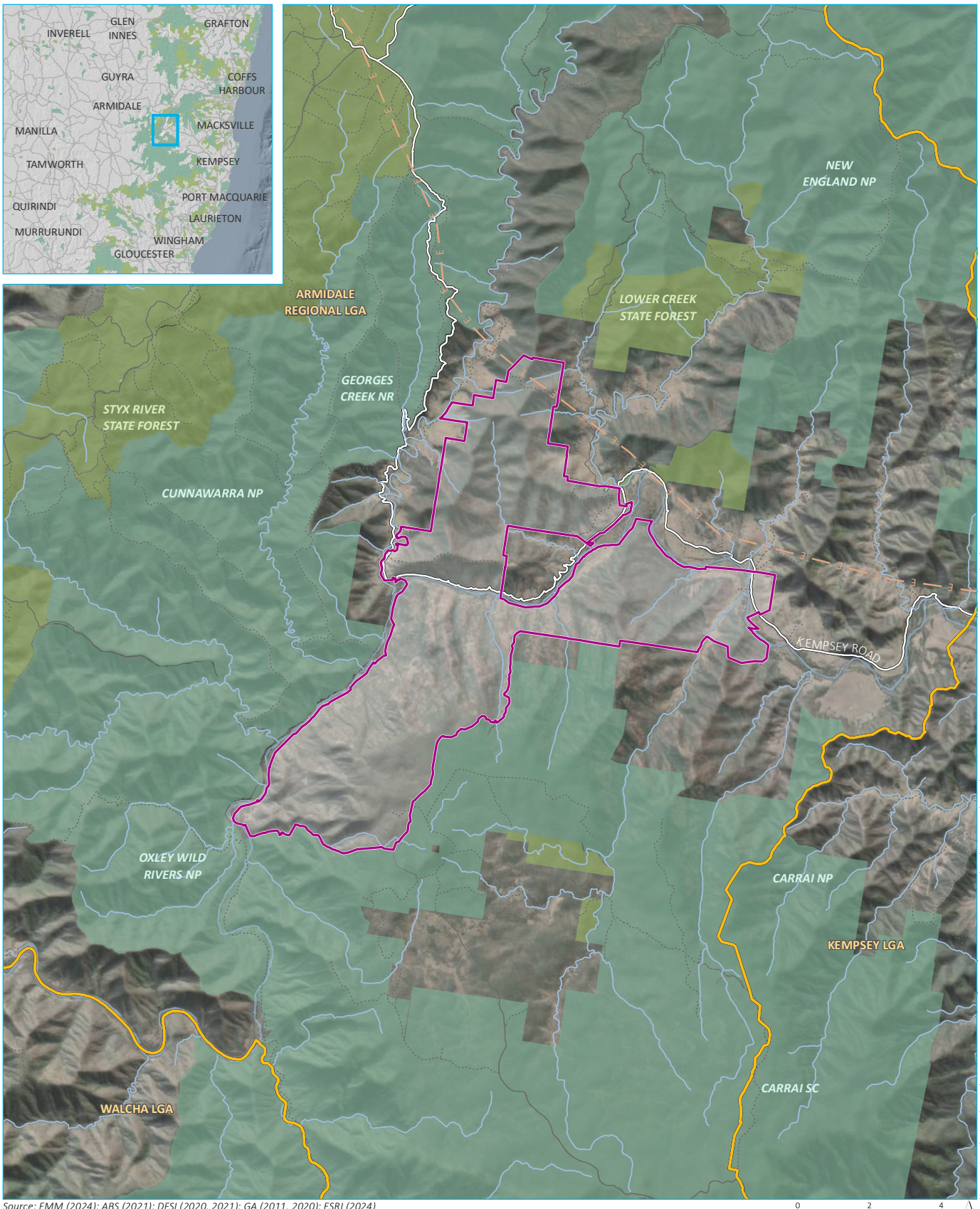
INSET KEY

- Major road
- NPWS reserve
- State forest

Regional setting

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 1.1

EMM creating opportunities



Source: EMM (2024); ABS (2021); DFSI (2020, 2021); GA (2011, 2020); ESRI (2024)

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KEY

- Project area
- Existing transmission line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- Local government area
- NPWS reserve
- State forest

INSET KEY

- Major road
- NPWS reserve
- State forest

Local setting

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 1.2

EMM
creating opportunities

1.2 Approval process

1.2.1 Approval process overview

The Project has been declared State significant infrastructure (SSI) and critical State significant infrastructure (CSSI) in accordance with the provisions of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The declaration of OMPS as a CSSI project acknowledges that the project is critical to the State for environmental, economic or social reasons.

As a CSSI project, the Project is subject to Part 5, Division 5.2 of the EP&A Act which requires the preparation of an EIS in accordance with Secretary's Environmental Assessment Requirements (SEARs) and the approval of the NSW Minister for Planning and Public Spaces. In addition to requiring approval from the NSW Minister for planning and Public Spaces, the Project has been deemed a controlled action under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and requires approval from the Commonwealth Minister for the Environment. The Minister for the Environment has accredited the NSW planning process for the assessment of the Project. The approval process is shown in Figure 1.3.

A single Environmental Impact Assessment (EIS) was prepared to address the requirements set out by the NSW Department of Planning, Housing, and Infrastructure (DPHI) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). In accordance with the EP&A Act *and Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), the EIS was placed on public exhibition for a period of 32 days, between 19 September 2023 to 20 October 2023.

Submissions were received during the public exhibition period and included comments from government agencies and councils, organisations and individuals. A Submissions Report has been prepared separately and provided concurrently with this Amendment report, with both reports to be publicly available on the DPHI Major Projects website (www.planningportal.nsw.gov.au/major-projects).

The NSW Minister for Planning and Public Spaces will consider the determination, including any conditions of approval, will be published on the DPHI Major Projects website following determination.

The Commonwealth Minister for the Environment's determination would follow the NSW Minister's determination and will be made publicly available, including any conditions of approval, on the EPBC Act Public Portal (https://epbcpublicportal.awe.gov.au/all-notices).

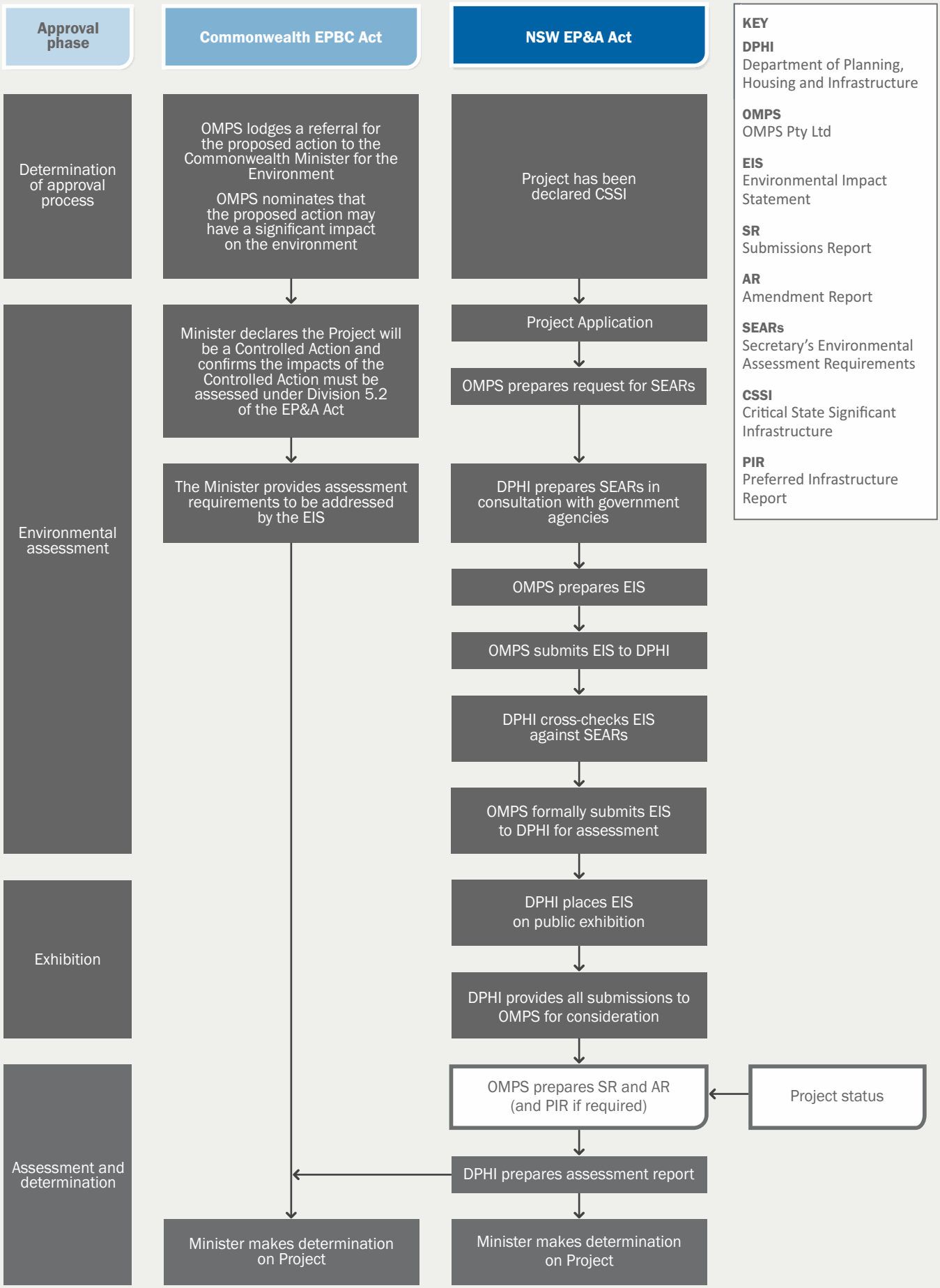


Figure 1.3 Approvals process

1.2.2 Current step in approval process

Some of the amendments outlined in this report are a response to consultation with various stakeholders during and following the EIS, and which they have formally raised in their submissions to the EIS. This report is not a formal response to submissions and does not include responses to submissions generally. The proponent has prepared a Submissions Report to respond to matters raised in submissions received during public exhibition. Project amendments can be included in a Submissions Report or submitted separately. The Submissions Report and this Amendment Report are both public documents and inform DPHI's assessment of the application as a whole. Figure 1.3 shows the key steps in the approval process for the Project and Figure 1.4 shows the Amendment Report process.

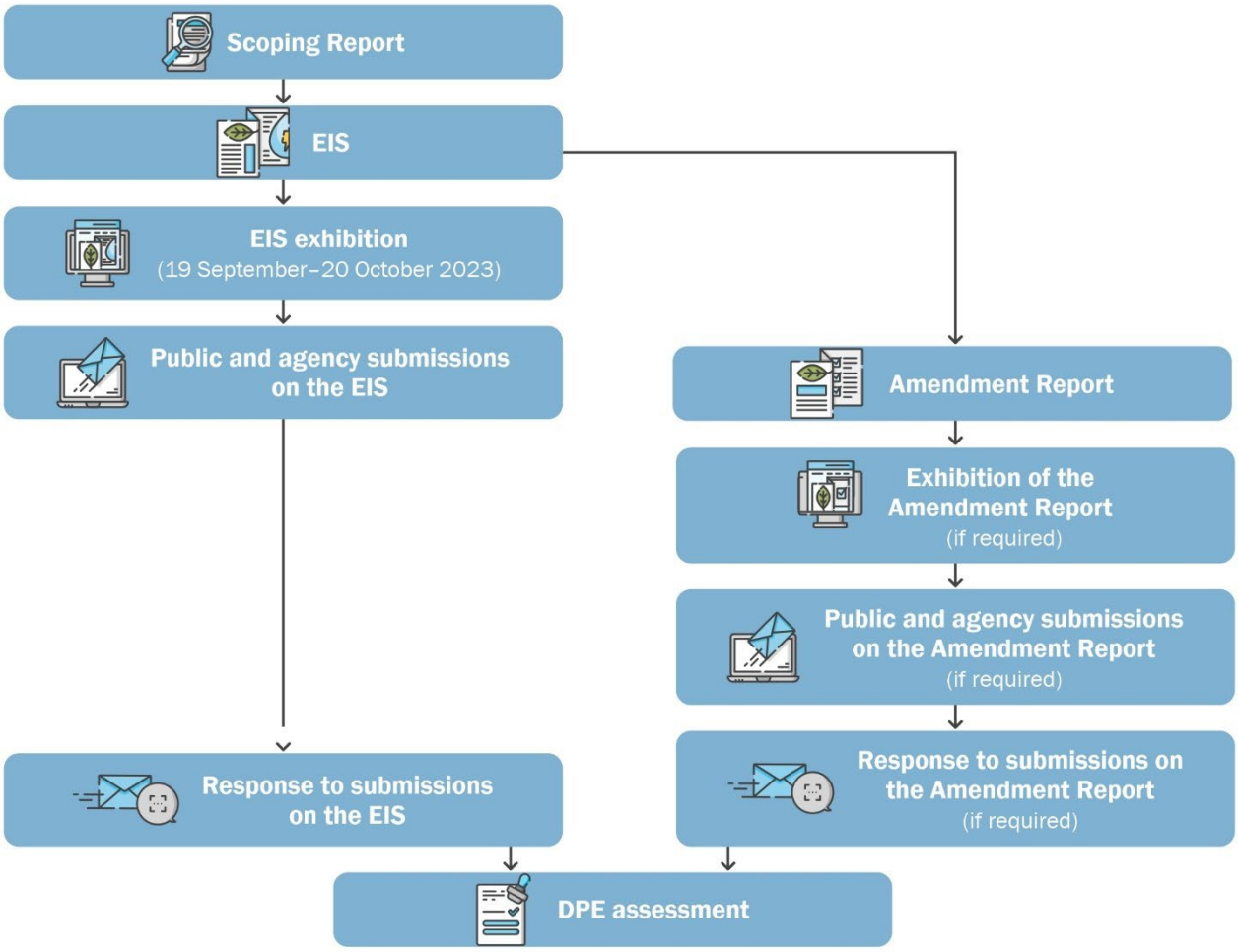


Figure 1.4 Amendment process

DPHI may require this Amendment Report to be public exhibited after which the proponent will submit a response to submissions received.

1.2.3 Next steps in approval process

An assessment report will be prepared by DPHI that considers the merits of the Project in accordance with the EP&A Act, including the principles of ecologically sustainable development. The assessment report will recommend to the Minister whether or not the Project should be approved, and provides conditions of approval. The Department's assessment report, the Ministers determination notice, and conditions of approval will be made publicly available.

Should the project be approved, the proponent would continue to consult with the community, government agencies and other stakeholders during the pre-construction, construction and commissioning phases.

If the project is approved, it is expected that construction would commence in early to mid-2025.

1.3 Overview of the proposed amendments

1.3.1 Original Project

A summary of the Project as exhibited in the Environmental Impact Statement (EIS) is provided in Table 1.1.

Table 1.1 OMPS EIS summary

Project element	Summary of the Project
Project area	The Project area is adjacent to the Macleay River and Carrai State Conservation Area to the east. Cunnawarra National Park, Oxley Wild Rivers National Park (OWRNP), and the Carrai National Park are also proximate to the Project area with declared wilderness areas to the east of the Project area.
Pumped hydro generation works	Pumped hydro generation infrastructure to be built and operated for the life of the asset includes: • Underground power station complex. • Two concrete faced rockfill dams and reservoirs, referred to as the upper dam and reservoir and lower dam and reservoir. • Two water intake structures, one at each reservoir. • Two concrete lined spillway chutes, one for each reservoir. • Macleay River pump facility. • Access tunnels (and tunnel portals) to the underground power station comprising the main access tunnel (MAT) and emergency, cable and ventilation tunnel (ECVT). • Power waterway.
Transmission connection works	Transmission infrastructure to be built and operated for the life of the asset includes: • Connection works including an approximately 15 km long alignment comprising, at a maximum, 330 kV double circuit overhead line and a 132 kV single circuit overhead line, up to 25 towers and an easement width of approximately 105 m. • A substation rated up to 330 kV. • A switchyard linking the connection transmission lines to the cables exiting the underground power station complex.
Ancillary development (construction and operation)	Ancillary development both temporary and permanent: • Access roads, access tracks and bridge crossing, including Main Access Road, Eastern Access Road, Lower Dam Access Road, Upper Dam Access Road, access to portals and underground works, Upper Dam Emergency Egress Road, Northern Transmission Access Road and Transmission Tower 8 Access Road; the road connection with the existing Kempsey Armidale Road will require the construction of at least one new single- or two-lane low-level bridge crossing over the Macleay River. • Surface works pads and facilities, including main accommodation camp, temporary or fly camps, work areas for concrete batching plants, staging areas, stockpiling areas, temporary site offices. • Communication infrastructure such as fibre optic cables. • Utilities during construction including water storage systems and construction power. • Utilities for operation including electricity and water. • Water diversion and water treatment facilities. • Spoil emplacement areas (three locations to store around 2.9 Mm^3 plus dead storage within reservoirs). • Ancillary operational facilities.

Project element	Summary of the Project
Disturbance footprint	The disturbance footprint represents the physical disturbance that can be expected as part of the construction works. As the design is refined, the final siting of the disturbance footprint can move within the construction envelope, subject to the recommended environmental management measures, and provided it does not exceed any limits as defined by the construction envelope. The disturbance footprint for the Project covers an area of around 330 ha.
Operational footprint	The operational footprint is the area required for permanent infrastructure to operate the Project. The maximum operational footprint is about 60 ha.
Construction	Construction duration of around four to five years. Construction workforce of over 600 workers at construction peak.
Rehabilitation	Rehabilitation of areas disturbed during pre-construction and construction will be undertaken progressively where practical during all stages and phases of the Project.
Operation	It is expected that the operation of the new power station will require around 30–50 full-time workers, as well as additional contractors for regular and ad hoc maintenance and repairs. The operational life of the Project is estimated to be 100+ years.
Hour of operation	Construction and operation of the Project will be 24/7 and 365 days per year.
Capital investment value	Estimated to be a base cost of approximately $1.97 B.

1.3.2 Amended Project

An overview of Project amendments is provided in Table 1.2 and shown in Figure 1.5. As part of these amendments, the Project area, construction envelope, disturbance footprint and operational footprint, have consequently all been revised to accommodate stakeholder feedback, design changes and refined construction requirements.

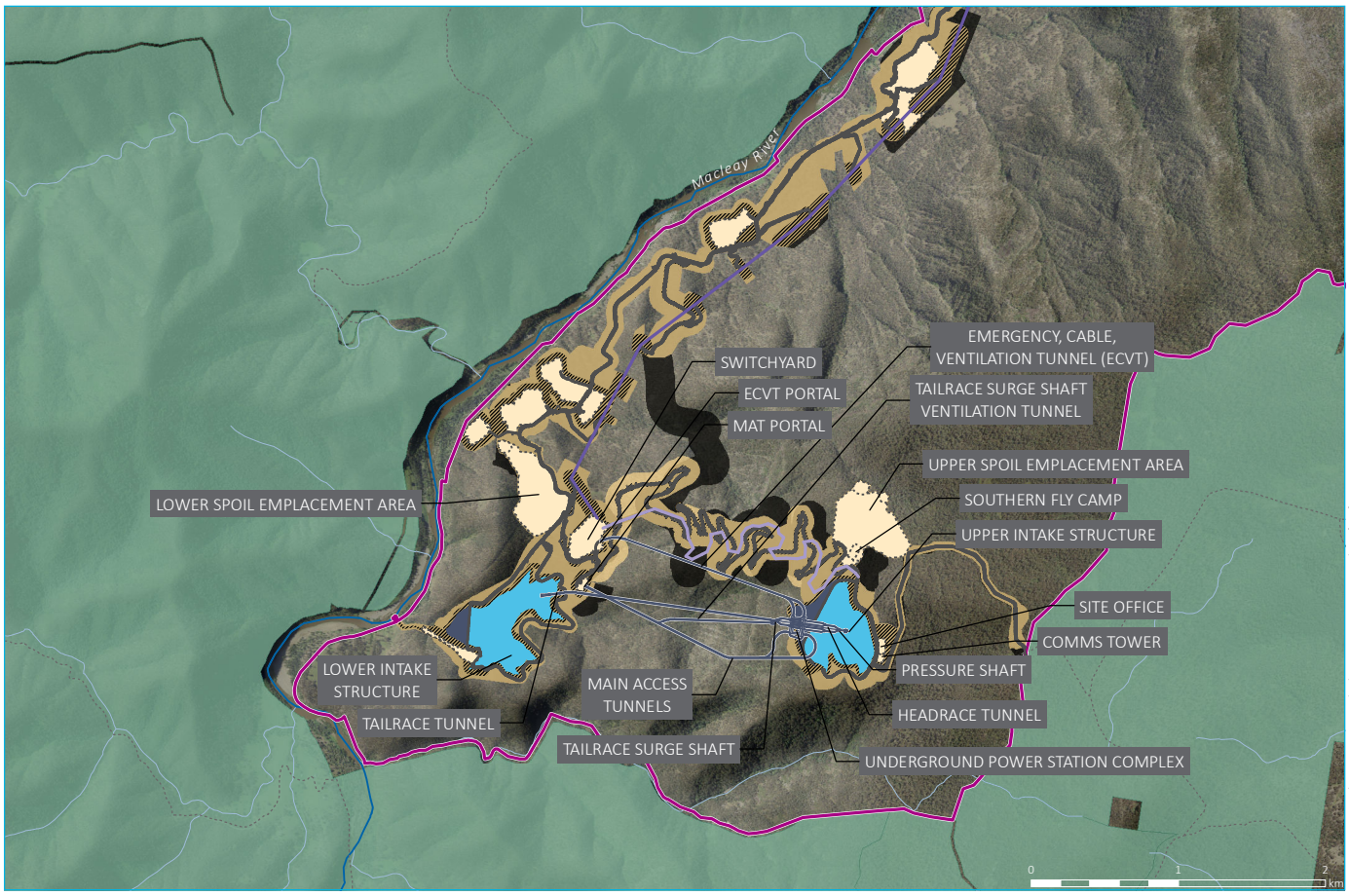
The amendments are aimed at reducing construction impacts and optimising schedule, as well as aligning to revisions and progress of the design. The advancements in design have occurred following the change in ownership of OMPS Pty Ltd, results of more recent geotechnical investigations and environmental investigations, and stakeholder feedback.

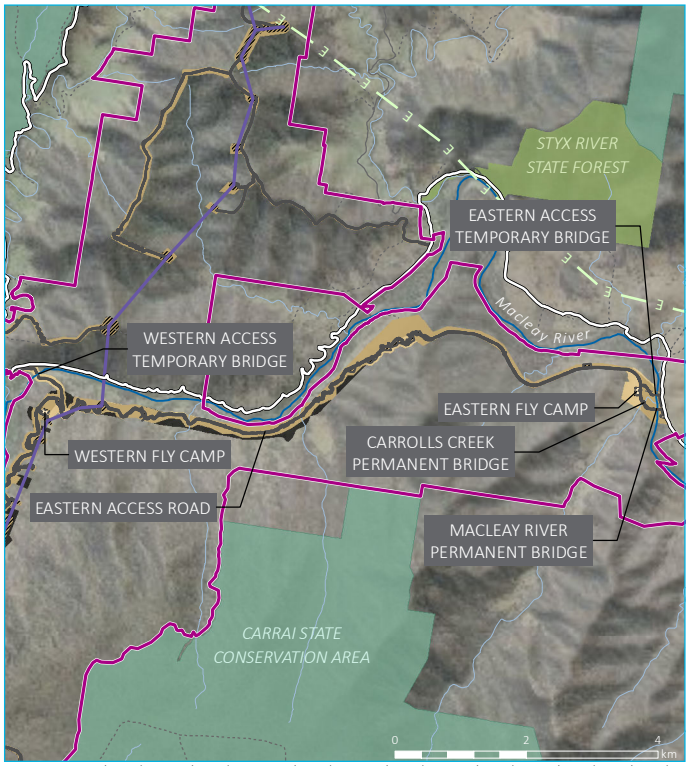
This Amended Report includes those technical assessments which need to take into account the revised design, including the updated spoil emplacement approach, as described in Table 1.2.

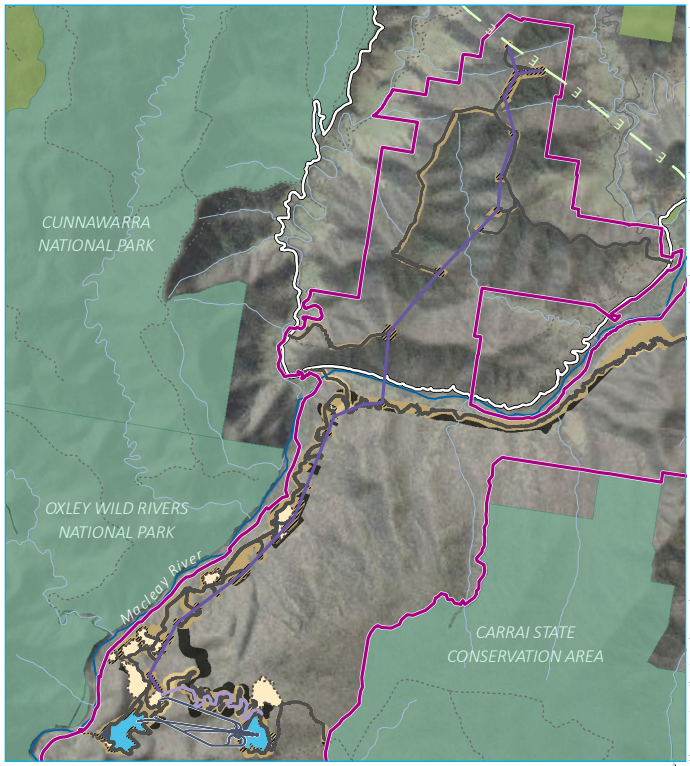
Table 1.2 Overview of the project amendments

Project Element	Description of amendment	Reason(s) for amendment
Internal roads and bridges		
Eastern Access Road (EAR) refinement	Realignment of the EAR	• To reduce need for earthworks, improve road safety and address drainage issues. • Improve cut and fill balance to reduce requirements of permanent spoil emplacement associated with road works. • Reduce the period of internal road construction and therefore overall construction period, and improve effectiveness of emergency response measures (access and egress).
Bridges	A temporary bridge will be utilised prior to the construction of the two permanent bridges near Smiths Bluff (referred to as Eastern Access Temporary Bridge). A secondary, temporary access is proposed via the construction of a new, temporary bridge crossing of the Macleay River about 600 m north-east of Georges Junction (referred to as Western Access Temporary Bridge).	

Project Element	Description of amendment	Reason(s) for amendment
Upper Dam Access Road (UDAR) refinement	Realignment of the UDAR (including removal of a large north-south connecting section of road).	• Avoid direct impacts on the habitat of the brush tailed rock wallaby and in response to submissions from Biodiversity, Conservation and Science (BCS) Directorate of NSW DCCEEW.
Construction methods and requirements		
Temporary or fly camps	While fly camps were previously anticipated for the project, up to three fly camps are confirmed to be required and will be located near Smiths Bluff (Eastern fly camp), the intersection of the Main Access Road and the EAR (Western fly camp) and the upper reservoir (within spoil emplacement area) (Southern fly camp). The camps will each accommodate about 20 workers and up to 90 workers depending on the ultimate configuration, and would be established within the first year of construction.	• To reduce pressure on local accommodation sources.
Blasting and rock crushing/processing	Allowing blasting as a construction method for road works and other above-ground works. Rock processing/crushing facilities will be required in the lower reservoir (LR) and upper reservoir (UR) areas to process rock for use in dams.	• To optimise construction timing • Additional blasting and rock crushing/processing is likely to be required based on findings of more recent geotechnical investigations
Construction water requirements	Increasing the estimated water requirements for use in construction (e.g. dust suppression, concrete batching, etc) from 1 ML/day to 3 ML/day.	• Additional water requirements based on updated design and construction methods
Spoil and materials		
Laydown/stockpile areas	There will be four areas used for stockpiling and material laydown instead of two. One area is located along the main access road (between transmission towers 14–16), one area is located in proximity to the batching plant, one area is located near Georges Junction, and one is located near the Eastern Access Temporary Bridge on the eastern side of the Macleay River. The largest of the four areas has also been flagged as available for other ancillary uses.	• To accommodate construction processes safely • To ensure construction process can be organised efficiently to support construction scheduling
Spoil emplacement	Two permanent spoil emplacement (PSE) areas are now proposed, with the areas both having increased in size to accommodate revised spoil estimates, reduced stockpile heights and slope angles.	• To take into account spoil quantities generated from an optimised 900MW design • To respond to stakeholder feedback regarding landform and erosion risks • To avoid direct impacts and further minimise indirect impacts to Pultenaea sp. Werrikimbe NP (*Pultenaea rubescens)*
Underground arrangement and sizing		
Underground arrangement and sizing for improved generation capacity	An amended underground arrangement and tunnel sizes to reflect up to around 900 MW generation and at least eight hours of storage capacity. Re-location of MAT portal is proposed to align with amended arrangement.	• The EIS presented a preliminary design initially based on a 600 MW generation capacity, with intent to optimise the design up to 900 MW capacity. • To confirm a 900 MW generation scheme with at least eight hours energy storage, an increase in the cavern size of the powerhouse is needed.







Source: EMM (2024); BECA (2022); AECOM (2023); OMPS (2024); SMEC (2024); DFSI (2020); GA (2011)

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KEY

- Surface works
- Project area
- Disturbance footprint
- Amended construction envelope
- Surface works
- EIS construction envelope

Project operational elements

- Power and communications lines
- Transmission overhead lines
- Tunnels, portals, intakes, shafts
- Permanent road
- Reservoir
- Dam wall

Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Vehicular track
- Existing transmission line
- NPWS reserve

Overview of Project amendments

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 1.5

EMM
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1.4 Need for this Amendment Report

This Amendment Report outlines the amendments which have been made to the design of the Project following exhibition of the EIS (the amended project). This Amendment Report outlines the Project design and construction changes, clarifies some matters in the EIS and assesses the environmental impacts of the amended project. Where required, the Amendment Report has included additional or revised environmental management measures to manage or minimise environmental impacts.

This Amendment Report is intended to assist the community, government agencies and the approval authority to understand the implications of the amended Project. The Minister for Planning and Public Spaces will subsequently decide whether to grant approval, or to refuse the project, under the EP&A Act.

Under clause 179(2) of the EP&A Regulation 2021, an application for approval for SSI may be amended or varied with the approval of the Planning Secretary, before the application is determined.

This report presents the amended Project and assesses its impacts. In accordance with clause 179(4) of the EP&A Regulation, OMPS has prepared this Amendment Report having regard to the State Significant Infrastructure Guidelines, particularly Appendix D of that guideline - Preparing an Amendment Report (DPIE, 2022).

This Amendment Report is structured as follows:

- **Chapter 1: Introduction.** This chapter provides an overview of the Project as exhibited, a summary of the approval process, the purpose of this amendment report and a summary of the proposed amendments.
- **Chapter 2: Strategic context.** This chapter identifies any changes to the strategic context of the project arising from the amended project.
- **Chapter 3: Description of amendments.** This chapter compares the amended project to the original and provides a detailed description of each amendment.
- **Chapter 4: Statutory context.** This chapter provides an outline of any changes to the statutory requirements arising from the amended project.
- **Chapter 5: Engagement.** This chapter summarises the stakeholder engagement that has been undertaken during the development of the amended project.
- **Chapter 6: Assessment of impacts.** This chapter assesses the change in impacts associated with the amended project.
- **Chapter 7: Justification of amended project.** This chapter provides an evaluation of the merits and conclusions of the amended project.
- **Appendices:**
    - **Appendix A** – Amended project description
    - **Appendix B** – Updated statutory compliance table
    - **Appendix C** – Updated mitigation measures
    - **Appendix D –L** – Supporting Technical Studies

2 Strategic context

2.1 Introduction

This chapter updates the strategic context for the purpose of the Amendment Report, noting in particular any relevant changes in the strategic planning document and other public policy settings. Overall, all strategies, plans and policies identified in the EIS remain current and relevant.

2.2 Summary of the strategic context in the EIS

The strategic context chapter of the EIS (Chapter 2) focused on the policy context to transition Australia's energy from fossil fuels to renewables by 2050. This is shown in Figure 2.1 below.

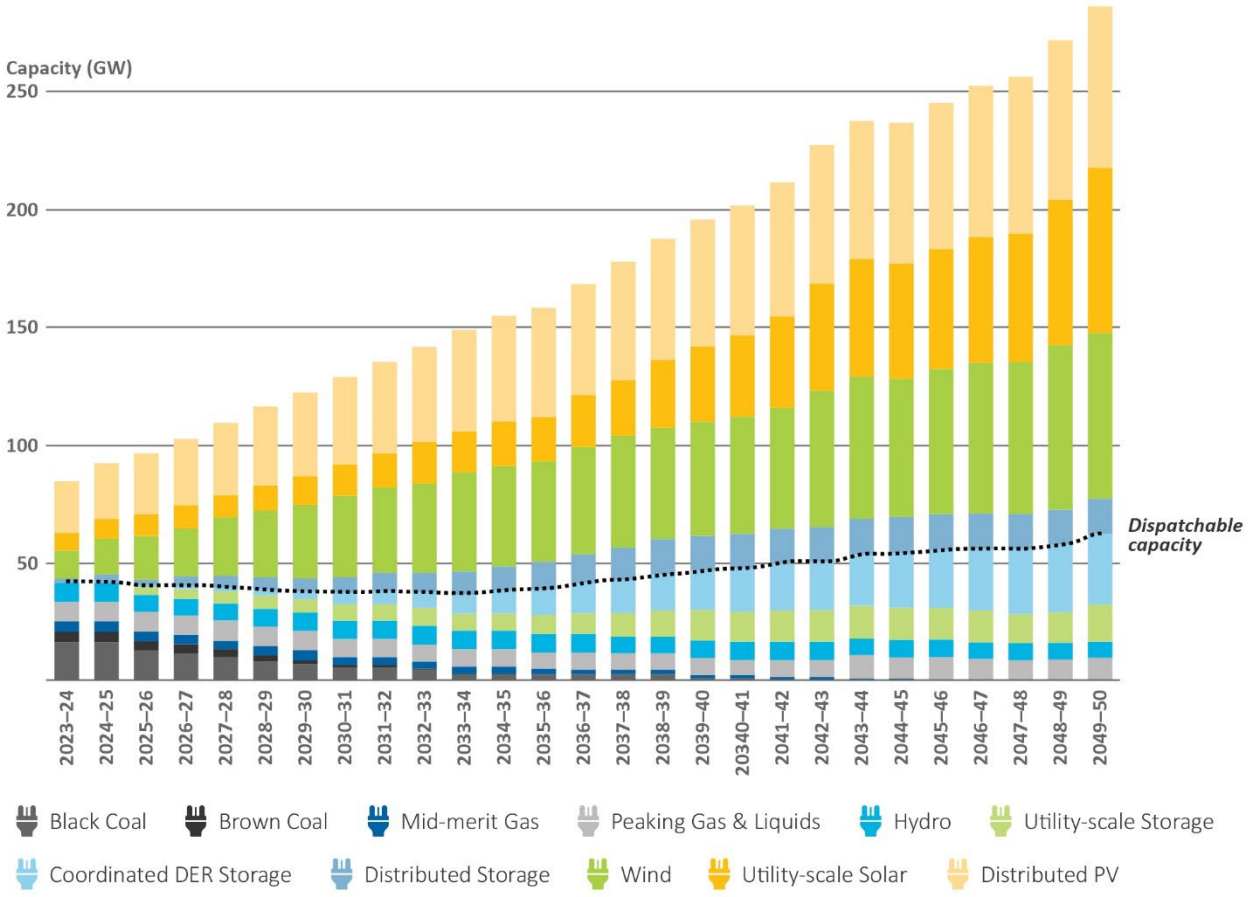


Figure 2.1 Forecast NEM capacity to 2050 (AEMO, 2022 ISP)

Pumped hydro energy storage projects across NSW, including this Project, are major energy storage schemes that will aid in addressing the needs of the existing market and policy trends, while dealing with environmental and technical issues such as reducing carbon emissions and intermittency in electricity supply.

The policy context surrounding this Project includes the Paris Agreement, a legally binding international treaty designed to strengthen international efforts to limit the effects of climate change. It aims to hold the global increase in temperature to below 2 degrees Celsius (0C) above pre-industrial levels. The Paris Agreement has been adopted by 196 countries, including Australia, and came into force on 10 December 2016.

In June 2022, the Australian Government committed to reduce emissions by 43% on 2005 levels, by 2030. This will put Australia on track to achieve net zero emissions by 2050. This commitment has been legislated through the Commonwealth *Climate Change Act 2022* (CC Act), passed in September 2022.

The objects of the CC Act are to advance an effective response to the urgent threat of climate change, set out Australia's emissions reductions targets and require annual climate statements to be prepared by the responsible Minister to ensure accountability.

The Australian Government Clean Energy Regulator administers the Large-scale Renewable Energy Target (LRET) which incentivises investment in eligible renewable energy power stations. The LRET of 33,000 gigawatt hours (GWh) of additional renewable electricity generation was met at the end of January 2021 (Clean Energy Regulator 2021). The annual target will remain at 33,000 GWh until the scheme ends in 2030.

The Electricity Strategy (DPE 2019) is the NSW Government's plan for a reliable, affordable, and sustainable electricity future that supports a growing economy. Developed at a time when four of NSW's five remaining coal-fired generators were scheduled to close by 2033, the strategy outlines a reliable energy system which meets NSW's energy requirements and emission reduction targets.

The Electricity Infrastructure Roadmap, completed in late 2020, builds on the Electricity Strategy and is the NSW Government's plan to transform the electricity system into one that is cheap, reliable and clean. It coordinates investment in transmission, generation, storage and firming infrastructure as ageing coal-fired generation plants retire. It also includes actions that will deliver 'whole-of system' benefits including a plan to deliver the state's first five REZs in the Central-West Orana, New England, South-West, Hunter-Central Coast, and Illawarra regions.

The Electricity Infrastructure Roadmap draws on AEMO's projection of approximately 2.3 GW of long duration storage required in NSW over and above the 2 GW from the Snowy 2.0 Project. AEMO's projection is what also drives the Integrated System Plan for the delivery of these goals and objectives.

This Project has been strategically planned to address the pending retirement of NSW coal-fired power stations, to firm the large amount of VRE coming into the system and will act to reduce the risk of emerging energy reliability gaps. The proposed timeline allows for the Project to be available by 2030, in time to provide energy security and insurance against Vales Point, Bayswater and Mount Piper retirements.

2.3 Updated and additional strategic policy matters

2.3.1 AEMO's Integrated System Plan 2024

The Australian Energy Market Operator (AEMO) releases its Integrated System Plan (ISP) every 2 years. The EIS noted that at the time of writing, most of the electricity generated for the NEM was sourced from coal-fired power plants. This is still the case as of time of writing this Amendment Report. The EIS noted that in NSW during the 2020/2021 financial year, 64% of energy was generated by coal (AEMO 2021). However, as established in AEMO's *2022 Integrated System Plan* (2022 ISP), multiple factors were driving a transformation of the NEM being:

- The change in the energy mix away from coal fired assets to be replaced with variable renewable energy (VRE) and firming technologies such as pumped hydro energy storage and batteries.
- The electrification of the economy leading to a need for double the electricity currently generated to be delivered by 2050.

To achieve this, the ISP 2022 supported investment in large scale projects to:

- treble the amount of firming capacity provided by sources other than coal, which included pumped hydro
- generate 16 GW of pumped hydro storage capacity and utility scale batteries
- double the amount of variable renewable energy.

REZs were identified in the ISP 2022 as areas where "clusters of large-scale renewable energy can be developed to promote economies of scale in high quality areas and capture geographical and technological diversity in renewable resources" (AEMO 2022).

The latest ISP was released as a final document in June 2024. Previous ISPs focussed on investment in renewable projects to meet targets – that is, having a net zero economy by 2050, with a 43% reduction in 2005-level emissions by 2030, with 82% of energy provided from renewable sources. This latest ISP focuses now on delivery of those projects with an optimal pathway set out for the needed generation, firming and transmission to support the transition.

Pumped hydro projects are integral to those objectives with the ISP noting that "*the optimal mix of generation and storage, including renewables such as solar and wind as well as firm capacity technologies like battery storage, pumped hydro and gas-fired generation.*"

The ISP notes that utility scale batteries, which are already being constructed across the national electricity market, are designed to dispatch energy instantaneously. Pumped hydro provides a longer term storage and dispatch role, providing much more security in the network. Utility scale batteries also have a relatively shorter life-span with many requiring replacement by the 2040s. Pumped hydro have a life-span of around 100 years.

There are emerging technologies that could provide alternatives or supplementation to current technologies such as pumped hydro. This includes advanced compressed air energy storage, gravitational storage, flow batteries and concentrated solar thermal systems. However, these technologies are not currently at a stage of development to make them viable for investment, design and operation within the timeframe required to transition to renewables.

2.3.2 Kempsey Local Strategic Planning Statement

As a result of amendments made to the *Environmental Planning and Assessment Act 1979* in March 2018, all councils in New South Wales are now required to prepare a local strategic planning statement (LSPS). Kempsey Shire Council's Local Strategic Planning Statement 2020-2040 is called *Future Macleay - Growth & Character*.

The primary purpose of the LSPS is to provide the basis for, and the delivery of, strategic planning in a local area. It is the link between the NSW Government's regional plans (including the North Coast Regional Plan 2036) and local plans.

Section 11.1.4 under Theme 4 – Safe & Suitable Housing, the LSPS identifies the need to promote climate responsive development and for greater reliance on alternative energy sources. The LSPS also notes alignment with the North Coast Regional Plan 2036 specifically the identified need to promote renewable energy opportunities. Under the Table of Alignment, 'Promote renewable energy opportunities' is a key action against Theme H3: Manage natural hazards and climate change.

The Project therefore remains consistent with this local strategy.

2.3.3 Armidale Local Strategic Planning Statement

The EIS submitted in September 2023 identified the Armidale LSPS (October 2020) and highlighted 5 of the plan's planning actions and goals which the Project supported. The document was updated and adopted by Council in April 2024 which removed or amended the planning priorities and goals discussed in the EIS.

In the new LSPS, a commitment to renewable energy permeates throughout, including both support to the transition to renewable energy for Australia through the New England REZ, as well as recognising the economic benefits to the region. Renewable Energy is noted in the Mayor's foreword as driving growth and employment in the region in and of itself, as well as a Renewable Energy Industry precinct near the airport to for secondary industries supporting the REZ. It notes that the Council's priorities as set in the Regional Plan include "Leverage the REZ and to identify and promote wind, solar and other renewable energy production opportunities."

The table below summarises the key themes and planning priorities to which the project is relevant, with a commentary as to the compliance of the Project.

Table 2.1 Relevant Armidale LSPS Planning Priorities and goals

LSPS element	Compliance of the OMPS project
Prosperity and growth Planning Priority A6 Our tourism	The Project EIS included a Social Impact Assessment, and this report includes an SIA Amendment Report. A key focus of that study was accommodation and the potential to impact both the local community and tourism and recreation. There is currently a 3-month period in the construction schedule where accommodation would be required for construction staff. This has been assessed in the SIA, and the proponent is exploring the feasibility of amending construction schedule or construction camp configuration to remove this need in order to minimise or even remove this potential effect.
Nature and resilience Planning Priority C2 Our biodiversity and national parks	The plans Action C2.1 is Protect areas of high biodiversity value and natural landscapes. A Biodiversity Development Assessment Report (BDAR) was provided with the EIS, with an updated version provided with this report to reflect the Amendments. While there are unavoidable impacts to some areas, the project has sought to minimise and avoid impacts as far as practicable. In the context of the proposed amendments, this included the removal of a whole section of the Upper Dam Access Road (UDAR) in order to avoid impacts to the Brush-tailed rock wallaby denning habitat. It also included the redesign of the Upper Reservoir spoil emplacement area to minimise as far as possible impacts to the *Pultenaea rubescens*. Any impacts that are unavoidable will be subject to offsets in accordance with the Biodiversity Conservation Act 2016 and approval by the Nature Markets and Offset division of the NSW Department of Climate Change, Energy, the Environment and Water.
Planning Priority C4 Our renewable energy	The LSPS notes that "The New England REZ is the largest in Australia (8Gw) and will play a critical role in replacing coal fired power stations in NSW" and includes Action C4.1 Support the growth of appropriate renewable energy projects that provide benefits to the region. This project would fall into this Action and has already been declared as Critical State Significant Infrastructure. The proponent will continue to consult and work with ARC to ensure that the project realises benefits to the community.

2.3.4 Electricity Supply and Reliability Check Up

On 25 May 2023, the NSW Government announced it had commissioned a team from Marsden Jacob Associates (MJA) to undertake an Electricity Supply and Reliability Check Up. The Check Up was an exercise to identify any additional steps that NSW needs to take to deliver the Electricity Infrastructure Roadmap to ensure a reliable supply of clean, affordable energy. It was necessary given global competition for investment has intensified, supply chain constraints and skills shortages have become more acute, and some regulatory, planning and community issues have become apparent.

On 4 August 2023, MJA submitted the Check Up report to the NSW Government. The report sets out findings across three themes and makes 54 recommendations to the NSW Government.

The Electricity Supply and Reliability Check Up (Office of Energy and Climate Change, September 2023) is the NSW Government response.

The Check Up confirms that consumers face reliability risks should new network and firming infrastructure not arrive on time. The report notes that closing power stations need to be replaced by new renewable generation and storage enabled by new network infrastructure.

The Project is fully aligned with the directions expressed in the Check Up.

2.3.5 Peak Demand Reduction Scheme

The Peak Demand Reduction Scheme aims to reduce peak electricity demand in NSW. It forms part of the NSW Energy Security Safeguard.

The scheme does this by providing financial incentives to households and businesses to reduce energy consumption during hours of high peak demand. The scheme started with a demand reduction target of 0.5% in 2022. This will increase to 10% by 2030.

The Peak Demand Reduction Scheme is updated annually, and hence has been updated since the production of the EIS.

The Peak Demand Reduction Scheme notes that renewable energy in the NSW electricity supply mix has been steadily increasing (approximately 30% in 2022) and affirms continued commitment for a transition to renewables.

While this strategy is focused on reducing energy demand, the contribution of pumped hydro energy storage systems to the same fundamental challenge is complementary.

3 Description of amendments

3.1 Introduction

This chapter provides a detailed description of the proposed amendments. These amendments have resulted from ongoing design, and amendments requested by some stakeholders during EIS preparation. Appendix A incorporates these amendments into a revised project description, to replace Appendix G of the EIS. Some of the amendments requested by stakeholders have been formally raised in their submissions on the EIS. However, this report is not a formal response to submissions and does not include responses to submissions generally.

3.2 Overview of the proposed amendments

Following exhibition of the EIS, the proponent identified amendments to the Project presented in the EIS. These amendments provide functional improvements to the Project design, confirm elements of the Project that were highlighted as opportunities in the EIS, takes into account ongoing development of the construction methodology, and aim to provide for ongoing impact minimisation principles.

Within the EIS, to assist in detailing the key infrastructure associated with the Project, the footprint was divided into five 'construction areas'. The construction areas are predominantly centred around the generation components in the south of the Project area, with only transmission lines and access roads occupying the north of the Project area. The five construction areas used to describe the Project were:

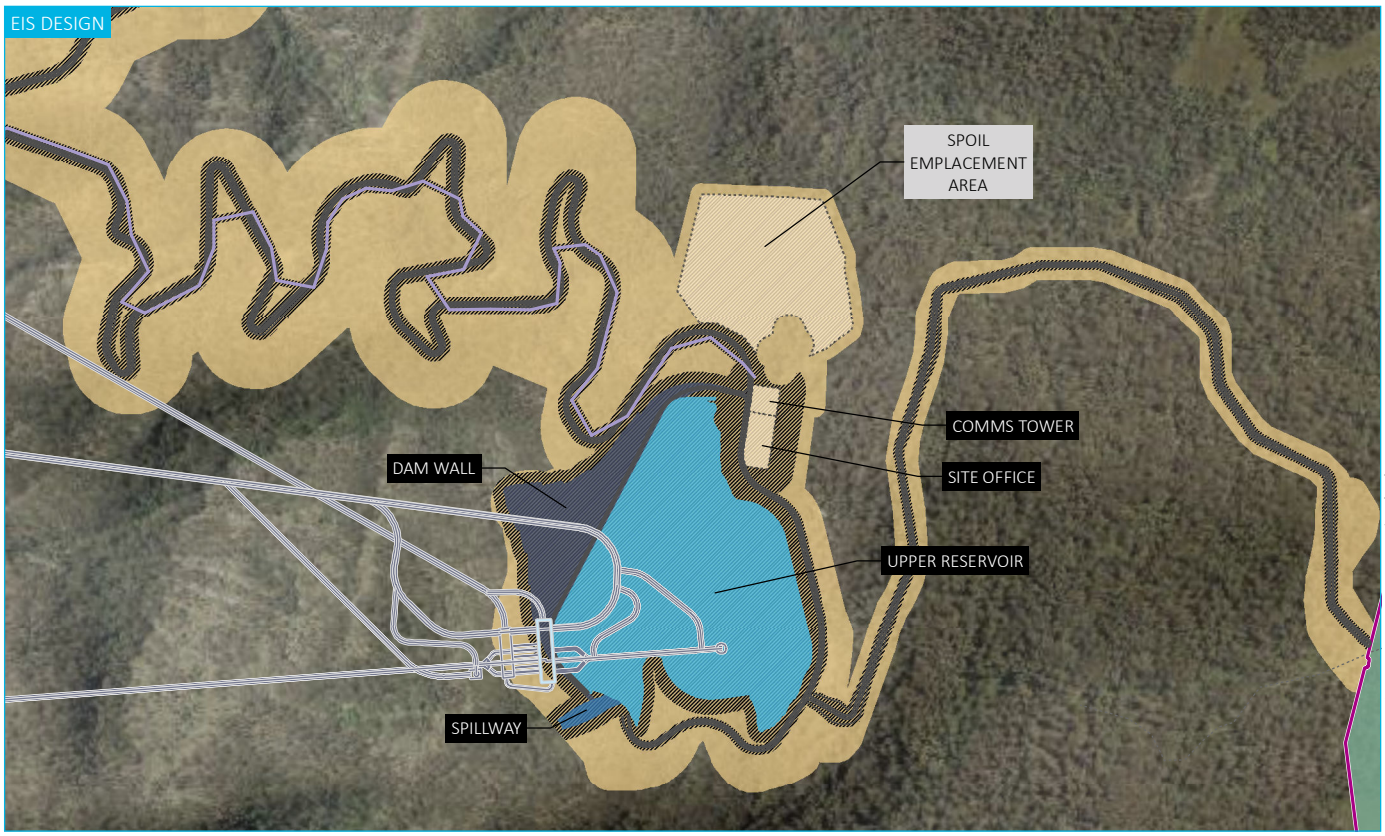
- upper dam and reservoir (Figure 3.1A)
- lower dam and reservoir (Figure 3.1B)
- underground works (Figure 3.1C)
- access roads (Figure 3.1D)
- transmission infrastructure (northern and southern areas).

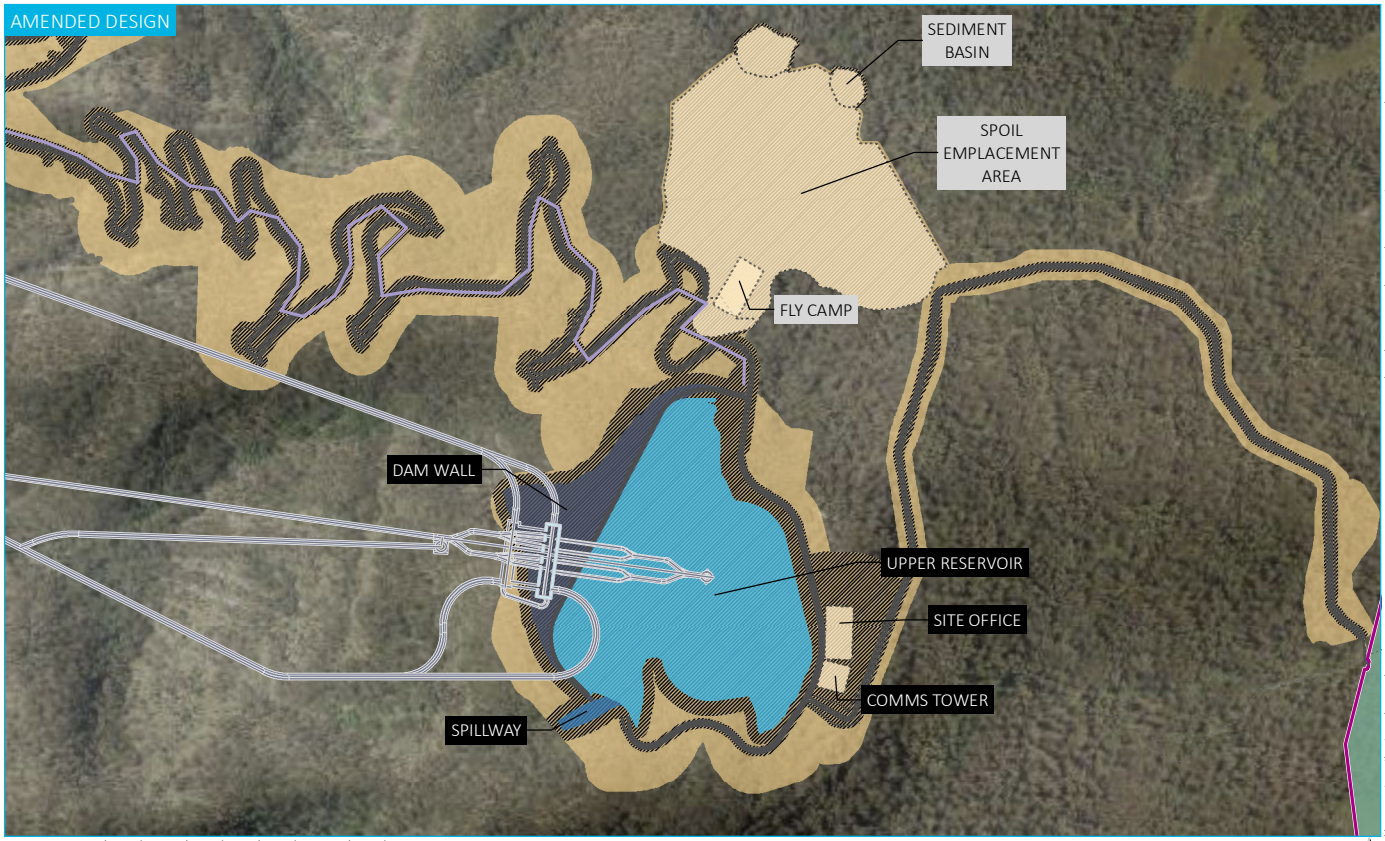
A summary of the amendments and the comparison of the Amended Project to the Project as exhibited in the EIS is provided in Table 3.1 and shown in Figure 3.1A-D, aligning to the above construction areas. The Project amendments are described in detail in Section 3.3. To accommodate the amendments, the project area, construction envelope, disturbance footprint and operational footprint, have all been updated (described in Section 3.4), and these are also shown on the figures. Note that there is no change to transmission infrastructure (northern and southern) and associated project areas and is therefore not shown in the following figures. A minor realignment of the power and communications lines along the UDAR are shown on Figure 3.1B.

Table 3.1 Overview of the project amendments in comparison to the project

Project Element	Description of change	Summary of the Project as exhibited in EIS	Summary of the amended Project	Section referenced
Internal roads and bridges				
Eastern Access Road (EAR) realignment	Realignment of the EAR to reduce need for earthworks, improve road safety and address drainage issues.	Approximately 11.4 km	Approximately 12.1 km	3.3.1i
Temporary bridges	A temporary bridge will be utilised prior to the construction of the two permanent bridges (referred to as Eastern Access Temporary Bridge). A secondary, temporary access is proposed via the construction of a new, temporary bridge crossing of the Macleay River about 600 m north-east of Georges Junction (referred to as Western Access Temporary Bridge). This amendment is proposed to reduce the period of internal road construction and therefore overall construction period and improve effectiveness of emergency response measures (access and egress).	One temporary bridge: Eastern Access Temporary Bridge. Two permanent bridges near Smiths Bluff.	Two temporary bridges: Eastern Access Temporary Bridge (EATB) and Western Access Temporary Bridge (WATB). Two permanent bridges near Smiths Bluff.	3.3.1ii
Upper Dam Access Road (UDAR) refinement	Realignment of the UDAR (including removal of a large north-south connecting section of road) in response to regulator feedback to avoid known habitat and potentially significant impacts to the threatened Brush-tailed Rock Wallaby.	Approximately 7.1 km	Approximately 6.4 km	3.3.1ii
Construction				
Temporary or fly camps	While fly camps were previously anticipated for the project, up to three fly camps are confirmed to be required and located near Smiths Bluff (Eastern fly camp), the intersection of the Main Access Road and the EAR (Western fly camp), and the upper reservoir (within spoil emplacement area) (Southern fly camp). The camps will each accommodate about 20 workers and up to 90 workers depending on the ultimate configuration, and would be established within the first year of construction. All services will be trucked in and out of the sites, with no permanent facilities or services proposed.	Temporary or fly camps may be required. The location and size will be documented during the detailed design phase.	Three temporary or fly camps will provide small scale temporary work accommodation for workers completing initial road works until the main accommodation camp is completed. Proposed locations in proximity of EATB, WATB, and Upper reservoir.	3.3.2i
Blasting and rock crushing/processing	Allowing blasting as a construction method for road works and other above-ground works. Rock processing/crushing facilities will be required in the lower reservoir (LR) and upper reservoir (UR) areas to process rock for use in dams.	Blasting required for tunnels and portals.	Blasting required for tunnels and portals, reservoirs and road works.	3.3.2ii
Construction water requirements	Increasing the estimated water requirements for use in construction (e.g. dust suppression, concrete batching, etc).	Approximately 1 ML/day	Approximately 3 ML/day	3.3.2iii

Project Element	Description of change	Summary of the Project as exhibited in EIS	Summary of the amended Project	Section referenced
Spoil and materials				
Laydown/stockpile areas	There will be four areas used for stockpiling and material laydown. One area is located along the main access road (between transmission towers 14–16), one area is located in proximity to the batching plant, one area is located near Georges Junction, and one is located near the Eastern Access Temporary Bridge on the eastern side of the Macleay River. The largest of the four areas has also been flagged as available for other ancillary uses, to provide further flexibility as the detailed design progresses.	There will be two areas used for stockpiling and material laydown, covering a total area of 114,000 m^2	There will be four areas used for stockpiling and material laydown, covering a total area of 119,600 m^2	3.3.3i
Spoil emplacement	Revised spoil estimates were derived following changes to the underground arrangement and sizing. This, in addition to incorporating agency feedback, required changes to the conceptual landform design. The conceptual landform design presents reduced height and slopes however requires a greater disturbance area as a result.	Three permanent spoil emplacement locations to store around 2.9 Mm^3 plus dead storage within the reservoirs with approximate capacity 300,000-400,000 m^3.	Two permanent spoil emplacement locations to store around 3.55 Mm^3. Use of dead storage in reservoir is not anticipated unless required for any surplus material.	3.3.3ii
Underground arrangement and sizing				
Underground arrangement and sizing for improved generation capacity	The Project will provide up to around 900 MW of electricity generating capacity and at least eight hours of energy storage at full generating capacity.	A preliminary design (underground arrangement) initially based on a 600 MW generation capacity, with ability to optimise the design up to 900 MW capacity. The EIS described an arrangement of up to 900 MW and between 8 and 12 hours of energy storage.	Up to 900 MW and at least 8 hours of energy storage. Underground arrangement and tunnel sizes reflect greater energy storage capacity. Re-location of MAT portal to align with amended arrangement.	3.3.4





Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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KEY

- Project area
- Disturbance footprint
- Construction envelope

Project operational elements

- Underground power station complex
- Tunnels, portals, intakes, shafts
- Permanent road
- Power and communications lines
- Surface works
- Upper dam spillway
- Reservoir
- Dam wall

Existing environment

- Vehicular track
- NPWS reserve

Label format

SURFACE PERMANENT INFRASTRUCTURE

TEMPORARY INFRASTRUCTURE

Upper dam and reservoir construction area

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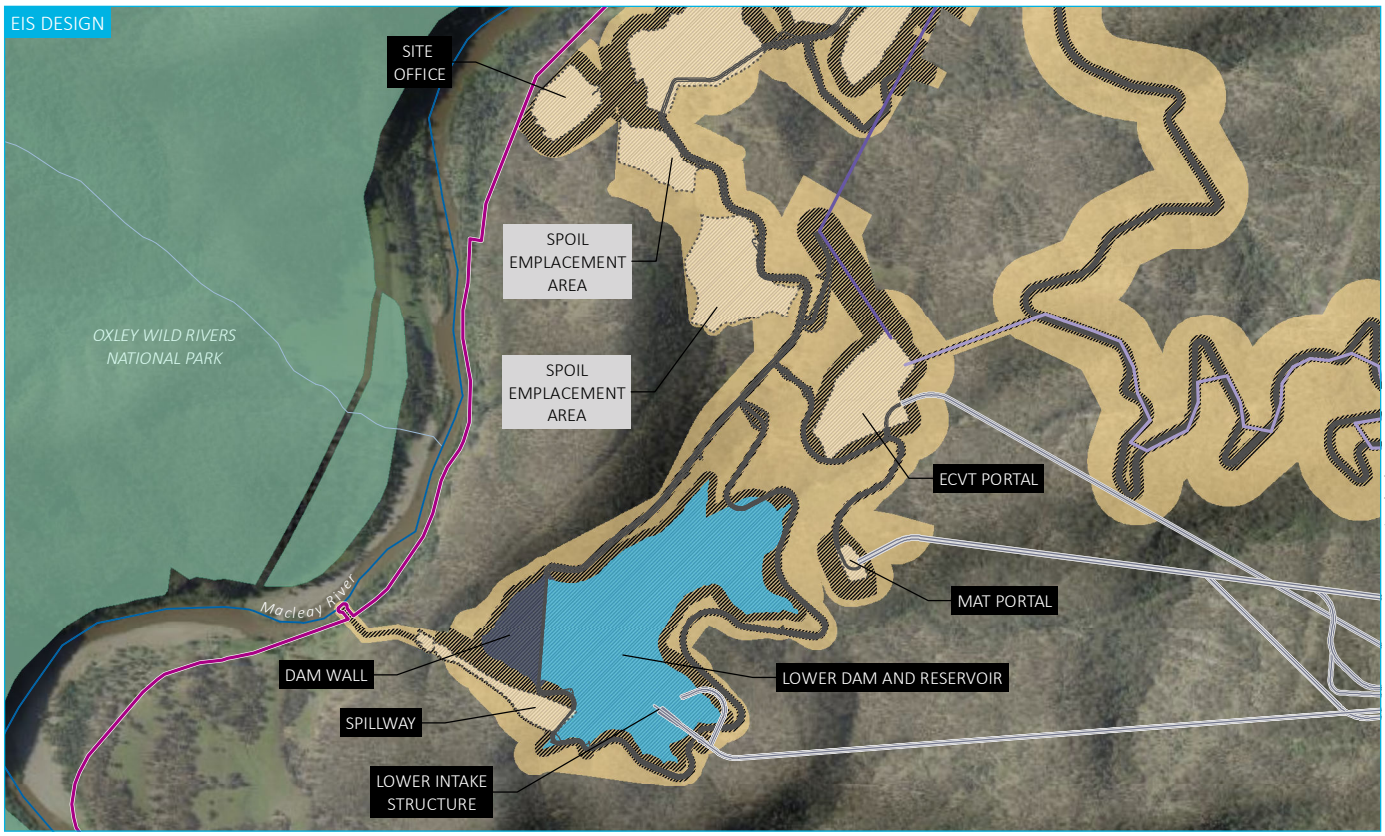
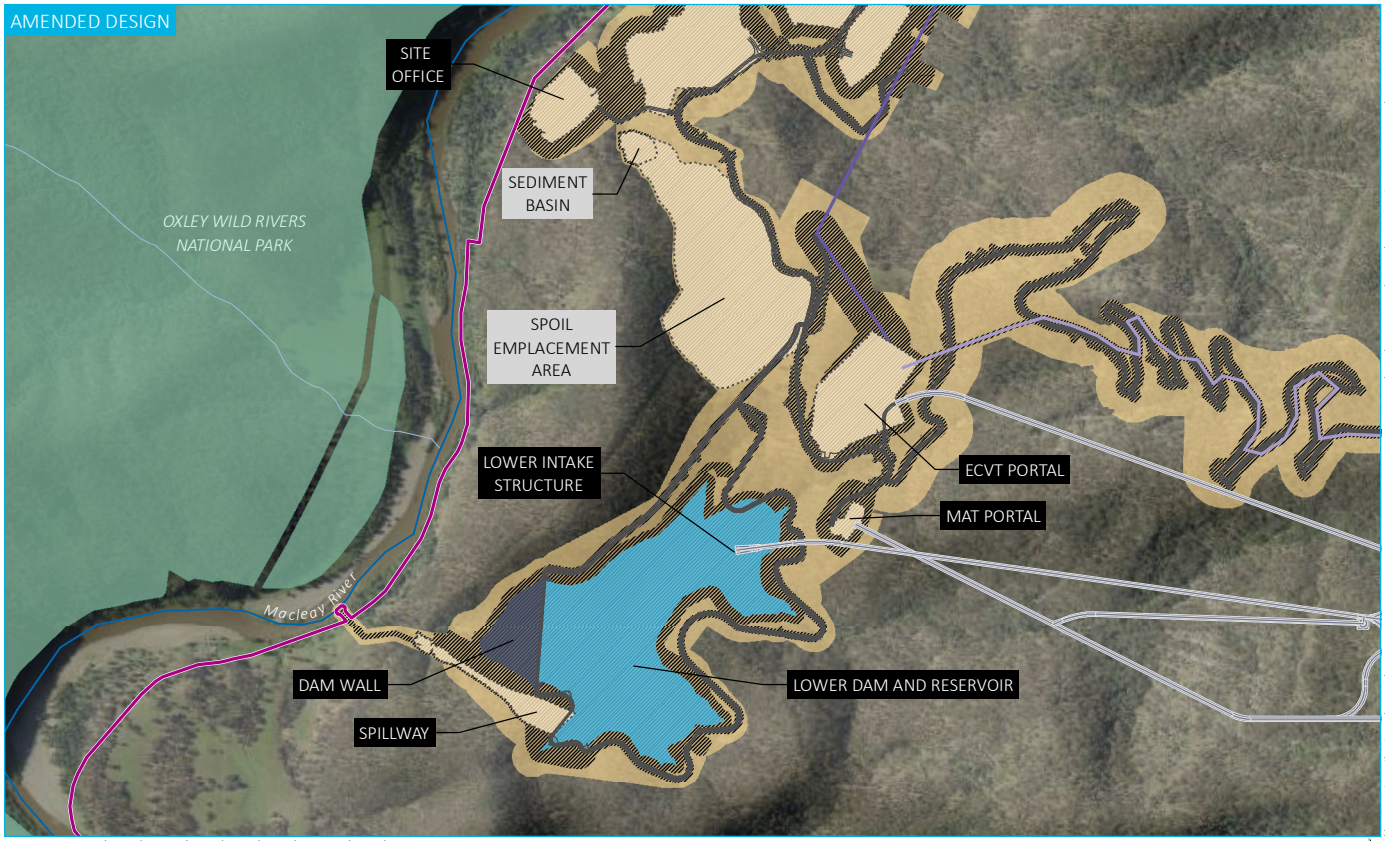
Figure 3.1A

EMM creating opportunities





Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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KEY

- Project area
- Disturbance footprint
- Construction envelope

Project operational elements

- Tunnels, portals, intakes, shafts
- Permanent road
- Power and communications lines
- Transmission overhead lines
- Surface works
- Reservoir
- Dam wall

Existing environment

- Macleay River
- Watercourse/drainage line
- NPWS reserve

Label format

SURFACE PERMANENT INFRASTRUCTURE

TEMPORARY INFRASTRUCTURE

Lower dam and reservoir construction area

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 3.1A

EMM
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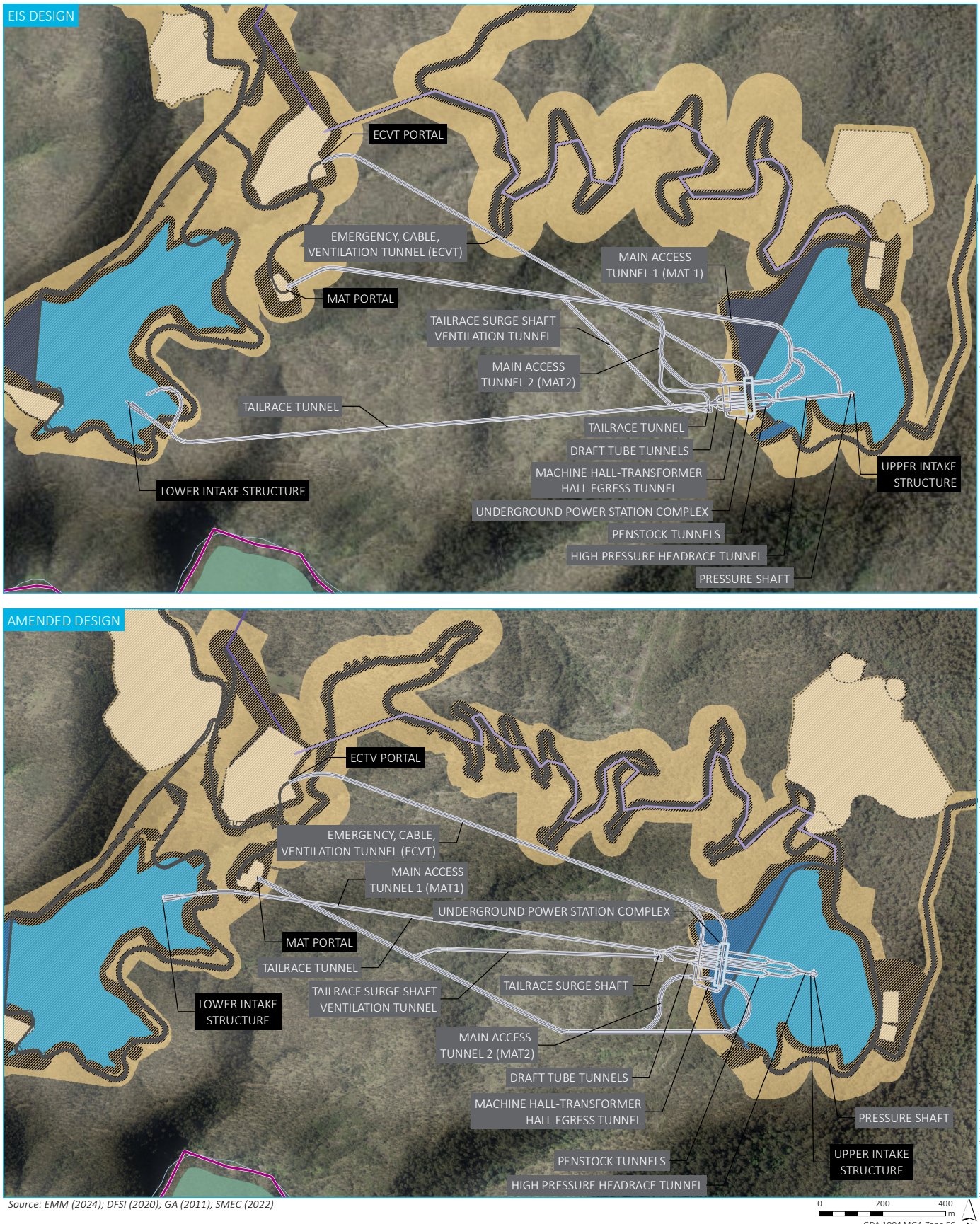

Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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KEY

- Project area
- Disturbance footprint
- Construction envelope

Project operational elements

- Underground power station complex
- Tunnels, portals, intakes, shafts
- Permanent road
- Power and communications lines
- Transmission overhead lines
- Surface works
- Upper dam spillway
- Reservoir
- Dam wall

Existing environment

- Macleay River
- Watercourse/drainage line
- NPWS reserve

Label format

SURFACE PERMANENT INFRASTRUCTURE

TEMPORARY INFRASTRUCTURE

Underground power station complex

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 3.1C

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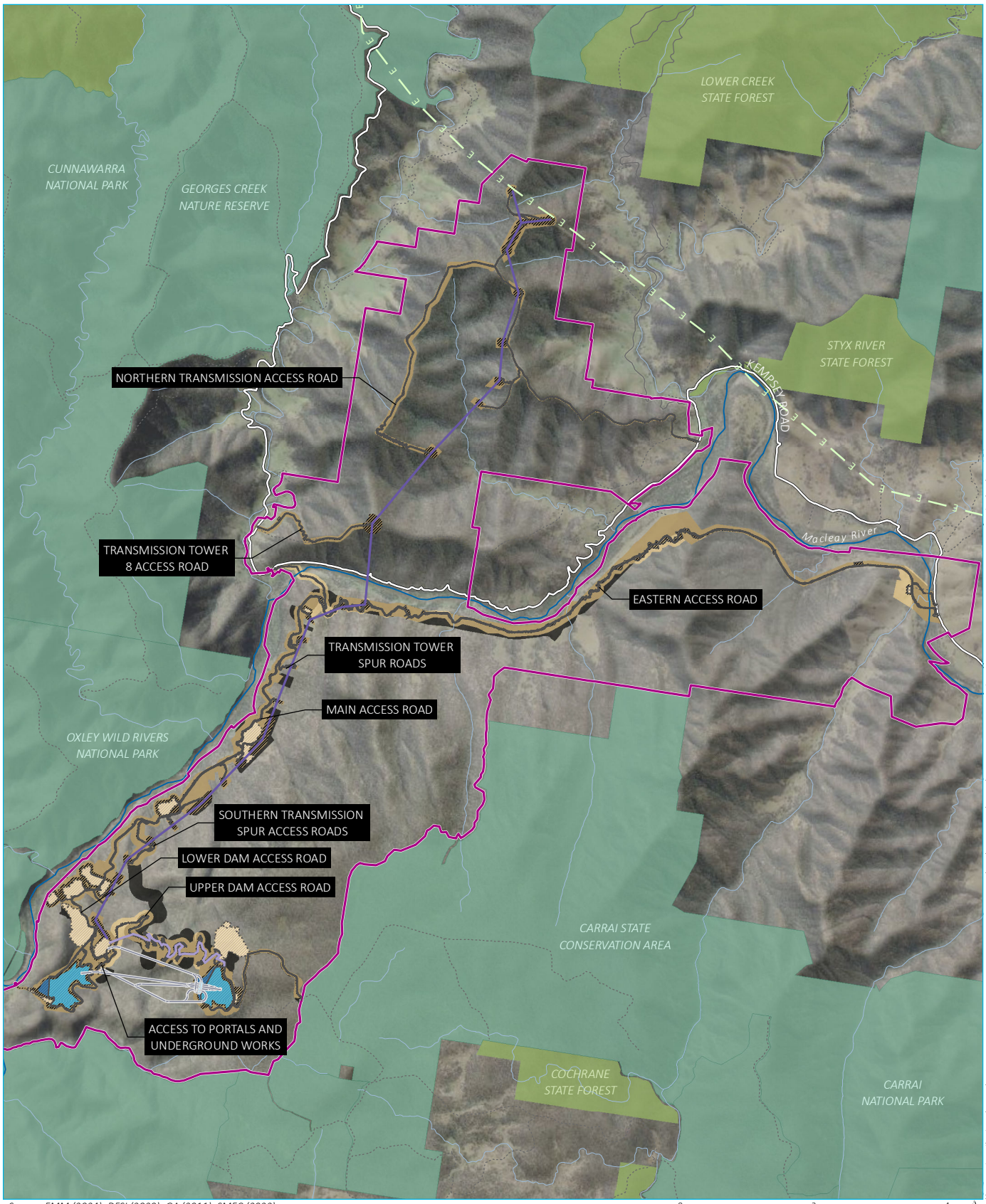

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Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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KEY

- Project area
- Disturbance footprint
- Construction envelope
- Surface works
- EIS construction envelope

Project operational elements

- Underground power station complex
- Tunnels, portals, intakes, shafts
- Power and communications lines
- Transmission overhead lines
- Permanent road
- Reservoir
- Dam wall

Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Minor road
- Vehicular track
- Existing transmission line
- NPWS reserve
- State forest

Label format

SURFACE PERMANENT INFRASTRUCTURE

Access roads construction area

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
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Figure 3.1D

EMM creating opportunities

3.3 Detailed description of proposed amendments

3.3.1 Internal roads and bridges

i Eastern Access Road

Refinements have been made to the EAR to reduce the need for earthworks, improve road safety and address drainage issues. The realignment addresses a particularly steep section of the EAR, which would have required significant earthworks with cut batters reaching up to 15 m in vertical height. This steep grade, spanning almost 500 m, posed a risk to oversized and over-mass vehicles (OSOM) delivering Project components. The revised alignment follows the natural contours of the valleys and ridges, eliminating the previous long, steep downgrade of less than 70 m at a 12% downgrade. The refined alignment will increase the total length of the road (to approximately 12.1 km), however will reduce the earthworks volumes within this section, with the cut volume of the original alignment totalling 155,000 m^3, whereas the refined alignment involves only 91,000 m^3 of cut.

This change will also shorten the period of internal road construction, thereby reducing the overall construction timeline and enhancing the effectiveness of emergency response measures for access and egress.

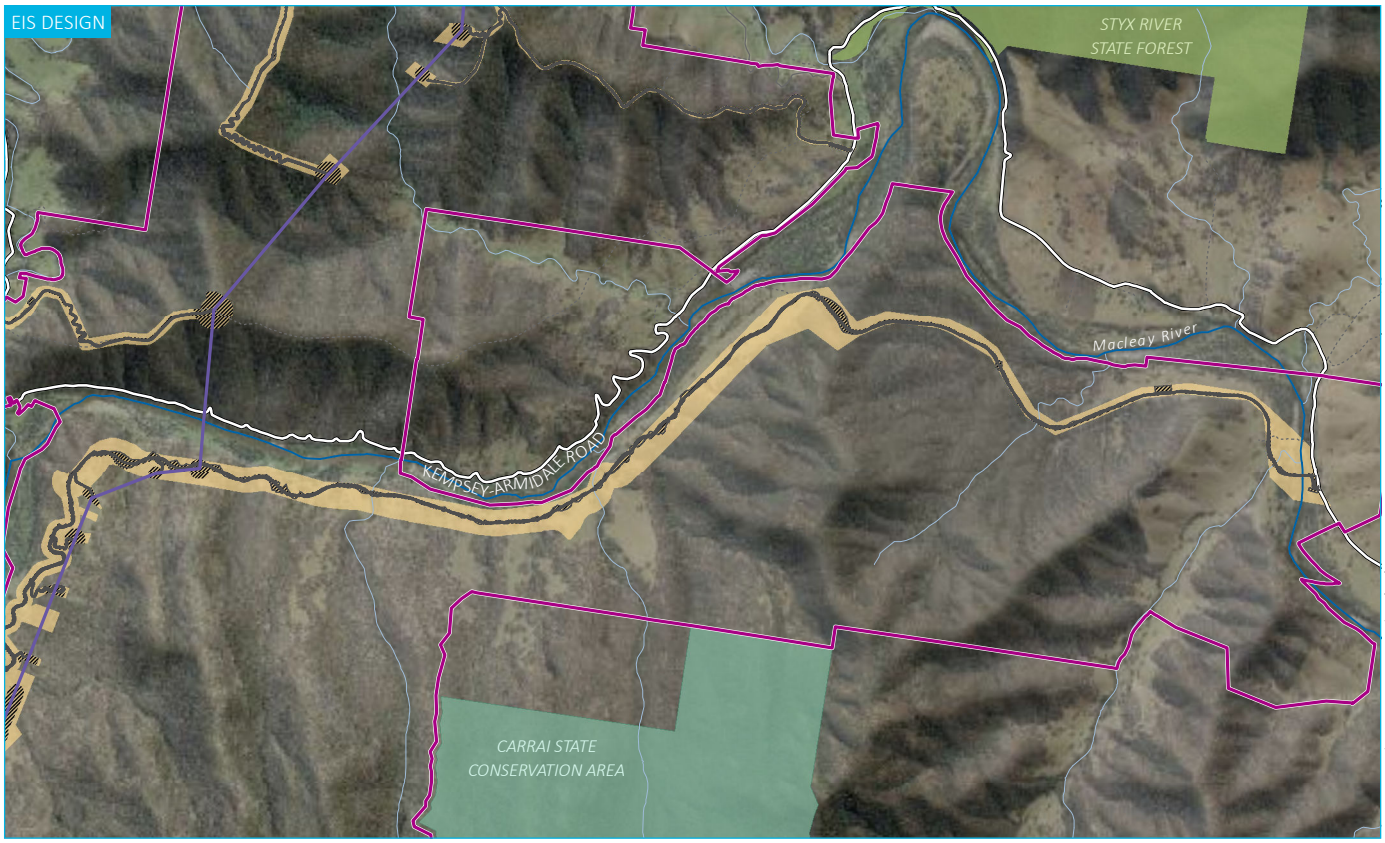
The alignment of the amended EAR compared to the EIS is shown in Figure 3.2.

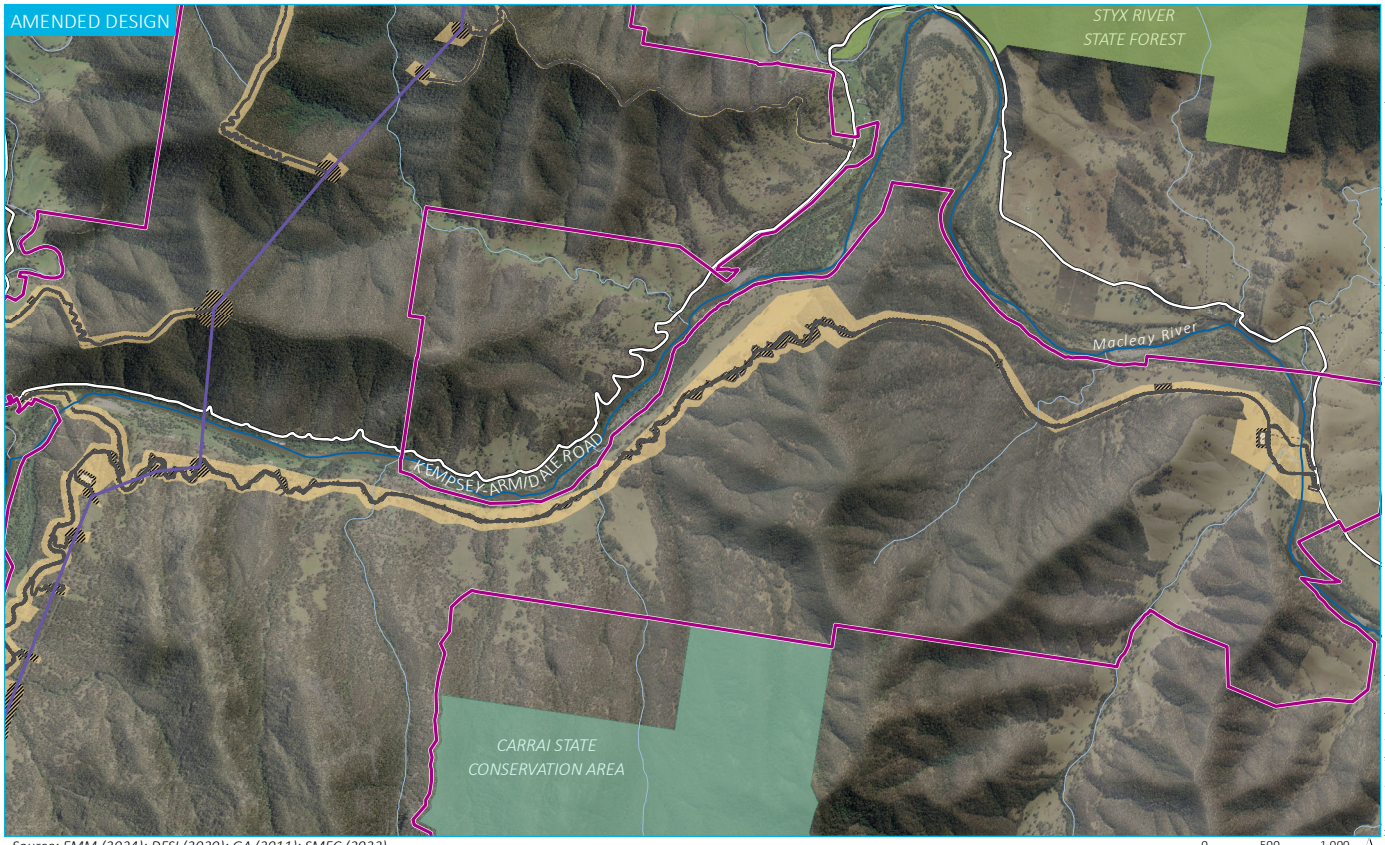
ii Temporary bridges

The EIS identified the need for one temporary bridge, which was to be built in the same location as the two permanent bridges near Smiths Bluff and was to be the primary site access to the EAR. As part of design and constructability review, this temporary bridge location has been moved immediately north of the permanent bridge to better suit span and bridge requirements, and so that access to the site can be maintained while the permanent bridge is being built if needed. This bridge is referred to as the Eastern Access Temporary Bridge (EATB). In addition, and with the aim of reducing the overall construction timeframe of the Project, a second temporary bridge crossing is proposed about 600 m north east of Georges Junction. This bridge is referred to as the Western Access Temporary Bridge (WATB).

The indicative design of temporary bridges is shown in Figure 3.3.It is anticipated the WATB will be decommissioned upon the completion of the EAR, while the EATB will be decommissioned prior to the completion of the Smiths Bluff and Carrolls Creek permanent bridges.

The construction method for temporary bridges will involve building abutments from concrete blocks on gravel beds, protected by sheet pile walls. This will allow the bridges to be removed with minimal disturbance and provide improved flooding resistance. The road approach on floodplains will be turned parallel to the river channel as soon as possible. This design reduces the risk of washout by preventing a long, raised bank from lying across the flow.





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Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

0 500 1,000 m
GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Construction envelope
- Permanent road
- Transmission overhead lines

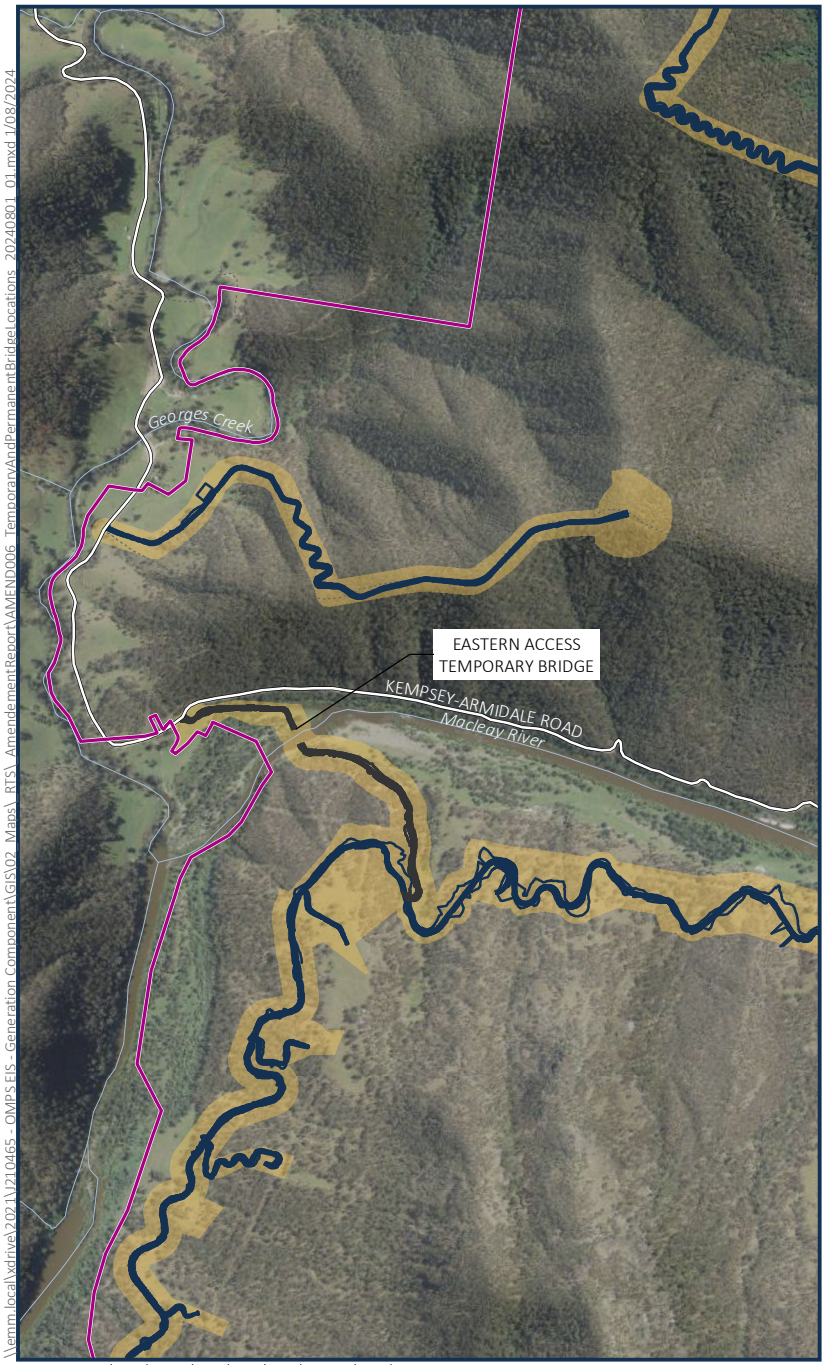
Existing environment
- Macleay River
- Watercourse/drainage line

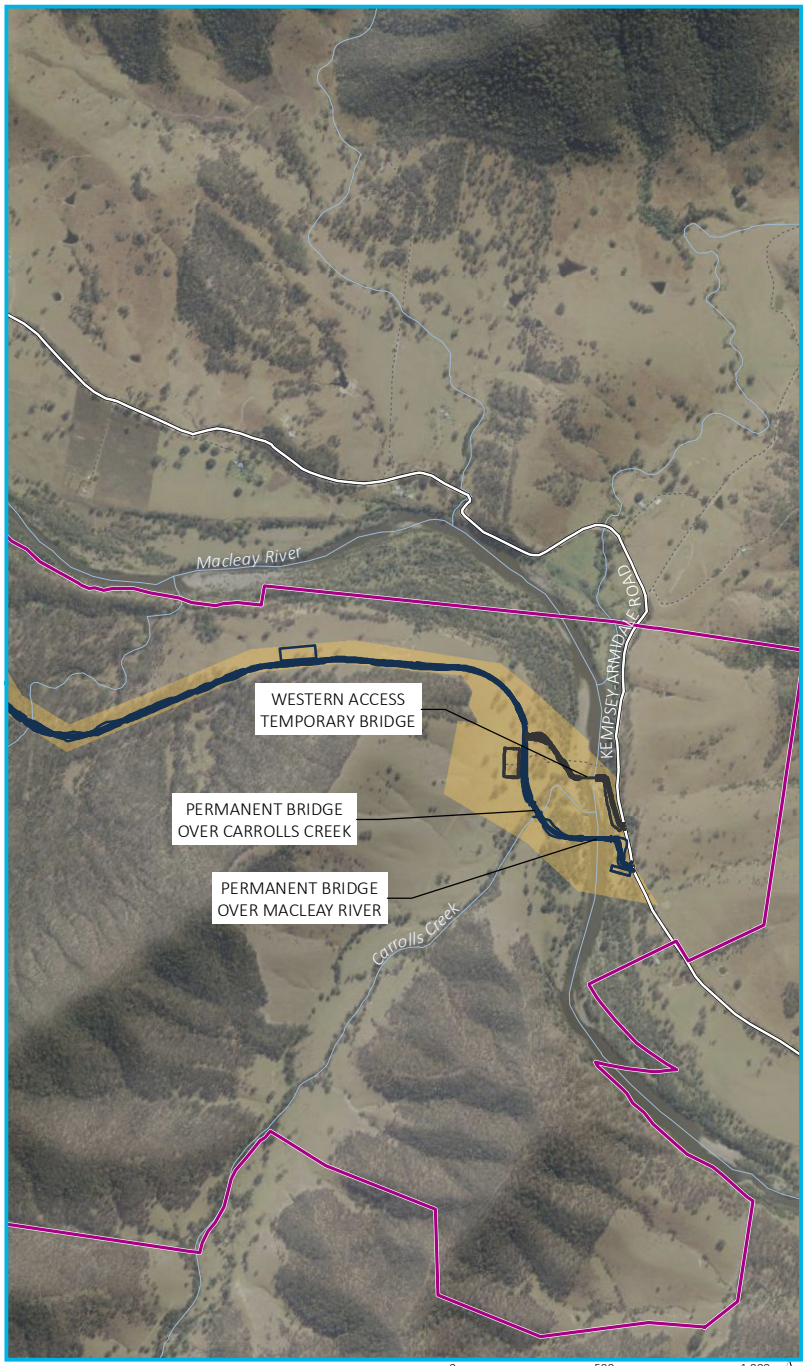
Existing environment
- Major road
- Minor road
- Vehicular track
- NPWS reserve
- State forest

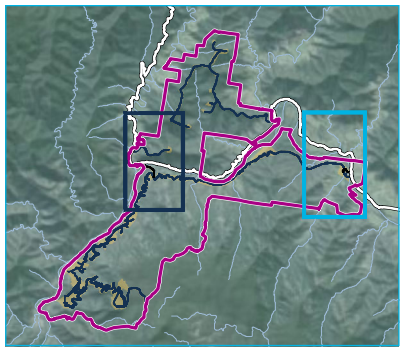
EAR realignment

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 3.2

EMM
creating opportunities







KEY

- Project area
- Permanent road
- Temporary bridge
- Construction envelope

Existing environment

- Kempsey-Armidale Road
- Vehicular track
- Watercourse/drainage line

0 500 1,000 m

GDA 1994 MGA Zone 56

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Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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Temporary bridge locations

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Figure 3.3

EMM creating opportunities

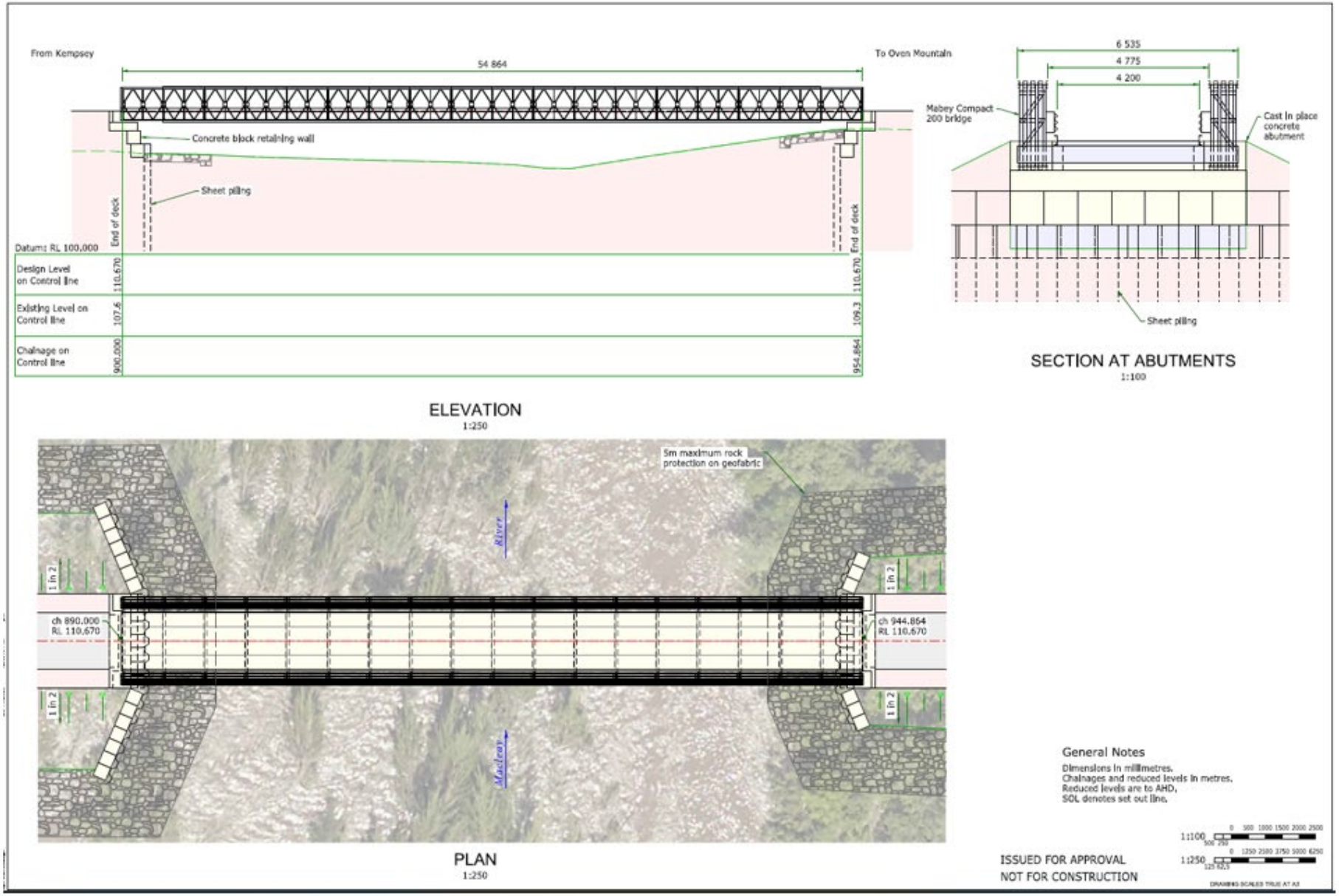


Figure 3.4 Cross-section and plan view of temporary bridge design

iii Upper Dam Access Road

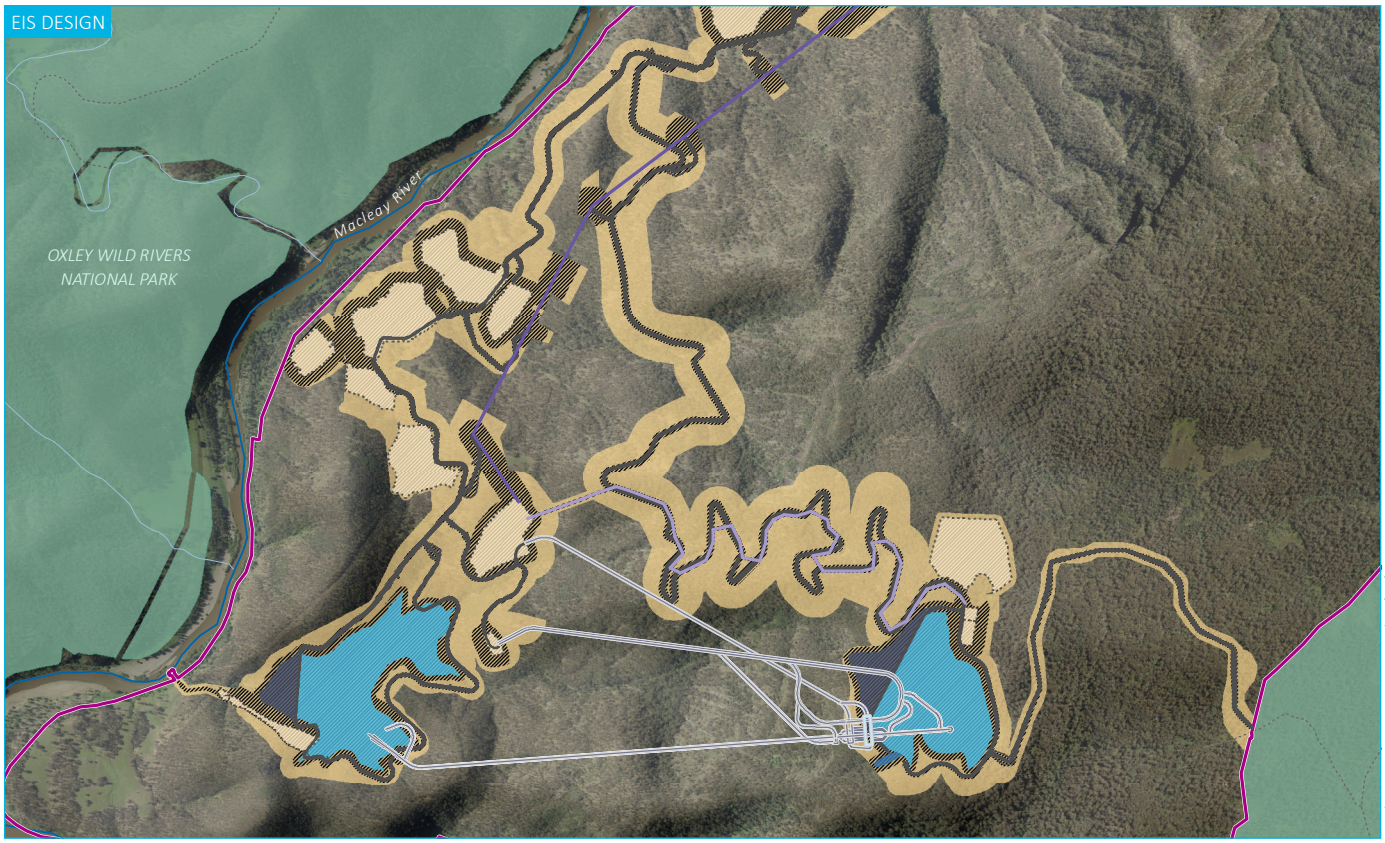
The EIS presented an access road to the upper reservoir that spurred from the Main Access Road, through Brush-tailed Rock-wallaby (BTRW) denning and habitat areas, linking to a UDAR alignment up the escarpment. Feedback from the Biodiversity Conservation and Sciences Directorate of DCCEEW advised that the Project, as exhibited in the EIS, would have a significant impact on BTRW.

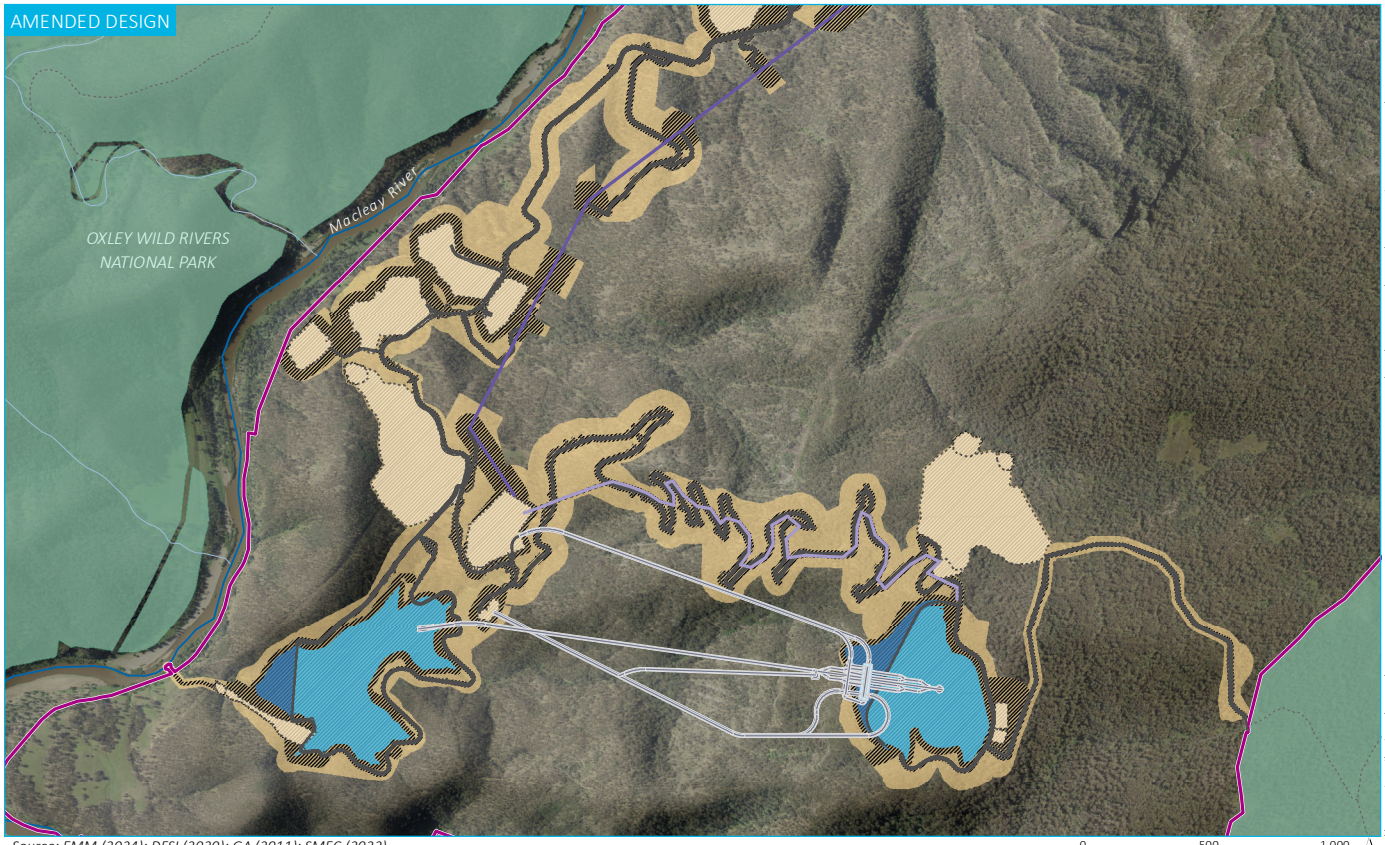
The proponent has since investigated other design options to avoid and/or minimise these impacts, ensuring that any identified alternatives can still be feasibly constructed given the challenging terrain. Improvements to safety for heavy vehicles were also investigated.

The Amended Project has removed the access road linking the Main Access Road and UDAR as presented in the EIS to avoid known BTRW denning habitat, and made refinements to the alignment of the UDAR to allow more feasible heavy vehicle access and to address drainage issues. The amendments to these roads are shown in Figure 3.5. The road design includes measures to enhance safety for users, such as optimizing the road geometry to better fit the terrain. The realignment has reduced the length of the UDAR by approximately 700 m, and now joins the Lower Dam Access Road (LDAR) further to the south.

Turn bays have been placed at approximately 500 m intervals along the road, near corners where the gradient flattens to 3%, allowing for safer three-point turns. Although originally designed for 20-tonne articulated dump trucks (ADTs), the road will be revised to accommodate 30-tonne ADTs. Passing bays, also spaced at 500 m, are positioned on straight sections to avoid swept path issues, increasing the pavement width from 5 – 7 m to allow two ADTs to pass each other. Initially, turn bays were considered for dual use as passing bays, but due to their corner locations, separate passing bays are now provided.

Silt fences are installed at cross drainage entries, with erosion protection required at outfalls. Given the steep terrain and the distance to the water receiver, most silts are expected to settle out, ensuring water quality is maintained. These refinements to the UDAR aim to create a safer, more practical access route for the Project's construction phase.





Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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KEY

- Project area
- Disturbance footprint
- Construction envelope

Project operational elements

- Underground power station complex
- Tunnels, portals, intakes, shafts
- Permanent road
- Power and communications lines
- Transmission overhead lines
- Surface works
- Upper dam spillway
- Reservoir
- Dam wall

Existing environment

- Macleay River
- Watercourse/drainage line
- Vehicular track
- NPWS reserve

UDAR realignment

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Figure 3.5

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3.3.2 Construction

i Temporary or fly camps

While fly camps were previously anticipated for the Project in the EIS, up to three fly camps are confirmed to be required for the Amended Project. These are proposed to be located:

- near Smiths Bluff, referred to as the Eastern fly camp
- near the intersection of the Main Access Road and the EAR, referred to as Western fly camp
- at the upper reservoir (within spoil emplacement area), referred to as Southern fly camp.

The proposed locations and indicative layout are shown in Figure 3.6.

The fly camps will accommodate about 20 workers and up to 90 workers depending on the ultimate configuration of each camp. The camps will be established within the first year of construction to provide small scale temporary work accommodation for workers completing initial road works until the main accommodation camp is completed.

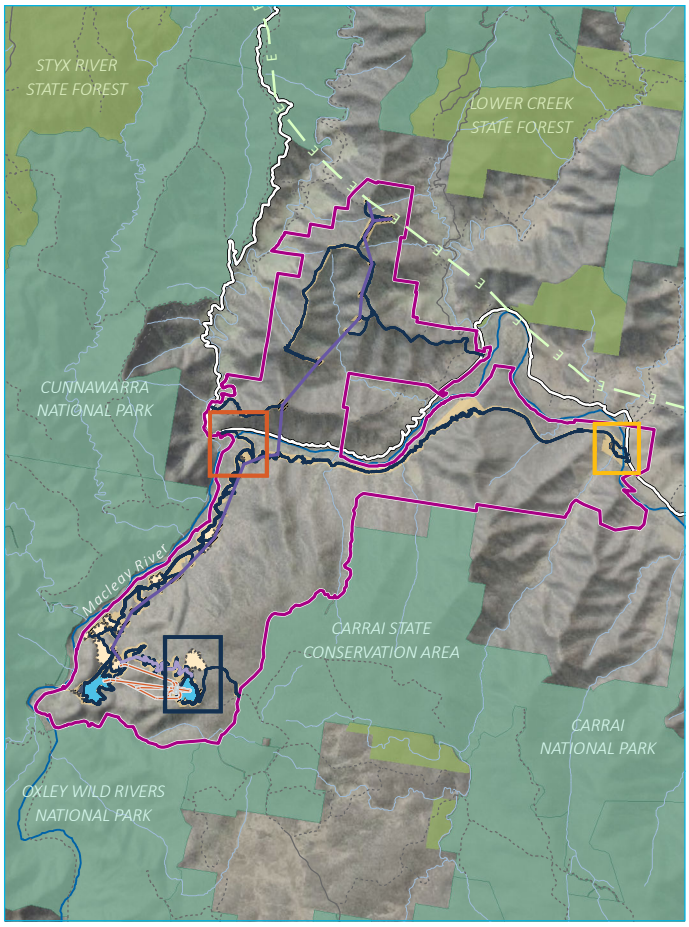
Each fly camp will provide parking for light vehicles, site office, ablutions, laundry and diner. The camp will be run by generators and all services will be trucked in and out of the sites, with no permanent facilities or services proposed. At completion of their use, the fly camps would be disassembled and the land used for the remainder of construction and/or rehabilitated.

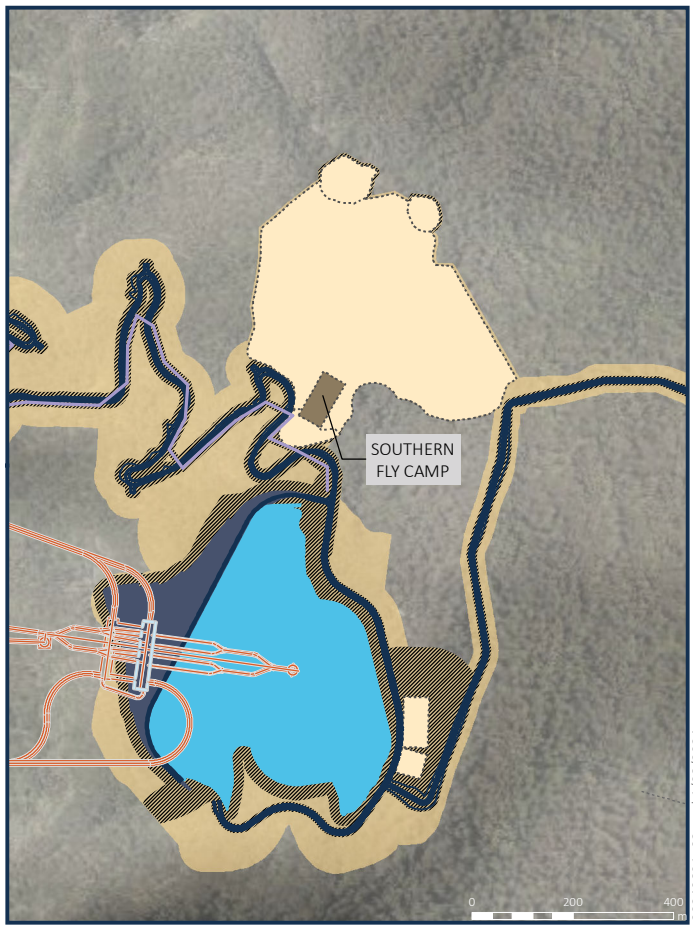
ii Blasting and rock crushing/processing

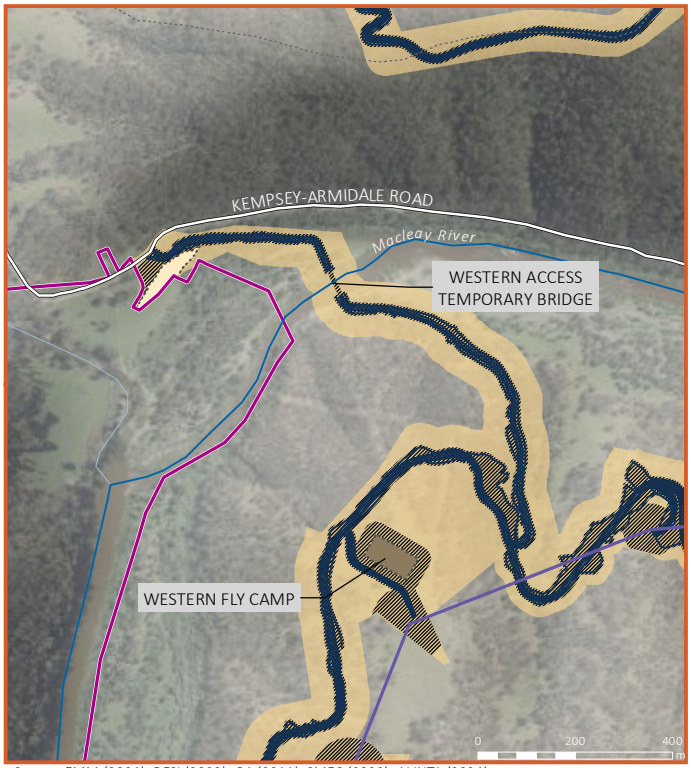
The EIS and the supporting noise and vibration assessment (NVIA) identified that blasting would occur for:

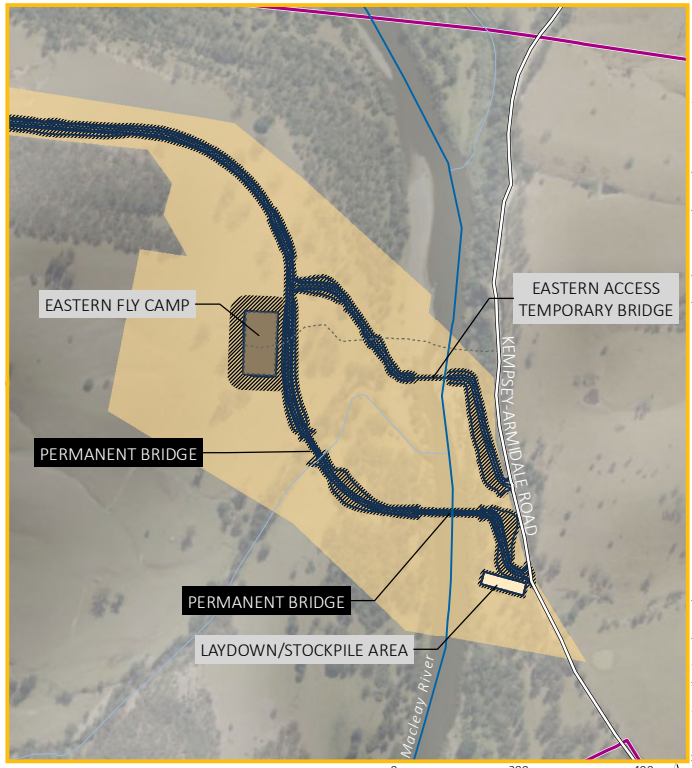
- intake and portal construction at lower and upper reservoirs
- ECVT and MAT portals
- Underground powerhouse cavern including collector tunnels, manifolds, penstocks, gallery, surge shaft chamber and draft tubes
- tunnel construction.

In addition to the above locations, the Amended Project will utilise blasting as a construction method for road works and other above-ground works, in combination with earthworks, namely cuts or excavation through hard rock. Rock processing/crushing facilities will be required in the lower reservoir (LR) and upper reservoir (UR) areas to process rock for use in dams. An Addendum to the NVIA has been prepared to assess the potential change in predicted impacts due to blasting (see Appendix I).









Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022); ALINTA (2024)

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KEY

- Project area
- Disturbance footprint
- Construction envelope

Project operational elements

- Underground power station complex
- Power and communications lines
- Tunnels, portals, intakes, shafts
- Permanent road
- Fly camp
- Surface works
- Reservoir
- Dam wall

Existing environment

- Kempsey-Armidale Road
- Vehicular track
- Existing transmission line

Label format

SURFACE PERMANENT INFRASTRUCTURE

TEMPORARY INFRASTRUCTURE

Fly camp locations

Oven Mountain Pumped Hydro Energy Storage Project
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Figure 3.6

EMM creating opportunities

iii Construction water requirements

The EIS and supporting surface water assessment (SWA) considered indicative water usage requirements during construction as part of the Project's water balance. This estimated approximately 1 ML/day of construction water would be required.

The Amended Project increases the estimated water requirements for use in construction from 1 ML/day to up to approximately 3 ML/day. This increase is due to a review of water requirements needed for concrete batching, road works and dust suppression, temporary fly camps and other uses.

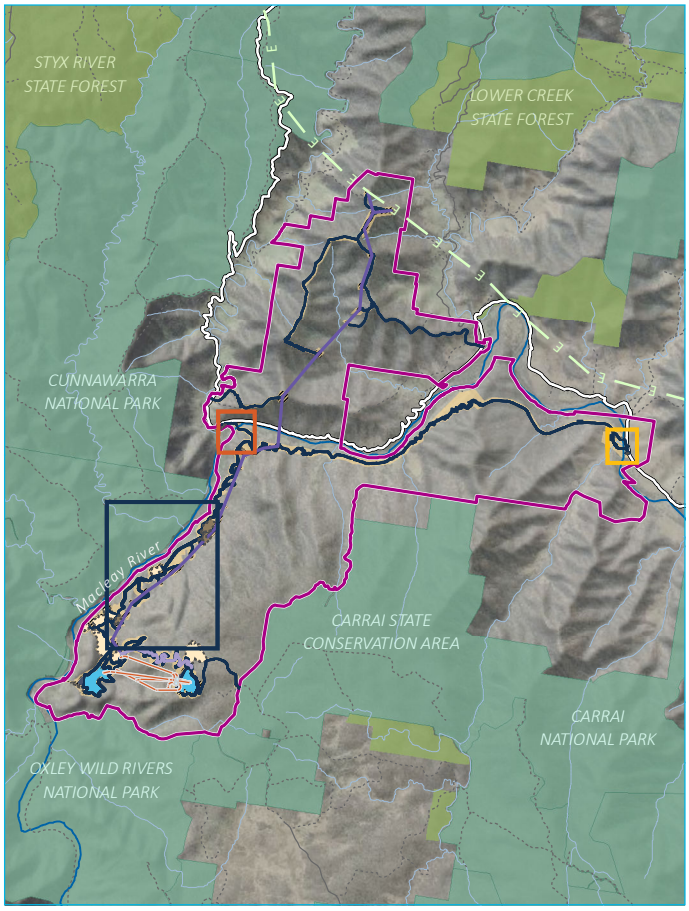
Construction water will be supplied to water storage systems either via groundwater bores, or via pumping of water from the Macleay River to support camp operations, the concrete batching plant, dust suppressions, aggregate processing and other activities across the site.

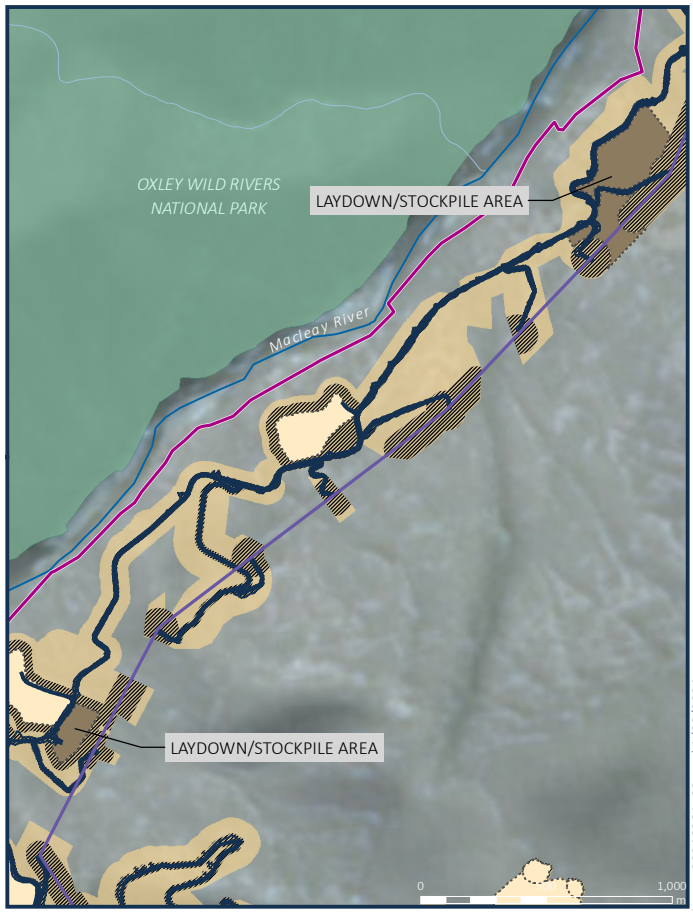
Since the exhibition of the EIS, the proponent has engaged a water broker and has been seeking and acquiring available water licenses to support the total water demand needed for the Amended Project. Based on the progress of this activity, the proponent can demonstrate suitable water access for the Project to incorporate this additional construction water demand (see Section 6.4.2vii).

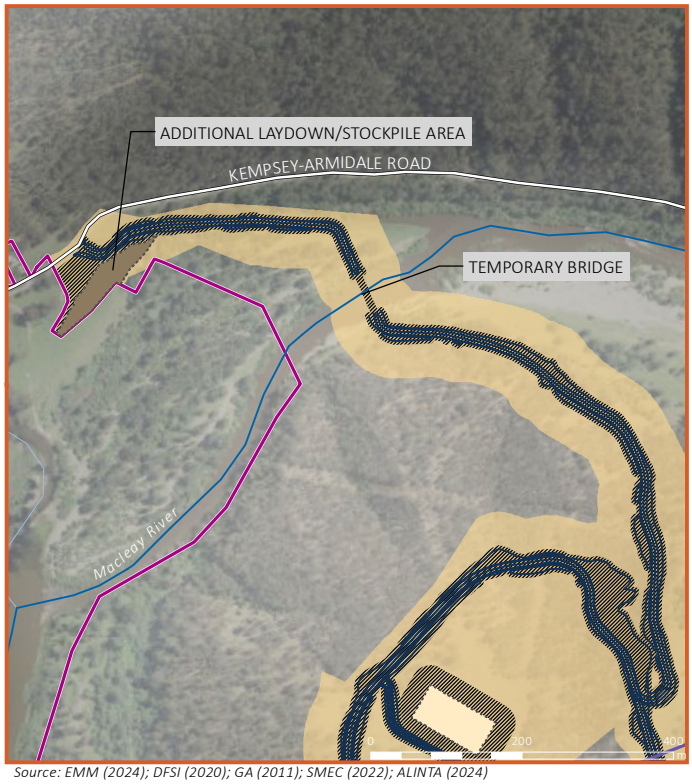
3.3.3 Spoil and materials

i Laydown / stockpile areas

There will be four areas used for stockpiling and material laydown. One area is located along the main access road (between transmission towers 14–16), one area is located in proximity to the batching plant, one area is located near Georges Junction, and one is located near the Eastern Access Temporary Bridge on the eastern side of the Macleay River. The largest of the four areas has also been flagged as available for other ancillary uses, to provide further flexibility as the detailed design progresses. There will be four areas used for stockpiling and material laydown, covering a total area of 119,600 m^2. Progressively, and at the end of construction, the laydown / stockpile areas will be rehabilitated and returned to a state representing its previous use.







Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022); ALINTA (2024)

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KEY

- Project area
- Disturbance footprint
- Construction envelope

Project operational elements

- Underground power station complex
- Transmission overhead lines
- Permanent road
- Laydown/stockpile area
- Surface works

Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Existing transmission line
- NPWS reserve

Location of laydown/stockpile areas

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Figure 3.7

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ii Spoil emplacement

The EIS presented three spoil emplacement areas developed to accommodate around 2.9 Mm^3 of material, as well as identified the use of dead storage within the reservoirs to accommodate approximately 300,000-400,000 m^3 of additional spoil.

Since the EIS, the proponent has progressed the design of the powerhouse and power waterways (Section 3.3.4) and subsequently revised the estimated spoil material that will be generated. In response to the revised spoil estimates, and in addition to agency feedback received on spoil emplacement, the proponent engaged WSP to review the spoil management approach and develop suitable and stable conceptual landforms.

As a result of the work by WSP (2024), two permanent spoil emplacement (PSE) locations are proposed instead of three, the upper PSE and lower PSE, and have capacity to store around 3.55 Mm^3 of material. The two locations are shown on Figure 3.8. It is anticipated that all spoil material could be contained within these locations and any shortfall resolved at detailed design, therefore use of dead storage in reservoir is not anticipated but could be investigated if surplus material becomes likely.

The conceptual landforms and basis of design is provided at Appendix D and describe the upper PSE and lower PSE. The permanent spoil emplacement areas will be land formed to integrate into the existing topography, and progressively rehabilitated. They present reduced height and slopes compared to the EIS design, however requires a greater disturbance area as a result.

a Upper PSE

Options for the upper PSE were initially aimed to be contained within the existing construction envelope and to avoid sensitive areas and known constraints, specifically the presence of Pultenaea sp. Werrikembe (*Pultenaea rubescens*) to the south and Guthrie's Grevillea (*Grevillea guthrieana*) to the north of the original PSE area. Based on the predicted volumes, the need to limit slopes, and access constraints preventing the transfer of material to other parts of the site, it was not possible to stay within the construction envelope. As such, the disturbance footprint and construction envelope have been amended to accommodate revised designs, and unfortunately, because of topographical constraints on other sides and with preference to avoid direct and indirect impacts to Pultenaea sp. Werrikembe, it was also not possible to avoid impacts to Guthrie's Grevillea. These impacts will form part of the offset strategy being developed by the proponent.

The fill volumes for the proposed surface of the Upper PSE is shown in Figure 3.9, with a maximum height of around 35 m above existing ground. The concept view of the final landform is shown in Figure 3.10. The overall slopes for the Upper PSE are replicated in Table 3.2. The Upper PSE has an average slope of 17 degrees with steeper slopes tying into the steep natural terrain.

Table 3.2 Overall slopes for Upper PSE

Angle (degrees)	Slope area (ha)	Percentage of total
<11	1.26	7.1
11-14.5	2.10	11.6
14.5-18	5.56	30.4
18-21.5	8.86	47.6
>21.5	0.62	3.3
Total	18.4	100

Source: WSP 2024

b Lower PSE

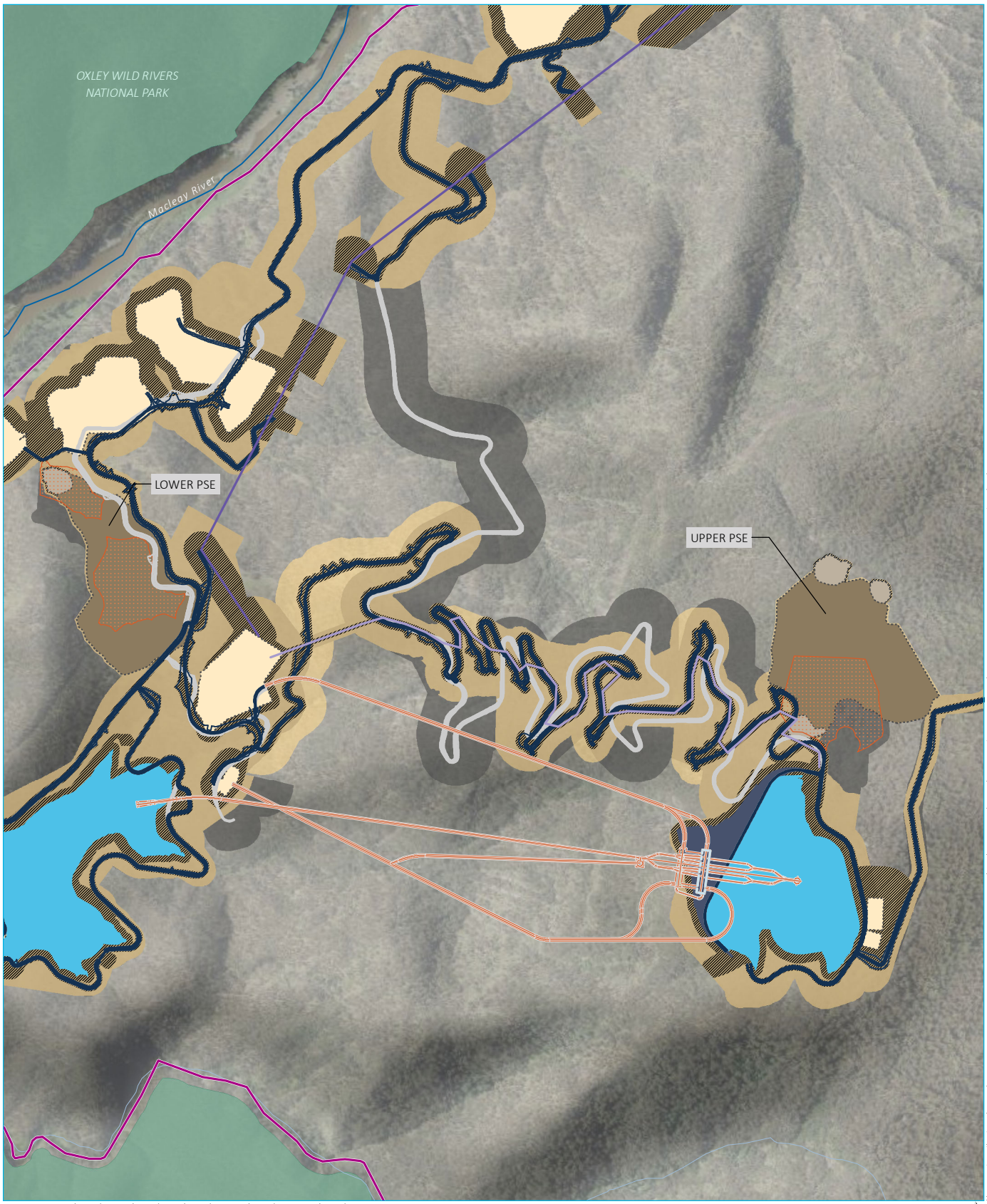
Options for the Lower PSE were initially aimed to be contained within the existing construction envelope. However, based on the predicted volumes, the need to limit slopes, and general area constraints to limit overall disturbance in other parts of the lower construction area, it was not possible to stay within the construction envelope. As such, the disturbance footprint and construction envelope have been amended to accommodate revised designs.

The fill volumes for the proposed surface of the Lower PSE is shown in Figure 3.11, with a maximum height of around 35 m above existing ground. The concept view of the final landform is shown in Figure 3.12. The overall slopes for the lower PSE are presented in Table 3.3. The Lower PSE has an average slope of 14 degrees with steeper slopes up to 22 degrees tying into the steep natural terrain.

Table 3.3 Overall slopes for Lower PSE

Angle (degrees)	Slope area (ha)	Percentage of total
<11	4.16	27.6
11-14.5	3.67	24.0
14.5-18	4.19	26.9
18-21.5	2.51	15.8
>21.5	0.98	5.7
Total	15.51	100

Source: WSP 2024



Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022); ALINTA (2024)

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KEY

- Project area
- Disturbance footprint
- Amended construction envelope
- EIS construction envelope

Project operational elements

- Underground power station complex
- Tunnels, portals, intakes, shafts
- EIS permanent road
- Amended permanent road
- Power and communications lines
- Transmission overhead lines
- Reservoir
- Dam wall
- EIS PSE
- Amended PSE
- Sediment basin
- Surface works

Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Existing transmission line
- NPWS reserve

Location of Upper PSE and Lower PSE

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Figure 3.8

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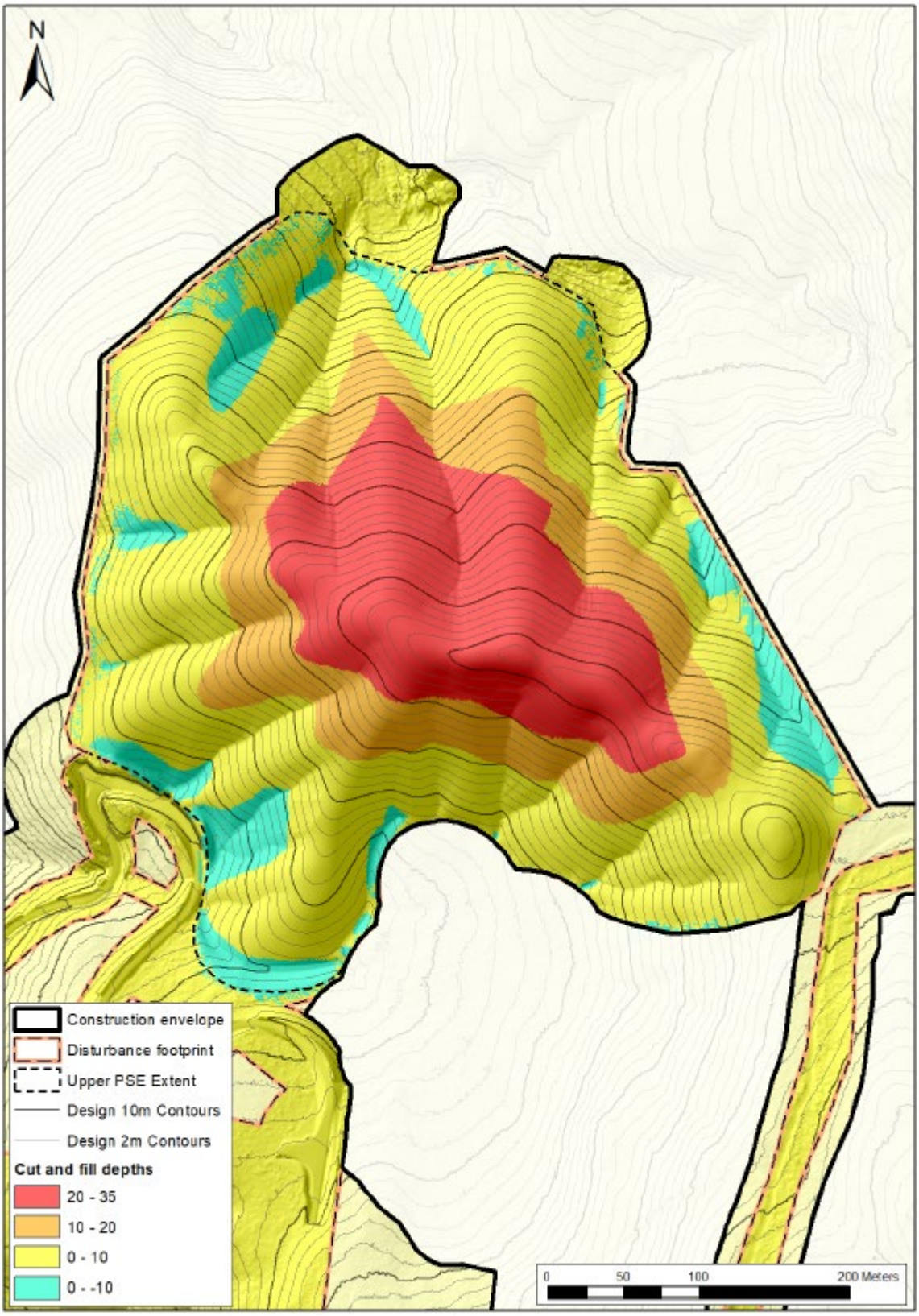


Source: WSP 2024

Figure 3.9 Upper reservoir spoil emplacement fill volume

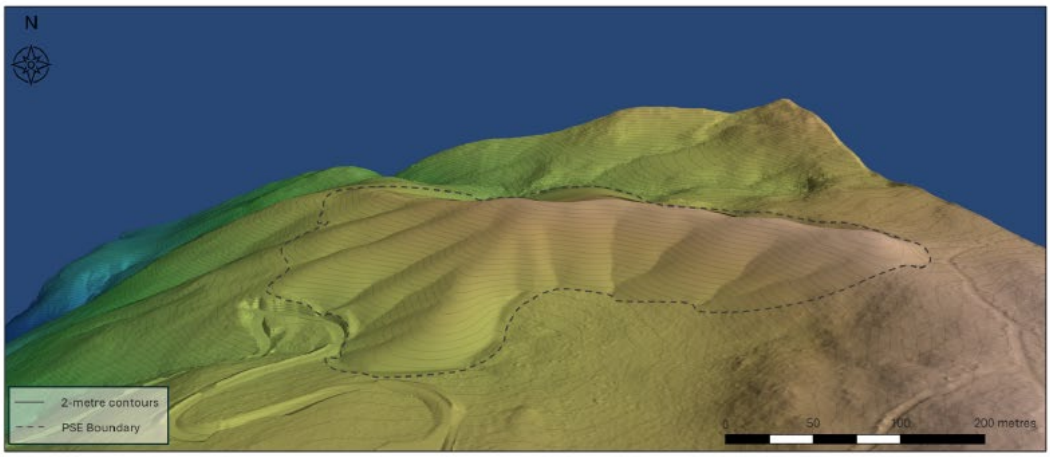


Figure 4.3 Views from the South (upper PSE)

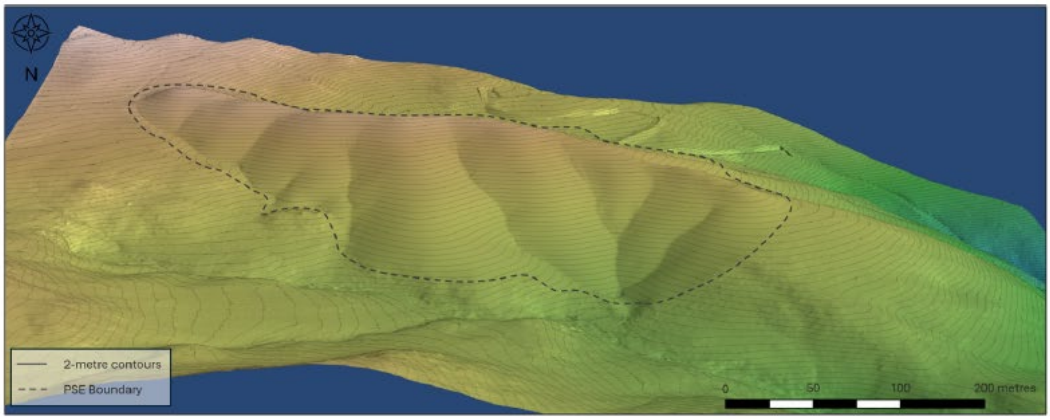


Figure 4.4 Views from the North (upper PSE)

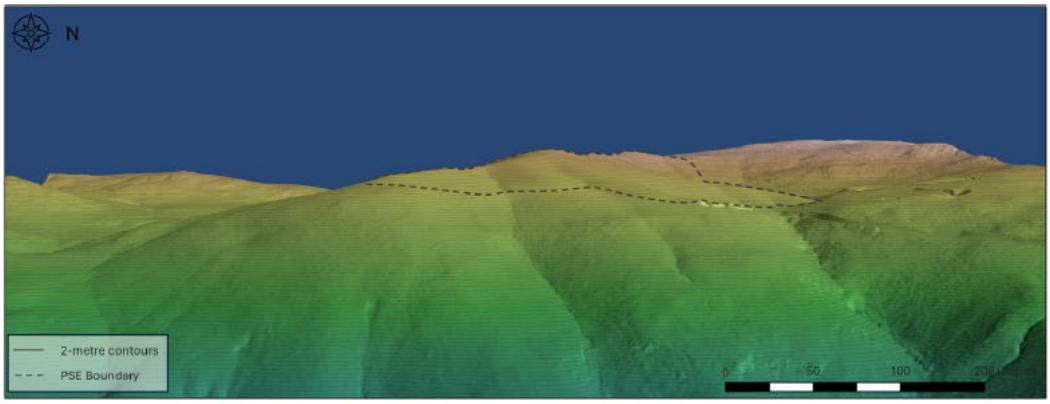
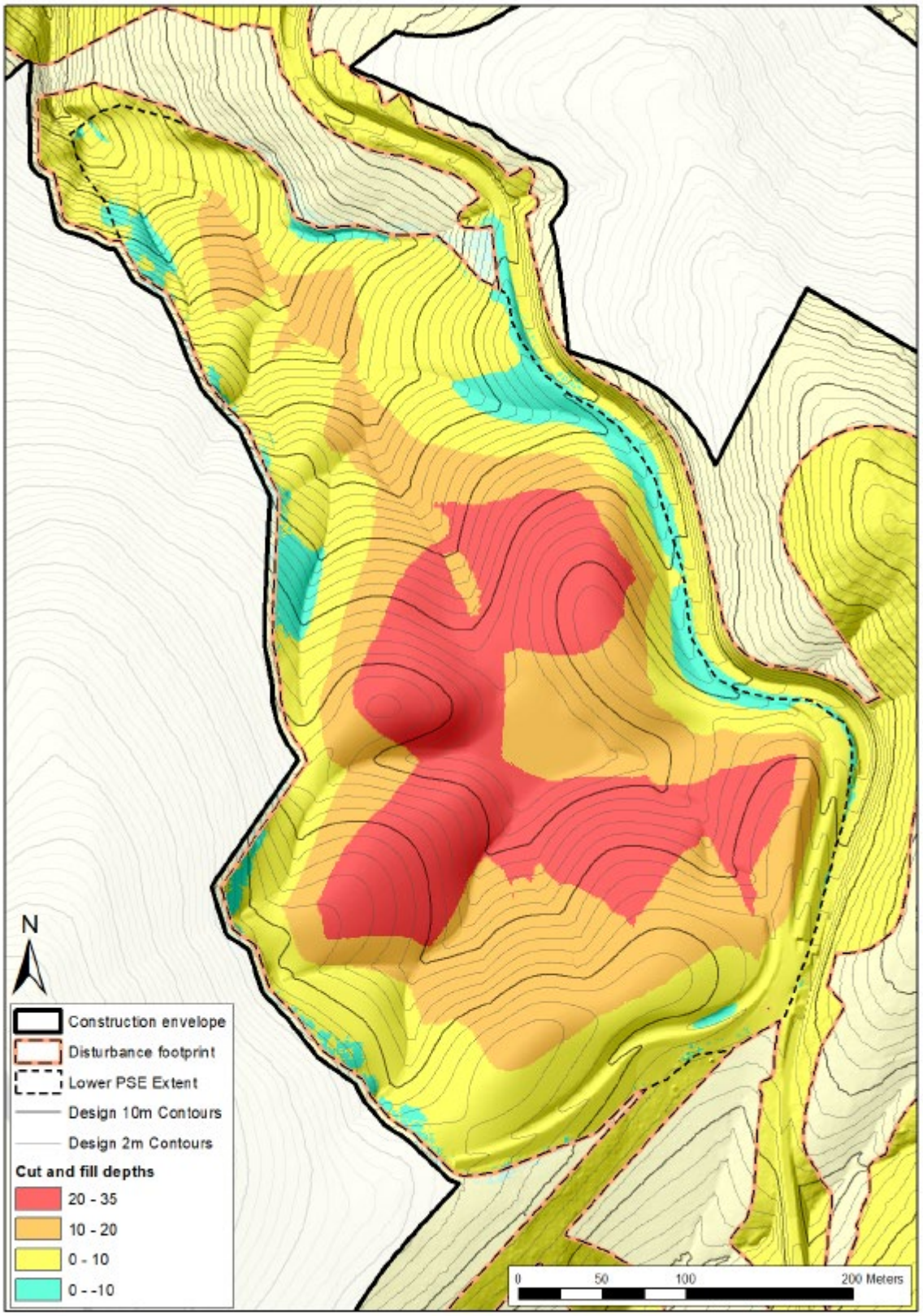


Figure 4.5 Views from the bottom of the valley – eye level view (upper PSE)

Source: WSP 2024

Figure 3.10 Conceptual view of upper reservoir spoil emplacement



Source: WSP 2024

Figure 3.11 Lower reservoir spoil emplacement fill volume

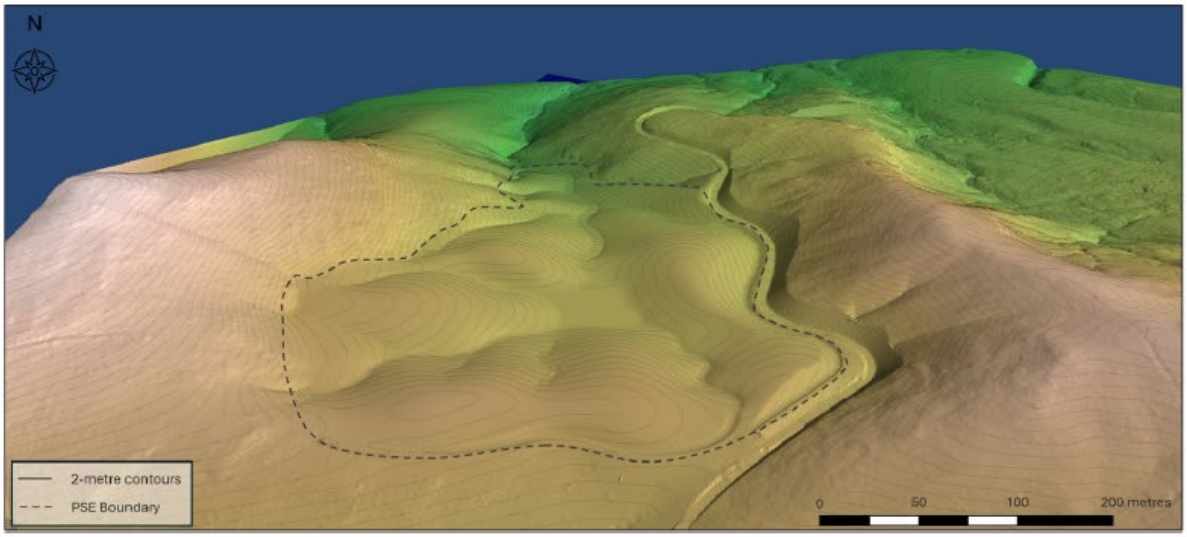


Figure 4.11 Views from the South (lower PSE)

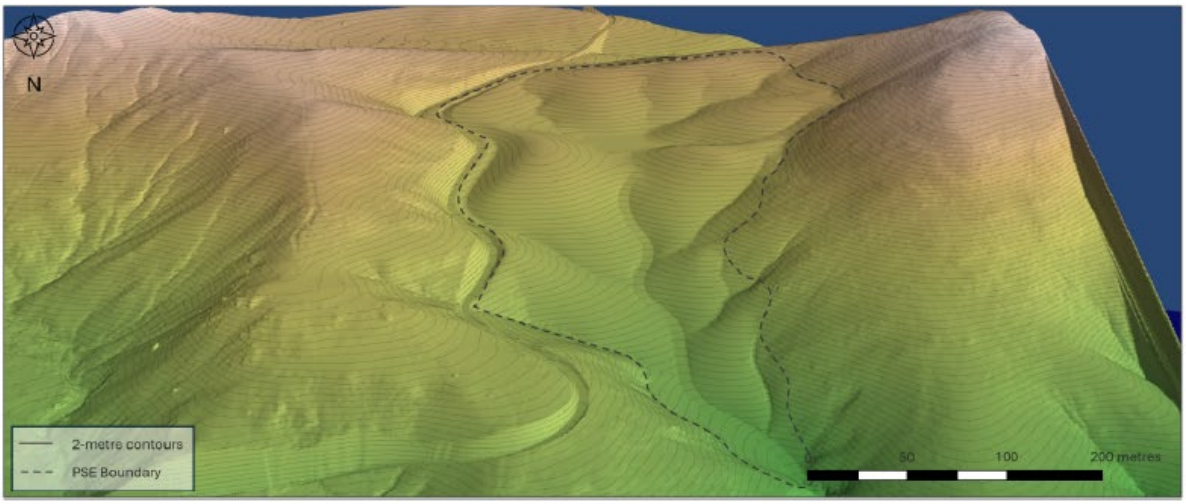


Figure 4.12 Views from the North (lower PSE)

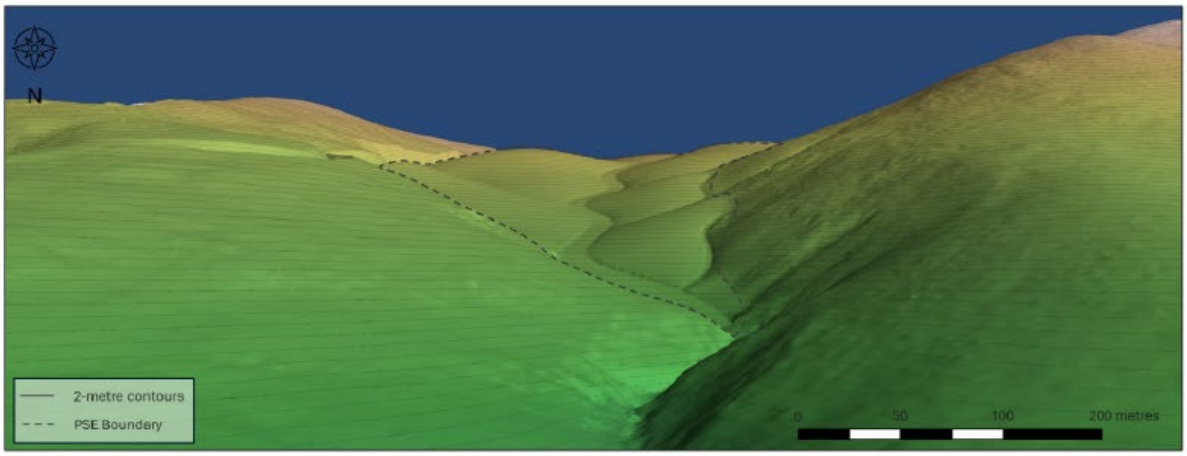


Figure 4.13 Views from the bottom of the valley – eye level view (lower PSE)

Source: WSP 2024

Figure 3.12 Conceptual views of lower reservoir spoil emplacement

3.3.4 Underground arrangement and sizing

The EIS presented a preliminary design initially based on a 600 MW generation capacity and between eight and 12 hours of energy storage, with intent to optimise the design up to 900 MW capacity. As such, the EIS described a scheme for up to 900 MW. Since the EIS, a review of the preliminary design and its constructability constraints was completed by the new owner of OMPS Pty Ltd, including review and incorporation of more recent geotechnical information. As a result, the underground arrangement and sizing has been revised and optimised to confirm a 900 MW scheme, which primarily results in an increase in the cavern size for the powerhouse and re-location of the MAT portal.

The design has been prepared to confirm the capacity of the Project to provide up to around 900 MW of electricity generating capacity and up to eight hours of energy storage at full generating capacity. This design includes a larger powerhouse cavern, a change in tunnel alignment, and re-location of the MAT portal to align with the change in underground arrangement. The revised underground arrangement is shown in Figure 3.13.

The change in underground arrangement and sizing effects the amount of spoil generated by the Project and therefore the need to amend the spoil emplacement design. No other changes to design or assessment are effected by this confirmed 900 MW underground arrangement.

3.4 Updated Project areas

i Project area

The Project area has been amended to reflect the inclusion of the WATB, as this falls outside of the original Project area presented in the EIS. The amended Project area, construction envelope and disturbance footprint have been presented previously in Figure 3.1A-D.

ii Construction envelope

The construction envelope has been updated to incorporate stakeholder feedback, design changes, and refined construction requirements. The overall area has been reduced from approximately 780 ha to around 768 ha. Although some project amendments, such as the Upper and Lower PSE areas, have extended beyond the initially proposed EIS construction envelope, significant refinements have been made to provide greater certainty of where impacts will be avoided (in particular for threatened species).

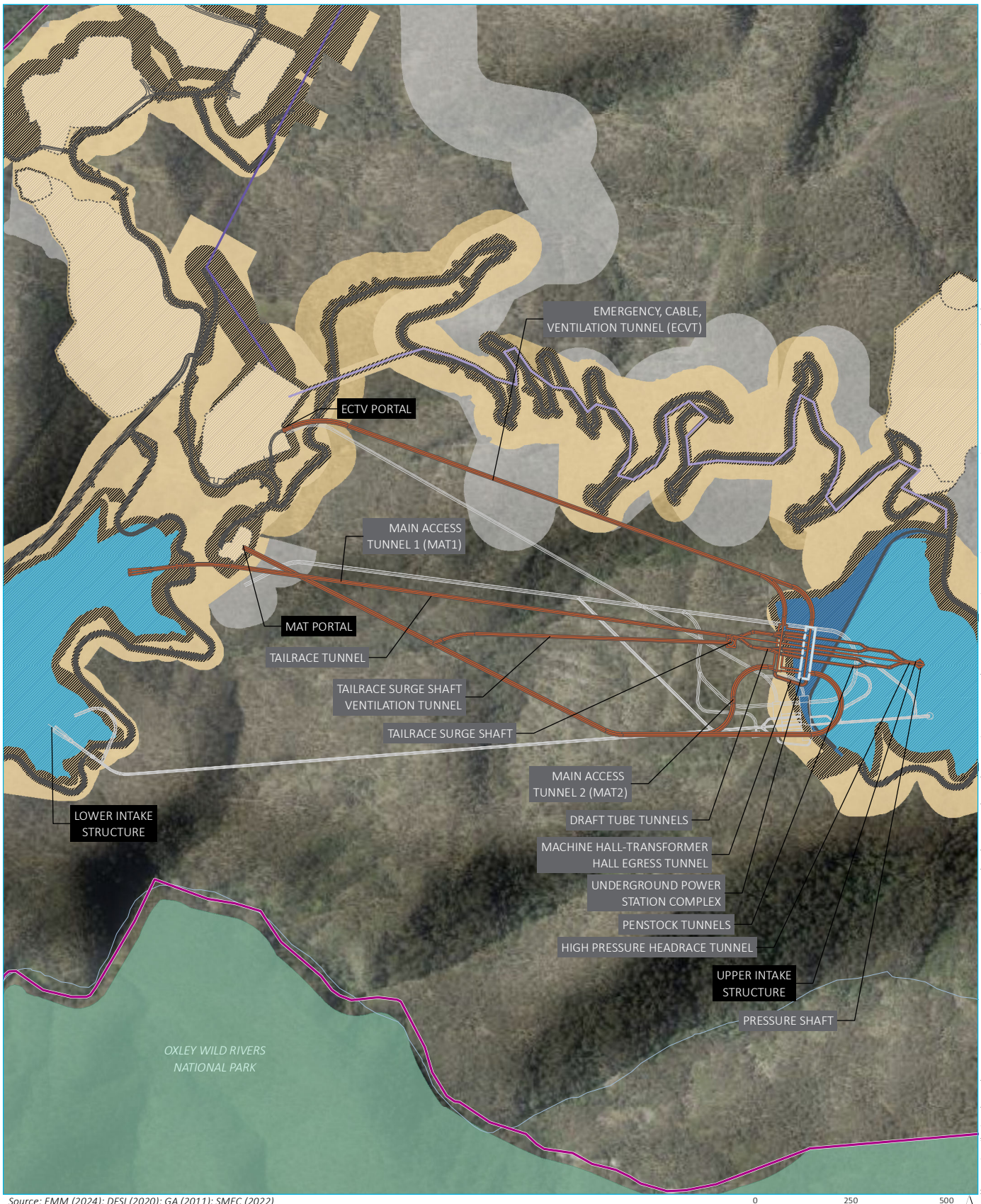
These adjustments include trimming large sections of the construction envelope along the EAR, south of the WATB and the UDAR, as previously discussed in Section 3.3. These changes result from further detailed design on major internal project roads, which has allowed for a more efficient use of space while still accommodating all necessary project components.

iii Disturbance footprint

The disturbance footprint has been updated to incorporate stakeholder feedback, design changes and amended construction and operation requirements. As a result, the footprint has increased from approximately 330 ha to around 367 ha. This increase is primarily due to the need for additional spoil storage in the Upper and Lower PSE areas, which are required to store an extra 0.65 Mm^3 of material. Additionally, the footprint has expanded to include the WATB and adjoining sections extending to the EAR and Kempsey Armidale Road.

iv Operational footprint

Updates to the operational footprint to accommodate design changes have increased the operation footprint from approximately 270 ha to approximately 280 ha. The amended operational footprint is shown in Figure 3.14.



Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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GDA 1994 MGA Zone 56

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KEY

- Project area
- Disturbance footprint
- Amended construction envelope
- EIS construction envelope

Project operational elements

- Underground power station complex
- EIS Tunnels, portals, intakes, shafts
- Amended Tunnels, portals, intakes, shafts
- Permanent road
- Power and communications lines
- Transmission overhead lines
- Surface works
- Reservoir
- Dam wall

Existing environment

- Watercourse/drainage line
- Kempsey-Armidale Road
- NPWS reserve

Label format

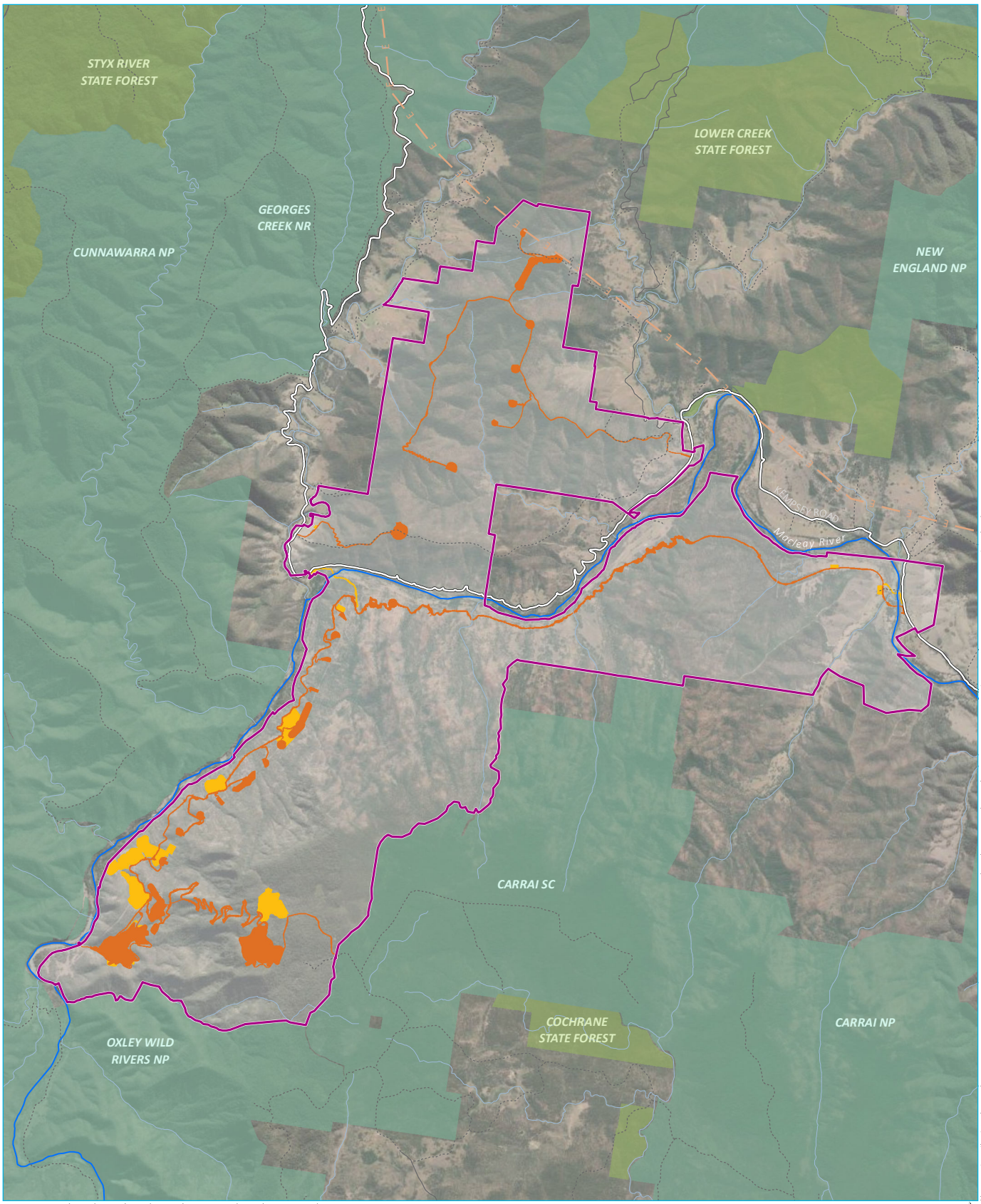
SURFACE PERMANENT INFRASTRUCTURE

UNDERGROUND PERMANENT INFRASTRUCTURE

Underground powerhouse and tunnel arrangement

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 3.13

EMM creating opportunities



Source: EMM (2024); ABS (2021); DFSI (2020, 2021); GA (2011, 2020)

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KEY

- Project area
- Operational footprint
- Progressive rehabilitation

Existing environment

- Macleay River
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Existing transmission line
- NPWS reserve
- State forest

Operational footprint overview

Oven Mountain Pumped Hydro Energy Storage Project
Amendment report
OMPS Pty Ltd
Figure 3.14

EMM
creating opportunities

4 Statutory context

The Project is classified as CSSI in accordance with Sections 5.12(4) and 5.13 of the EP&A Act.

Subsection 5.29(c) of the EP&A Act stipulates that the regulations may provide for the amendment of CSSI applications. As described in section 179 of the EP&A Regulation, an application may, with the approval of the Planning Secretary, be amended at any time before the application is determined.

This Amendment Report has been prepared to address the *State Significant Infrastructure Guidelines – Preparing an Amendment Report* (DPIE 2022).

4.1 New or additional statutory matters

This section considers whether:

- any of the proposed Project amendments change the of statutory requirements considerations presented in the EIS.
- any relevant statutory requirements have been amended or introduced since the completion of the EIS in August 2023.

4.1.1 Changes to statutory requirements from Project amendments

Details of the statutory requirements for the Project are provided in EIS Table 4.1. Further detail on how the Project complies with relevant legislation is provided in EIS Appendix C.

Changes to the statutory requirements for the amended Project are considered in Table 4.1 below.

Table 4.1 Statutory requirements for the Amended Project

Category	Change to action required compared to EIS Table 4.1
Power to grant approval	The proposed amendments do not change the power to grant approval for the Project.
Permissibility	The proposed amendments do not change the permissibility of the Project. **1. Approvals that should be substantially consistent with approved SSI** The proposed amendments do not change the approvals that should be substantially consistent with approved SSI. **2. Approvals that are not required for approved SSI** The proposed amendments do not change the approvals that are relevant to the Project but, in accordance with Section 5.23 of the EP&A Act, are not required to be obtained if the Project is approved by the Minister. **3. EPBC Act approval** The amended Project will be assessed under the assessment bilateral agreement between the NSW and Commonwealth Governments. The proposed amendments do not change the EPBC Act assessment process. Consultation with the DCCEEW on 29 April 2024 regarding the proposed amendment indicated that the Department will consider the amendments when the Amendment Report is submitted. **4. Other approvals not expressly integrated into the SSI assessment** The proposed amendments do not change the other approvals not expressly integrated into the SSI assessment.
Pre-conditions to exercising the power to grant approval	The proposed amendments do not change the pre-conditions to the Minister exercising the power to grant approval to the Project.

Category	Change to action required compared to EIS Table 4.1
Mandatory matters for consideration	**1. Mandatory matters for consideration** The proposed amendments do not change the matters that the Minister must consider when deciding whether to approve the carrying out of the Project. **2. Objects of the EP&A Act and ecologically sustainable development** The proposed amendments do not change the objects of the EP&A Act and ecologically sustainable development that must be considered when determining the application. An assessment of the amended Project against these matters is presented in Appendix C of the EIS. **3. Environmental Planning Instruments** The proposed amendments do not change the applicability of the Environmental Planning Instruments as considered in the EIS.

An updated statutory considerations table is presented in Appendix B.

4.1.2 Changes to statutory requirements

i Changes to the Environmental Planning and Assessment Act 1979

The EP&A Act has been amended three times since the EIS was completed. None of these changes are relevant to the Project.

ii Changes to the Environmental Planning and Assessment Regulation 2021

The EP&A Regulation has been amended nine times since the EIS was completed. Changes relevant to the Project are:

- the introduction of the estimated development cost in place of capital investment value
- updated references to the Flood Risk Management Manual and deleting references to the Floodplain Development Manual.

a Estimated development cost

Savings and transitional arrangements were put in place when the NSW Government introduced the use of 'estimated development cost' (EDC) in place of the former 'capital investment value' (CIV).

The *Environmental Planning and Assessment Amendment (Estimated Development Cost) Regulation 2023* provides that the amendments regarding estimated development cost do not apply to State significant infrastructure projects where a SEARs request application was submitted on the Major Projects Portal before 4 March 2024 (i.e. the commencement date).

The request for SEARs was made on 11 April 2022 and therefore the new EDC requirements do not apply.

b Flood Risk Management Manual

On 10 November 2023, the EP&A Act was amended to introduce the *Flood Risk Management Manual* (FRM Manual) and its associated Toolkit.

The Environmental Planning and Assessment Amendment (Flood Planning) Regulation 2023 amended Schedule 9 of the EP&A Regulation to refer to the FRM Manual and the definitions of "flood planning area" and "probable maximum flood" in the FRM Manual.

This regulatory change commenced in November 2023, after the Project application was submitted. However, flood modelling was completed for the Project as part of the Submissions Report (see Appendix E, Attachment D of Submissions Report).

iii Changes to State Environmental Planning Policy (Planning Systems) 2021

State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) has been amended four times during the relevant period. Changes relevant to the Project are:

- the introduction of the estimated development cost in place of capital investment value (see Section 4.1.2iia above)
- the introduction of a definition of "environmentally sensitive area of State significance".

a Environmentally sensitive area of State significance

The insertion of the term "environmentally sensitive area of State significance" within section 20 (Electricity generating works and heat or co-generation) of Schedule 1 in the Planning Systems SEPP serves to identify development which is classified as State significant development. This does not alter the classification of the Project as CSSI.

iv Summary

In summary, there have been no statutory changes relevant to the Project since the EIS was completed (Table 4.2).

Table 4.2 Summary of relevant statutory changes

Statutory instrument	Relevant change made	Project implications
EP&A Act	None	No change
EP&A Regulation	Estimated development cost	No change
	Flood Risk Management Manual	No change
Planning Systems SEPP	Estimated development cost	No change
	Environmentally sensitive area of State significance	No change

5 Engagement

This chapter describes the stakeholder engagement and other consultation activities undertaken following the exhibition of the EIS.

5.1 Engagement following the EIS exhibition

Chapter 5 of the EIS described the consultation that was carried out prior to the exhibition of the EIS and the consultation activities that were proposed as part of the exhibition of the EIS. Since the lodgement of the EIS, the Proponent has continued to engage with stakeholders including local authorities, government agencies, the local community and neighbouring landholders. Key consultation that has been undertaken is summarised in the following sections.

5.1.1 Local community

A summary of the community engagement undertaken during and post-submission of the EIS on the Project is provided in Table 5.1.

Table 5.1 Summary of community engagement

Stakeholder	Consultation method	Dates
All	• Summary of Findings published. • Social media post. • Email to Project mailing list. • Project newsletter. • Community Hub Kempsey	19 September 2023 to 28 June 2024
Regional community	• Meeting – in person. • Sponsorship of CUC Bursary Program for students participating in STEM higher education. • Sponsorship and attendance at community event - Kempsey Show. • Attendance at community event - Kempsey Science and Engineering Challenge. • Workshop with key stakeholders.	26 September 2023 to 19 June 2024
Businesses and industry	• Emails to key stakeholders. • Doorknocking. • Letterbox dropping. • Meetings with TAFE NSW. • Meeting – in person with Industry Capability Network. • Meeting – virtual - Regional Development Australia Mid-North Coast CEO. • Workshop with key stakeholders.	27 September 2023 to 13 May 2024

Stakeholder	Consultation method	Dates
Landowners – Lower Creek, Bellbrook and Carrai	• Doorknocking. • Letterbox dropping. • Meetings with Summary of Findings booklet. • Emails to key stakeholders. • SMS notification – water delivery, road maintenance, heavy vehicles. • Social media post. • Workshop with key stakeholders.	4 October 2023 to 31 May 2024
Community and special interest group	• Presentation to Rotary Club of West Kempsey.	20 March 2024

The proponent has actively sought to inform the local communities about the Project in a number of ways. Since the exhibition of the EIS, the proponent has issued two Project updates, December 2023 and March 2024, marking important planning milestones, providing a response to submissions update and a notification that the application for community grants had opened. The proponent has also attended local events such as the Kempsey show (9 to 10 April 2024) with an information stall and presented to the local rotary (19 March 2024).

The Project webpage has been maintained and updated as required during the response to submissions phase and all newsletters and community information released to date is available to the general public at: https://www.ompshydro.com/ . Project related news has included the ongoing geotechnical investigations, Kempsey-Armidale Road traffic notifications, community grant applications and local events such as the Saltwater Freshwater Festival 2024.

Another Project update will be issued to coincide with the lodgement of the Submissions Report and Amendment Report to DPHI.

5.1.2 Government agency engagement

Engagement with government agencies in relation to key issues raised in the submissions, including project amendments and construction methodologies has been undertaken. The consultation activities and key issues discussed with each government agency are summarised in Table 5.2.

Table 5.2 Summary of agency engagement

Stakeholder	Summary
DCCEEW [Commonwealth]	The Proponent continued to engage with DCCEW during the public exhibition of the EIS and as part of the preparation of this Amendment Report and the Submissions Report. A meeting was held in April 2024 to inform DCCEWW of the proposed amendments to the Project and included a summary of the proposed assessment approach. The meeting highlighted the reduction in impacts to biodiversity, the reduced construction envelope and increased disturbance footprint.
DCCEW Water	The Proponent held a meeting in May 2024 to provide DCCEW Water with an update of the project, and discussed the following: • water licensing strategies • proposed Specific Purpose Access License (SPAL) extraction conditions and associated streamflow impacts • WSP amendments to include SPAL category and other consequential provisions • commitment to consult with DCEWW Water and NSW DPI Fisheries over the fish screen design moving forward and into detail design.

Stakeholder	Summary
BCSD	The Proponent met with BCSD in January 2024 to discuss the Project and BCSD's submission on the EIS. This meeting resulted in amendments to the construction envelope to better align with the disturbance footprint in areas containing Serious and Irreversible Impacts (SAII) entities and critical habitat for SAII species, such as along the UDAR.
NPWS	The proponent held face to face and online meetings since the submission of the EIS with NPWS to discuss access through NPWS land for initial mobilisation of plant and equipment to the upper reservoir area only, or for emergency access and egress. The initial mobilisation will be limited to equipment required to commence the construction of the UDAR.
DPHI	The Proponent has engaged with DPHI in multiple meetings held in November 2023, December 2023 and June 2024 to inform DPHI of the proposed amendments to the Project and provide project updates. A meeting was also held in February in combination with Armidale Regional Council to discuss the approach and strategy for the Kempsey Armidale Road restoration project.
TfNSW	The Proponent engaged in a phone call in May 2024 and meetings in March to discuss amendments to the EAR and the inclusion of WATB. Additionally, engagements with TfNSW have taken place to coordinate approaches with neighbouring councils. These discussions aimed to align on a proposed delivery strategy that will ensure minimal disruption to local residents and road users.
Kempsey Shire Council	The Proponent held meetings in February and April 2024 with Kempsey Shire council, including a face-to-face discussion in April, to discuss collaboration and the establishment of Memorandums of Understanding (MoU) and Heads of Agreement (HoA). These agreements will outline how the proposed upgrade works required by the Project will be integrated with the Kempsey Armidale Road restoration project. The MoUs and HoAs will ensure alignment between Kempsey Shire Council and Armidale Regional Council and the proponent on an appropriate approvals pathway, timeline for delivery, and the project's funding and contribution to the proposed upgrade works and maintenance. Discussions regarding the detailed design of the proposed works are ongoing.
Armidale Regional Council	The Proponent engaged in multiple phone calls and emails with the Armidale Regional Council from January to June 2024. Meetings were held in March, April, and June to discuss various aspects of the project. In March, Armidale Regional Council discussed their submissions on the EIS. During the June 2024 meeting, similar discussions to those mentioned above were held, including a project update and the establishment of MoUs and HoAs related to the Kempsey Armidale Road restoration project. These discussions focused on ensuring alignment between the Councils and the proponent on an appropriate approvals pathway, timeline for delivery, and the project's funding and contribution to the proposed upgrade works and maintenance. Discussions with Armidale Regional Council have also been ongoing with regard to funding agreements for community benefits (Voluntary Planning Agreement). The VPA is currently being finalised with Armidale Regional Council alongside the HoA.

5.2 First Nations engagement

Consultation has been carried out with the Project's Registered Aboriginal Parties (RAPs) throughout the response to submissions phase of the Project regarding the Addendum to the Aboriginal Cultural Heritage Assessment (ACHA) (EMM 2024), including on the amendments and refinements to the Project.

Due to the delays between May 2023 and this addendum report being initiated, the consultation process was re-started. The process followed by the Heritage NSW *Aboriginal cultural heritage consultation requirements for Proponents I NSW* guidelines.

Initially, a close out email was distributed to the previous RAPs to ensure they were aware of the completion of the EIS ACHA components of the Project, and the need to re-start the process. Following this request to various State and Commonwealth government agencies was initiated on 11 March 2024, and which identified 77 Aboriginal individuals and/or organisations in the region. Of these, 20 registered an interest following the notification period, seven of which had been previously involved.

Several of these RAPs were invited to undertaken additional on-Country activities for the addendum report, including further field survey and a small excavation program on the upper reservoir between May and June 2024. To address criticism in the EIS ACHA, organisations associated with Anaiwan and Dhungutti traditional owners who had had only limited involvement previously, were prioritised for this phase of work, and included Armidale LALC, Dhungutti Elders Council and Iwatta Aboriginal Corporation.

This process, and the results are detailed in the updated Aboriginal Cultural Heritage Assessment (ACHA) provided with this Amendment Report.

Separate to the consultation requirements for the purposes of the ACHA, GIRA Advisory (a First Nations owned and operated business) has been engaged since the exhibition of the EIS as a First Nations advisor to the Project to assist with development of specific programs and cultural benefits, such as Aboriginal Ranger program, Heal Country initiatives and health, housing and accommodation services. Through on-site engagement and focused discussions with primary stakeholders, GIRA has supported the ACHA process (which is focussed on the prescribed process for that assessment). At the same time, GIRA has undertaken a broader First Nations consultation process to enable community engagement and participation with the Project. Since September 2023, this has included:

- 414 hours working within the community (on Country)
- 28 meetings with Project leads and First Nations primary stakeholders
- 1139 interactions with Project leads and Frist Nations primary stakeholders.

A summary of the community engagement undertaken during and post-submission of the EIS on the Project is provided in Table 5.3.

Table 5.3 Summary of First Nations engagement

Stakeholder	Consultation method	Dates
First Nations business	Meeting – in person	27 September 2023
Dunghutti Elders Council CEO	Face-to-face meeting	16 November 2023
Dunghutti Elders Council (Aboriginal Corporation)	Face-to-face meeting	11 January 2024
		February 2024
	Focused discussions	February 2024
		23 February 2024
	Email update	21 April 2024
Thunggutti Local Aboriginal Land Council CEO	Meeting	5 October 2023
Thunggutti Local Aboriginal Land Council	Face-to-face meeting	11 January 2024
		February 2024
	Focused discussions	February 2024
Birpai Local Aboriginal Land Council	Email update	21 April 2024
Kinchela Boys Home – Aboriginal Corporation	Email update	21 April 2024
	Face-to-face meeting	16 May 2024
First Nations groups	Emails to key stakeholders	10 October 2023
Saltwater Freshwater Arts Alliance GM	Face-to-face meeting	February 2024

Stakeholder	Consultation method	Dates
	Focused discussions	20 March 2024
Traditional Owner and Senior knowledge holders	Face-to-face meeting	15 March 2024
	On-Country activity	16 April 2024
First Nations groups	Face-to-face meeting – TAFE NSW	17 April 2024
Kempsey Regional Council and TAFE NSW	Face-to-face meeting	31 May 2024
Elder and artist John Kelly	Face-to-face meeting	31 May 2024

5.3 Future consultation

The Proponent will continue to consult with the community, government agencies and other stakeholders during the pre-construction, construction and commissioning phases.

As part of the ongoing Community Engagement Plan, the Project community information line and community email address will continue to be available during construction. Targeted consultation methods, such as letters, notifications, signage and face-to-face meetings, will also continue. Updates on progress of the amended project will be available on the Project website and social media platforms.

5.3.1 First Nations

In collaboration with First Nations stakeholders, their Aboriginal communities and/or nominated representatives, the proponent will co-create an annual community engagement action plan—based regional economic development opportunities and local perspectives.

The Action Plan will use the methodologies outlined in New South Wales Government First Nations Guidelines: *Increasing income and employment opportunities from electricity infrastructure projects and the Connecting with Country Framework* (July 2023) which communicates and maps activities that realise benefits sharing, capacity building and economic equity across the life of the Project. This includes:

- establishment of Aboriginal Advisory Group to integrate the voices, knowledge and values and perspectives of Aboriginal stakeholders with cultural authority in the responsible management of land, cultural heritage, access to land and land use agreements
- a First Nations Community Benefit Sharing framework that integrates Aboriginal voices, knowledge and values to ensure equitable distribution of benefits, sustainable employment and economic opportunities within the whole-of-community benefit sharing framework
- development of an Aboriginal Participation Plan to advance educational and sustainable employment outcomes with a focus on equity and excellence.
- assessment and development of Aboriginal and Torres strait Islander education, employment, supply chain and procurement opportunities to support improved, sustainable economic and social outcomes.

The consultation process noted above is separate to the ongoing consultation that is outlined in the ACHA in relation to cultural heritage matters, as part of an Aboriginal Cultural Heritage Management Plan.

5.3.2 Community

Should the Project be approved, the proponent will continue to develop productive working relationships with the local community. This will include Project updates and briefings in person and via their social media platforms. In addition, this will be achieved by establishing a Community Consultation Committee (CCC) in accordance with DPHI guidelines. To demonstrate impartiality towards key stakeholder concerns, an independently chaired CCC will facilitate structured engagement between the Project and Kempsey and Armidale Council and community representatives.

There would also be ongoing consultation as part of various management plans. For example, the Social Impact Assessment Amendment Report notes consultation ongoing with surrounding landowners and the development of a Communication and Engagement Plan for the next phase of the Project to outline an effective approach to communication and engagement underpinned by a proactive issues-management approach, open and transparent two-way communication processes and responsiveness to the communication needs and expectations of key stakeholders and the broader community. The CEP should also include an adequate grievance policy and mechanism.

The Proponent is in the process of developing this plan.

5.3.3 Agency

The proponent will continue consulting with government agencies, including the Armidale Regional Council, to secure a Heads of Agreement (HoA), and both the Armidale Regional Council and Kempsey Shire Council for Voluntary Planning Agreements (VPAs). In addition, if the Project is approved, the Proponent will continue to consult with DPHI and relevant agencies with respect to the development of Construction Environmental Management Plans.

The proponent will also consult with TfNSW, Armidale Regional Council, and Kempsey Shire Council about the Kempsey Armidale Road restoration project. Additionally, the proponent will continue to work with the RFS to organise a site visit.

6 Assessment of impacts

This chapter provides a summary of the additional assessments undertaken to assess the amended project. These assessments have been undertaken to identify and assess the potential construction, operational and cumulative impacts associated with the amended project as outlined in Chapter 3. Where required, additional or revised mitigation measures have been proposed.

Chapter 6 of the EIS provided an assessment of the key environmental aspects for the Project as identified in the SEARs.

6.1 Assessment approach

The aim of the amended Project is to incorporate design progression since the EIS and in particular seek opportunities to optimise its construction, as well as incorporate feedback received from stakeholders on the EIS. Consideration of the potential environmental impacts was undertaken as part of the development of the amended Project, with the aim to further avoid and minimise impacts where possible.

A summary of the environmental aspects potentially affected by the amended Project is provided in Table 6.1. Impacts associated with other environmental aspects not included in Table 6.1, would be unchanged from those assessed in the EIS and, therefore, are not required to be assessed further in this Amendment Report.

A revised Biodiversity Development Assessment Report (BDAR) and Aboriginal Cultural Heritage Assessment (ACHA) are appended to this report. Other shorter technical amendments that are focussed purely on the aspects of those assessments that have changed as a result of the amended project are also appended to this report. These include traffic, air quality, noise, social impact assessment and bushfire. This report and its appendices should be read in conjunction with the Submissions Report for this Project as some amendments have occurred in response to submissions received. In addition, some response to submissions take the amended project into account. Finally, there are some technical assessments which are summarised below, but which are appended to the Submissions Report where they provided more immediate support to specific submissions. The technical assessments appended to the Submissions Report rather than this report are groundwater, geochemical, surface water and climate change risk assessment.

Table 6.1 Summary of environmental aspects potentially affected by the amended Project

Aspect	Project amendments				
	Access roads and bridges	Construction requirements	Spoil and materials	Underground arrangement and sizing	Changes to project areas
Land			✓		
Groundwater			✓	✓	
Surface Water	✓	✓	✓		
Biodiversity	✓	✓	✓		✓
Aquatic ecology	✓	✓	✓		✓
Aboriginal heritage	✓	✓	✓		✓
Traffic	✓				
Noise and vibration		✓	✓		
Air quality and greenhouse gas		✓	✓		
Built and natural heritage	✓	✓			✓
Visual	✓	✓	✓		
Social	✓	✓			
Hazards and risk (EMF and bushfire)	✓	✓			

6.2 Land

6.2.1 Approach to assessment

A key issue raised throughout the submissions period and in consultation with key government agencies was the design and assessment of permanent spoil emplacement (PSE) areas. Further investigation has been completed by WSP (WSP, 2024) to present a conceptual landform design and an accompanying report that responds to the key issues raised. This basis of design has then been assessed by relevant technical specialists when assessing the Amended Project. The key changes in spoil design are assessed in this Amendment Report.

Characterisation of the geochemistry within the Project area is essential to develop an understanding of risks associated with stockpiling excavated material (spoil). A geochemistry assessment was completed for the EIS and aims to inform risks associated with mobilising contaminants associated with disturbed materials. This assessment was updated for the Amended Project and prepared in response to submissions on the EIS, and is therefore provided separately as Appendix G of the Submissions Report. The updated assessment has been informed by additional sampling and testing, including kinetic humidity cell testing to provide an indication of the longer-term leaching potential of the spoil. The findings of the updated assessment are presented in this Section.

6.2.2 Spoil management

i Summary of spoil management in the EIS

The EIS noted that to accommodate spoil generated through excavation of the underground caverns and tunnels, three permanent spoil emplacement locations were identified with a capacity to store around 2.9 Mm^3 of material. Dead storage space within the reservoirs was also proposed for spoil placement, with a capacity to store approximately 300,000–400,000 m^3. One construction laydown area within the construction envelope was identified as providing further surplus storage capacity however assessment and approval of this area would be sought separately, if the storage was required.

For the spoil emplacement area at the upper reservoir site, the original capacity was 1,080,000 $m^{3.}$ of spoil. The initial capacity for the lower spoil emplacement area was 1,383,000m^3 of spoil.

ii Proposed amendments relevant to spoil

As outlined in Section 3, to take into account spoil quantities generated from an optimised 900MW design and stakeholder feedback regarding landform and erosion risks, spoil emplacement areas have been re-designed at both the upper and lower reservoir sites. Two PSE areas are now proposed, with the areas both having increased in size to accommodate revised spoil estimates, reduced stockpile heights and slope angles. These PSE areas will be located at the upper reservoir site and lower reservoir site and referenced as the upper PSE and lower PSE respectively. Further details are included below.

a Upper PSE area

The upper PSE is located on a relatively flat area but within steep topography either side of the proposed PSE. The original capacity was 1,080,000 $m^{3.}$ of spoil, which due to the revised quantities would lead to a deficit of approximately 686,400m^3. Additionally, the upper PSE area is constrained by the following:

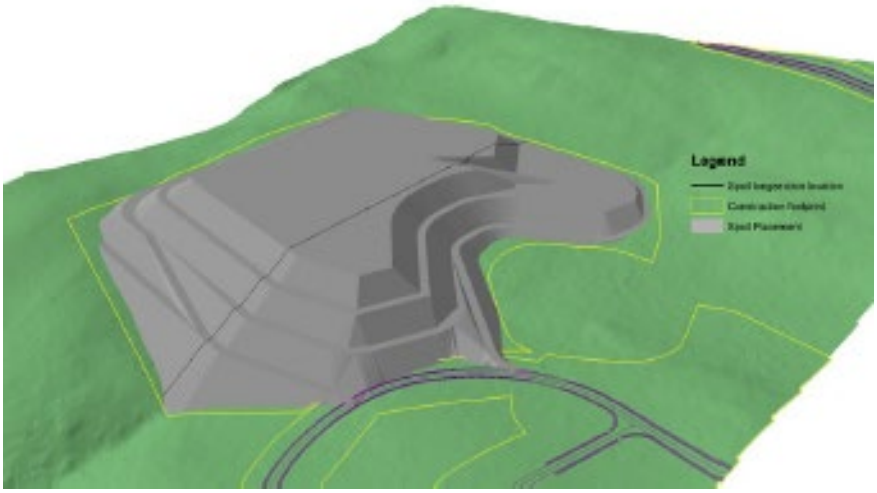
- The site access road constrains the PSE slightly in the south, with the road cut close to the PSE. The road location is largely fixed due to the road longitudinal slope requirements.
- Gradients of the natural terrain steepen significantly to the west, which limits the extent to which the footprint can be extended in that direction, The natural slopes are around 20 degrees in that area, which is close to the maximum targeted slope for the PSE.

- There are two flora species that have been considered during the redesign of the upper PSE area, primarily the Pultenaea sp. Wrrikimbe (*Pultenaea rubescens)* area located to the south, and the Guthrie's Grevillea (*Grevillea guthrieana*) located to the north east.

Various options were considered in relation to the identified constraints above, such as increasing re-use or relocating some of the material to the lower areas. However, one key design intent is to accommodate all of the surplus material from the upper excavations at the upper PSE, rather than relying on moving material from the upper to lower areas. Additionally, consideration was made regarding how to manage extending the PSE footprint out to areas where there were no topographical constraints. This led to the option of leaving the Pultenaea sp. Wrrikimbe undisturbed, while extending into part of the Guthrie's Grevillea area to the north. The northern boundary of the PSE extends 135 m into this area. These constraints are shown in Figure 6.1.

The maximum height of the upper PSE area is approximately 35 m. A comparison of the feasibility design to the amended design is shown in Plate 6.1.

The original feasibility design in the EIS had a smaller footprint, but a steeper grade, batters and greater overall height.



The updated design has a greater footprint but more stable slope design and overall, blends in more seamlessly with the surrounding landscape.

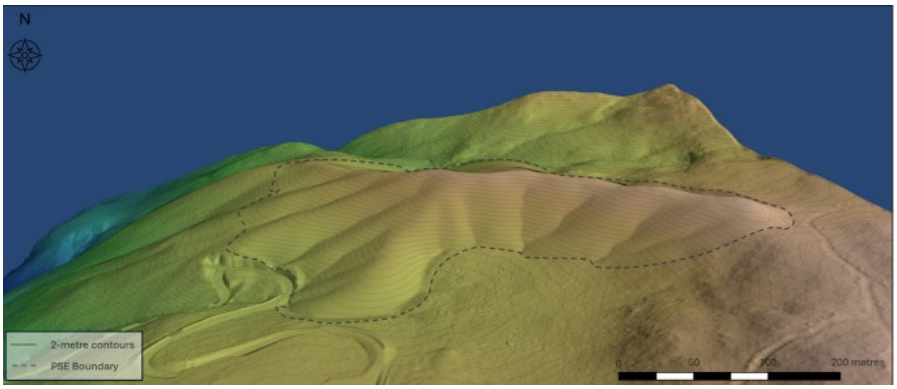
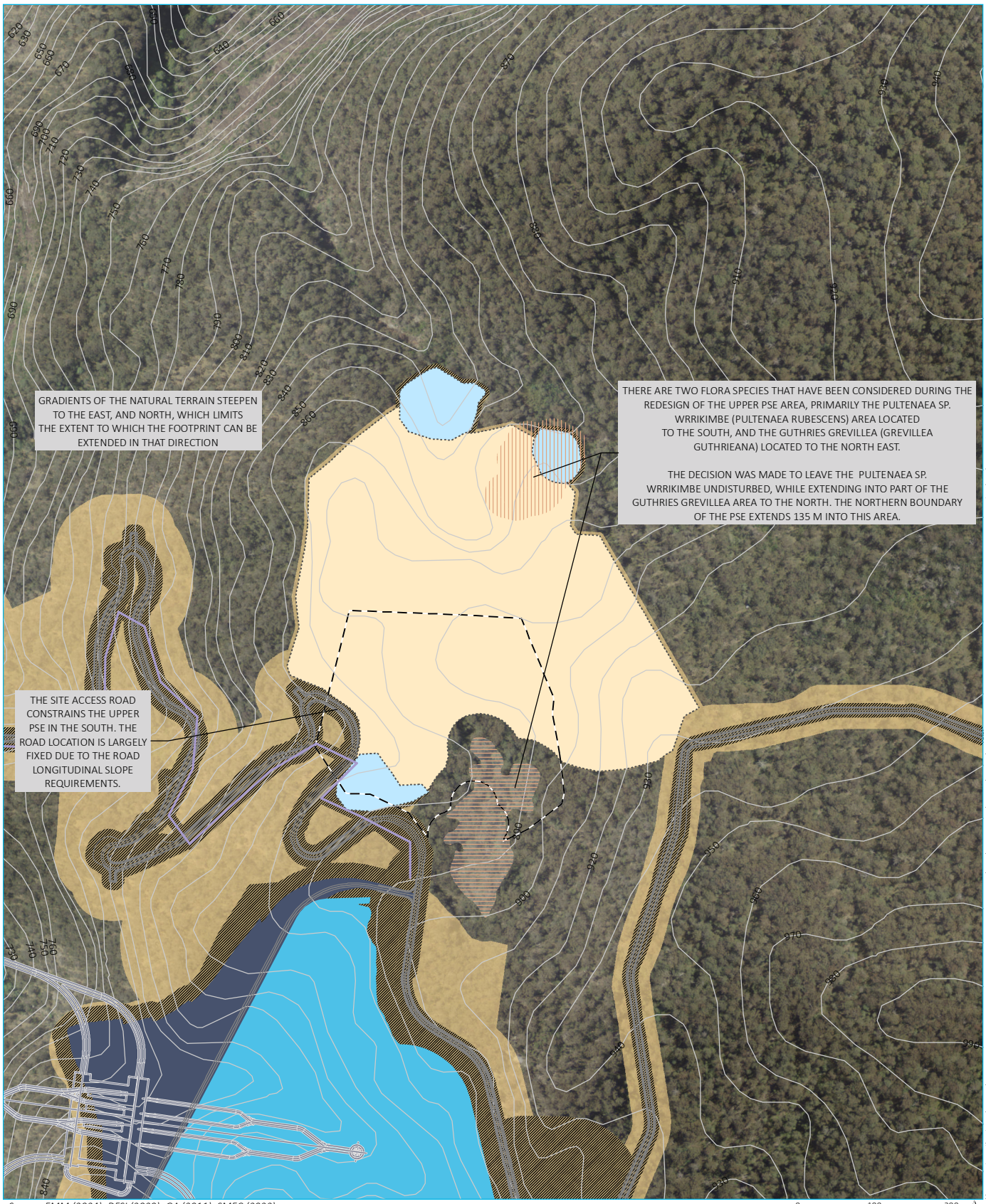


Plate 6.1 Upper PSE comparison



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Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

0 100 200 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Construction envelope
- EIS spoil emplacement area
- Sediment dam
- Amendment spoil emplacement area

Constraints

- Guthrie's Grevillea species polygon
- Pultenaea rubescens species polygon
- Contour (10 m)

Project operational elements

- Power and communications lines
- Tunnels, portals, intakes, shafts
- Permanent road
- Reservoir
- Dam wall

Upper spoil emplacement area constraints

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Figure 6.1

EMM
creating opportunities

The adjustment to the design, allowed for a capacity of 1,741,000 m^3 to be obtained, which is within 1.4% of the target and the small shortfall can be resolved at detailed design and is well within the tolerances of the overall volumes for this stage of the Project.

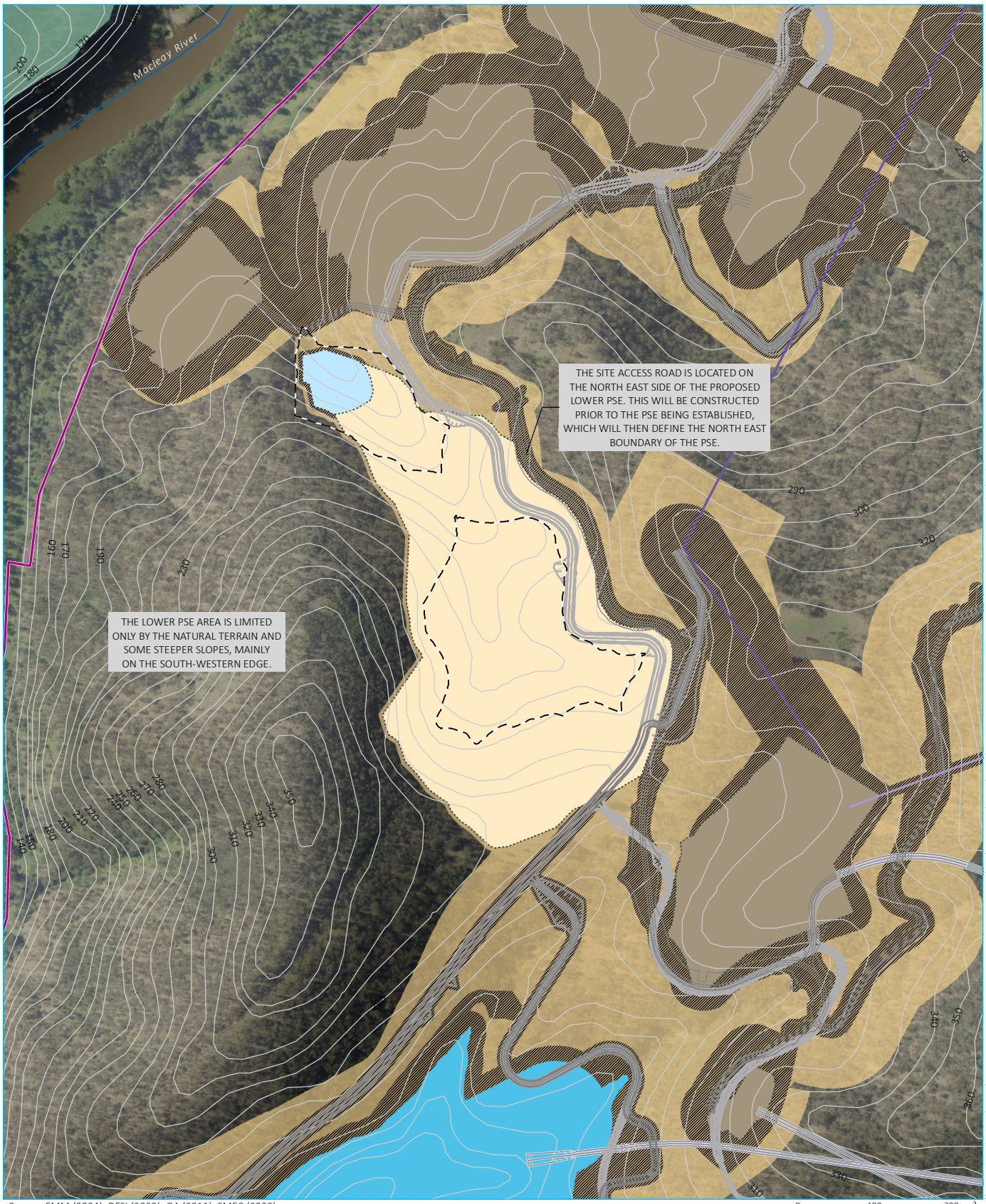
A further breakdown of key parameters for the upper PSE and associated impacts (particularly any changes in impacts to those presented in the EIS) is provided in Table 6.2.

b The lower PSE area

The lower PSE will be constructed in a valley. While this is not the preferred design option, as there is likely to be water flows into the area that would require specific management through the construction phase. It was acknowledged there were no alternative sites identified in the general area. The initial capacity for the lower PSE was 1,383,000m^3 of spoil, which due to the revised quantities of spoil would be a deficit of approximately 444,300m^3 on the target volumes. Additionally, the lower PSE area is constrained by the following:

- The site access road is located on the north east side of the PSE. This will be constructed prior to the PSE being established, which will then define the north east boundary of the PSE.
- The rest of the site is limited only by some steeper slopes on the natural environment, mainly on the south-western edge.

These constraints are shown in Figure 6.2.



Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

0 100 200 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Disturbance footprint
- Construction envelope
- EIS spoil emplacement area
- Surface works
- Sediment dam
- Amendment spoil emplacement area

Constraints

- EIS permanent road
- Contour (10 m)

Project operational elements

- Power and communications lines
- Transmission overhead lines
- Tunnels, portals, intakes, shafts
- Permanent road
- Reservoir

Existing environment

- Macleay River
- Watercourse/drainage line
- NPWS reserve

Lower spoil emplacement area constraints

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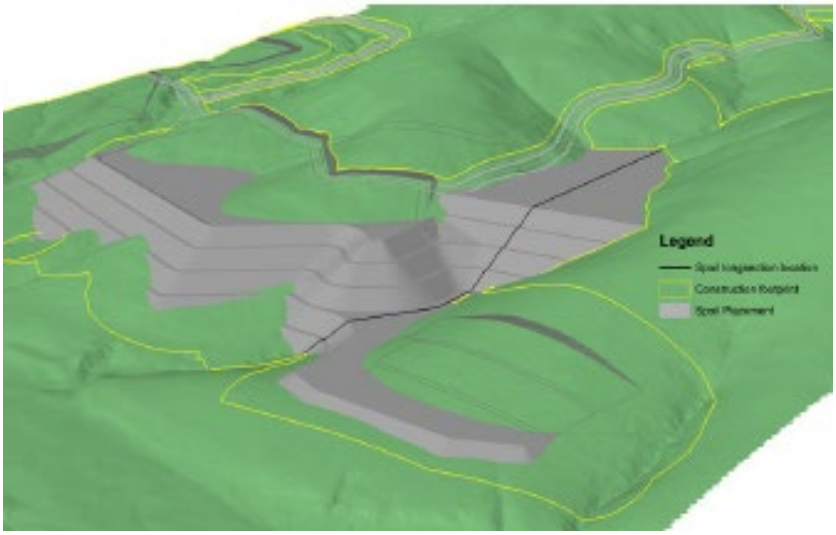
Figure 6.2

EMM creating opportunities

To accommodate the required volumes entirely within the lower PSE area, the footprint was extended to the west and south, along the ecologically surveyed limits of the area. By doing so, a capacity of 1,810,700m^3 was obtained. The maximum height of the lower PSE area is approximately 35 m. A comparison of the feasibility design to the amended design is shown in Plate 6.2.

The original feasibility design in the EIS had a smaller footprint, but a steeper grade, batters and greater overall height.



As with the Upper Reservoir, the updated design has a greater footprint but more stable slope design and overall, blends in more seamlessly with the surrounding landscape.

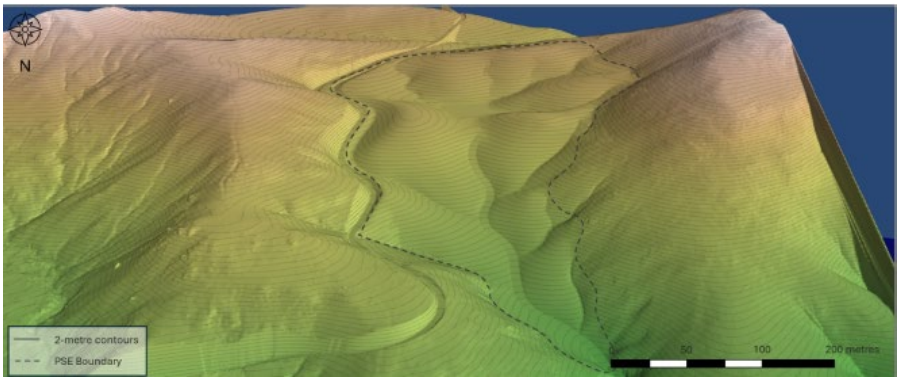


Plate 6.2 Lower PSE comparison

A further breakdown of key parameters for the lower PSE and associated impacts (particularly any changes in impacts to those presented in the EIS) is provided in Table 6.2.

iii Potential changes in impacts to those presented in the EIS

Table 6.2 provides key parameters considered as part of the PSE redesign and potential impacts associated with these parameters, particularly if they have changed to what was presented in the exhibited EIS.

Table 6.2 Potential changes in impacts related to spoil to those presented in the EIS

Key parameters considered for PSE redesign	Changes in impact to those presented in the EIS
Upper PSE area	
Increased capacity and footprint	Due to the constraints identified for the upper PSE (outlined above) and the requirement to increase the upper PSE footprint to accommodate revised spoil estimates, it was identified that the upper PSE area needed to either extend to the south or the north east (as natural terrain constraints were identified in the other directions). The option taken was to only impact one of the two ecology constraints. Therefore the option to extend the footprint 135m into the Guthrie's Grevillea area to the north was taken. The area with identified Pultenaea sp. Werrikimbe species was avoided.
Visual impact	As the overall height of the upper PSE area has been reduced, and the slope amendments have replaced the stark side batters, during the redesign, it is considered that the landform will blend well into the natural topography.
Slopes	The design intent is to limit slopes to 20 degrees wherever possible, with only limited areas steeper than this (potentially to 22 degrees). There are localised areas on the upper PSE, mainly at the edges of drains, where the slope is steeper than 18 degrees, with slopes generally up to 20 degrees. Some localised areas of the landform around the interface with the natural ground are steeper (up to 22 degrees), this is because the constructed landform needs to tie into the natural high slope angles of the surrounding valley which are in places up to 38 degrees. It should be noted that although the geotechnical stability has not been assessed for the PSE areas, a slope flatter than 22 degrees is expected to be stable, provided there is no risk of a wider failure through instability of the underlying natural rock material. While this will need to be confirmed at detailed design, the risk of wider failure through instability is low. Breakdown of slopes for the upper PSA area (including area in ha and percentage of total upper PSA area) includes: • <11 degrees = 1.26 ha (7.1%) • 11-14.5 degrees = 2.10 ha (11.6%) • 14.5-18 degrees = 5.56 (30.4% • 18-21.5 degrees = 8.86 (47.6% • >21.5 degrees = (0.62 ha (3.3%)
Erosion risk	The majority of the landform has an erosion risk well below the target value of 30, except for the drainage lines where rock armouring will be provided. From the initial assessment of rock requirements, it is expected that approximately 5,400m^3 of rock armouring would be required for some 2,200 m of drainage lines. It is recommended that durable rock (with a D50 grading of 250 mm) be used. This material will require screening prior to placement into the drains.
Water management – sediment and seepage collection dams	The challenge for water management at the upper PSE site is that the landform will be constructed on a ridge, with flows shedding off the area into relatively steep drainage lines. The location limits the potential to contain runoff and seepage, other than in relatively small sediment dams local to the site together with sediment fencing. It is proposed three small dams to capture. It is intended for these dams to be in operation until the surface has stabilised and the landform can be integrated back into the natural catchment, at which point they can be removed.

Key parameters considered for PSE redesign	Changes in impact to those presented in the EIS
Lower PSE area	
Increased PSE capacity and footprint:	Due to the constraints identified for the lower PSE (outlined above) and the requirement to increase the lower PSE footprint to accommodate revised spoil estimates, the lower PSE footprint extends into the valley, which is not ideal for water management, however it was the most favourable option in the area that will be able to achieve the required volumes.
Visual impact	It is considered that the landform will blend into the natural topography as evident from the eye-level views from the valley below the PSE.
Slopes	The intent is to limit slopes to 20 degrees, with only limited areas steeper than this, potentially to 22 degrees. The lower PSE will have an average slope of 14 degrees with a maximum of up to 22 degrees, tying into the steep natural ground on the southern side of the final landform. The breakdown of slopes for the lower PSA area (including area in ha and percentage of total lower PSA area) includes: • <11 degrees = 4.16 ha (4.16%) • 11-14.5 degrees = 3.67 ha (24%) • 14.5-18 degrees = 4.19 ha (26.9% • 18-21.5 degrees = 2.51 ha (15.8%) • >21.5 degrees = 0.98 ha (5.7%)
Erosion risk	Erosion risks for the redesign is generally low. There are some of the steeper areas on the southwest have increased erosion risk associated with run-on off the slopes, and some rock cladding will likely be required in that area. It is expected that approximately 7,100m^3 of rock armouring would be required for the 2.43 km of drainage lines, typically of durable rock (with a D50 grading of 250mm). This material will require screening prior to placement into the drains.
Water management – sediment and seepage collection dams	Water management for the lower PSE will be challenging, while a sediment control dam is planned to be located at the toe, the slope of the valley limits the capacity that can be reasonably achieved. Consequently, the dam cannot contain the full catchment area (based on the Blue Book requirements) and the works will need to be staged with clean catchments directed around the toe dam. Water management drains on the side slopes will also be required to ensure clean runoff from the edges is diverted around the construction footprint. As the work progresses up the valley, additional storage will likely be obtained by forming a shallow dam on the constructed landform well away from the outer edges to increase the sediment settling capacity. The sizing and detailing of these measures will be undertaken at detailed design.

6.2.3 Geochemistry

i Additional sample collection and testing

In addition to the sample collection and testing program presented in the EIS, kinetic humidity cell testing was conducted, with analysis of the leachate on a complementary suite including:

- pH, EC
- Major cations and anions
- Dissolved metals and metalloids (aluminium, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, strontium, thallium, uranium and zinc).

The purpose of this testing was to provide an indication of the longer-term leaching potential of the spoil and inform the risk assessment for impacts to the receiving environment.

The samples selected for analysis are presented in Table 6.3 below.

Table 6.3 Additional samples selected for analysis

Borehole	Depth (m bgl)	Rationale	Analysis requested
BH4B	71.2-71.4	Humidity cell – Shallow hornfels near upper reservoir and pressure shaft	Longer-term leaching
BH4B	420.0-420.3	Humidity cell – Granodiorite near pressure shaft excavation	Longer-term leaching
BH3001A	651.0-651.2	Humidity cell – Granodiorite near power station complex	Longer-term leaching
BH3001A	820.0-825.25	Humidity cell – Granodiorite near power station complex	Longer-term leaching

ii Sampling results

As no additional testing for waste classification or acid and neutral rock drainage was completed, there is no change to the results presented in the EIS which concluded:

- For the waste classification suite, results indicated that all reported results were below the contaminant threshold criteria for general solid waste.
- All reported results were below the specific contaminant concentration criteria for general solid waste.
- All reported results were below the toxicity characteristic leaching procedure threshold criteria for general solid waste.
- All samples either do not generate significant acidity or contain sufficient acid buffering capacity to prevent acid generation. No samples are classified as potentially acid forming (PAF). These results indicate that there is a low risk that the spoil excavated will be acid generating.

iii Metalliferous rock drainage

Although the results indicate that the spoil is unlikely to generate acidic drainage and that the low reactivity of the samples precludes saline drainage, there is the potential for neutral metalliferous drainage to be generated on exposure to ambient conditions. This was initially assessed in the EIS by conducting the de-ionised water leach testing. Following review from the NSW EPA, a series of humidity cell tests (as described above in 6.2.3i) was conducted over a number of months to assess the likely longer-term reactivity of the spoil following surface placement and exposure to weathering.

The results of the humidity cell testing were compared to:

- Australian and New Zealand guidelines for fresh and marine water quality (ANZG, 2018), 95% species protection level against toxicants in fresh water
- Background groundwater levels, where available.

The results show, although leachate concentrations exceed the guideline values for a number of parameters, with the exception of aluminium, concentrations are within the upper range of the pre-construction background water quality values. The low concentrations of and low variability of leachable metals and metalloids recorded during the test program indicate that the spoil samples are likely to be relatively unreactive and are unlikely to impact downstream groundwater quality.

It is noted that 95% freshwater guidelines are particularly conservative and have been included only for comparison. In addition, limitations are noted with comparing laboratory-controlled leach test results with natural systems, due to various factors such as the conditions under which the data were derived, differences in scale, and different exposure and reaction pathways (e.g. high water to rock ratios and periodic wetting in laboratory testing versus climate variations in the receiving environment).Nevertheless, leachate testing provides a useful indication of potential contaminants of concern (within the constraints of laboratory testing), and how concentrations may change, in this case under neutral drainage conditions.

6.2.4 Updated mitigation and management measures

Proposed changes to mitigation measures are provided at Appendix C. The relevant changes include clarifying the overarching framework and guidance for soil and water management through the preparation of a Soil and Water Management Plan (SWMP), including the preparation of relevant sub plans such Erosion Sediment Control Plans (ESCPs) and a Soil Stripping and Management Plan (SSMP). Additional measures are also proposed to ensure the detailed design and construction of PSEs incorporates appropriate drainage, sediment basins, and staged in a manner that reduces erosion risks.

While the geochemistry testing results are considered suitable for waste classification and for assessing geochemical risk of the bulk material expected to be encountered during construction of the Project. The number of samples analysed was not based on the revised volume of spoil that will be excavated during construction. Therefore, a geochemical monitoring program is recommended to be included in the water management plan to identify material that may contain concentrated metals. This has also been added to the updated mitigation measures at Appendix C.

6.3 Groundwater

6.3.1 Assessment approach

An assessment of groundwater impacts was carried out for the Amended Project, using the same methods as applied in the EIS. A detailed description of the existing environment, assessment framework and methods applied, as well as the findings summarised in this chapter, are provided in detail in the *Groundwater Impact Assessment* (EMM, 2024a), provided as Appendix F to the Submissions Report.

The primary change to the Project relevant to the groundwater assessment is the change in underground arrangement and sizing. The underground tunnelling and cavern sizes (including assumptions on tunnel lining), and its location within the geology, directly influences the groundwater model and groundwater drawdown predictions. As such, the groundwater model was updated and updated modelling was completed to provide an understanding of any changes in predicted groundwater drawdown extent and volumes. The findings of the updated assessment are presented in this Section.

6.3.2 Assessment of Amended Project

i Summary of groundwater assessment in the EIS

In regard to the underground arrangement and sizing of Project infrastructure to which the groundwater assessment was based, it was assumed the underground arrangement was sized to reflect the lower range of up to 900 MW of electricity generating capacity and between 8 and 12 hours of energy storage.

The predicted water table drawdown in the EIS assessment was due to groundwater flow into the underground Project features (i.e. the power waterway, reservoirs, access tunnels and the underground power station).

Drawdown at the Carrai Waterholes (4.3 km south-east of the Project) was not predicted to occur and risk of impacts on other groundwater or surface water users (e.g. East Kunderang Homestead bore) was considered low.

Groundwater Dependant Ecosystems (GDEs) which are entirely dependent on groundwater were observed to exist approximately 800 m from the Project and the drawdown is not expected to impact them. The risk of impact on GDEs which have an opportunistic reliance on groundwater (i.e. also rely on surface water) was assessed as low. There was also considered to be a low risk of impacts to stygofauna (i.e. fauna living in rock fissures etc).

ii Revised predicted water table drawdown

Water table drawdown (drawdown) in the Project is caused by groundwater flow into the key subsurface project features (i.e. the power waterway, reservoirs, access tunnels and the underground power station). This is expected to occur primarily as a function of secondary porosity (i.e. via fractures and along bedding planes).

The model assumed a bulk conservative hydraulic conductivity for each rock type and cannot simulate individual fractures because the locations and conductivity of individual fractures are not known until the tunnel intersects them. Attempts to 'constrain' the model to simulate unknown geological occurrences (i.e. fractures interspersed with low hydraulic conductivity zones) or design elements, is not in-line with the Australian Groundwater Modelling Guidelines (Barnett, et al., 2012) and has therefore not been undertaken. Therefore, the model predictions of inflow, baseflow reduction and drawdown are likely to be overestimating Project impacts.

During the construction period, drawdown progressively increases over time as seepage occurs over an increasing excavation area, generally as additional infrastructure components are excavated (and only prior to lining at steel-lined elements, including the penstock branching, tailrace branching and high pressure tailrace tunnel).

Drawdown at the end of construction is predicted within approximately 976 hectares (Ha) of the study area, extending up to 2.7 km from the power station complex. This is represented in Figure 6.3.

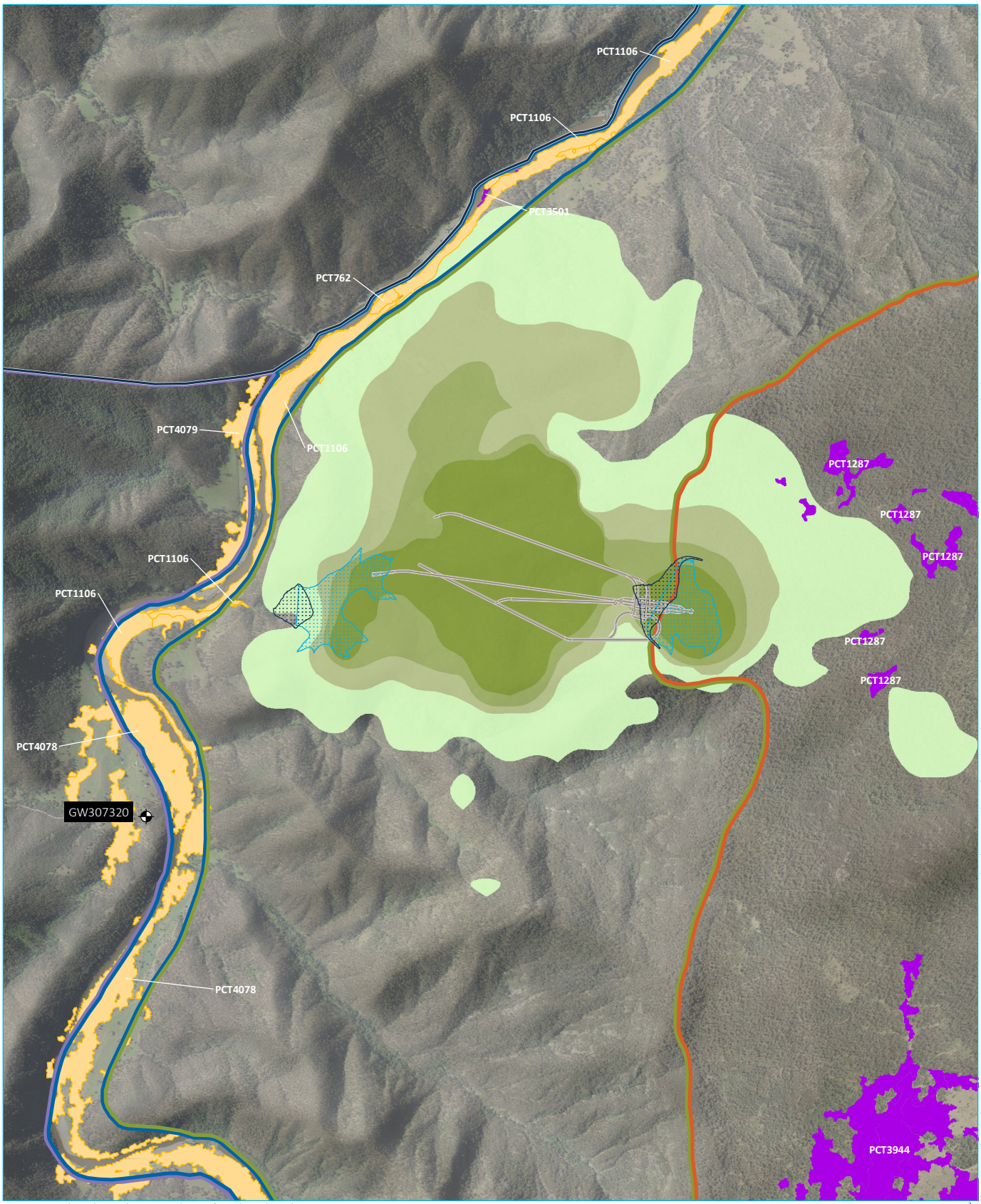
During operation, the Project induces drawdown near structural features that continually intercept the groundwater table (i.e. the drained MAT, ECVT and upper reaches of the lower and upper reservoir), similar to the construction phase. However, infiltration from the water held in the reservoirs and power waterway induces water table mounding (raising of the water table) extending radially (and predominantly down-slope) of the upper and lower reservoir.

Drawdown during operation is predicted within approximately 998 Ha of the study area, extending up to 2.9 km from the power station complex. Watertable mounding is predicted within approximately 157 Ha of the study area, extending up to 800 m from the reservoirs (i.e. the main source of water for infiltration). This is represented in Figure 6.4.

iii Revised predicted baseflow reductions

Baseflow reductions to the Macleay River and adjoining watercourses within the study area are predicted during construction of the Project. The maximum reduction is realised in the fourth year of construction (119.8 ML/yr), and represents a 0.2% reduction of baseflow relative to pre-Project conditions.

During operation of the Project, water retained in the reservoirs and power waterway infiltrates into the groundwater system and decreases the overall reduction of baseflow to the Macleay River and adjoining watercourses. Baseflow reduction is predicted to be 94.3 ML/year during operation of the Project, representing less than 0.1% reduction in baseflow, relative to pre-Project conditions. Baseflow reductions are also represented in Figure 6.3 and Figure 6.4.



Source: EMM (2024); DFSI (2020, 2021); DPIE (2022); GA (2011)

0 1 2 km

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KEY

- Study area
- Dam wall
- Reservoir
- Tunnels, portals, intakes, shafts

Focus area

- Escarpment
- Macleay River floodplain
- Plateau
- Western catchment

- Landholder bore

GDEs within study area

- Facultative – opportunistic
- Obligate

Construction probabalistic drawdown (m)

- 0.2 - 2
- 2 - 5
- 5 - 10
- > 10

Predicted water table drawdown during construction of the Project (67th percentile)

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Figure 6.3

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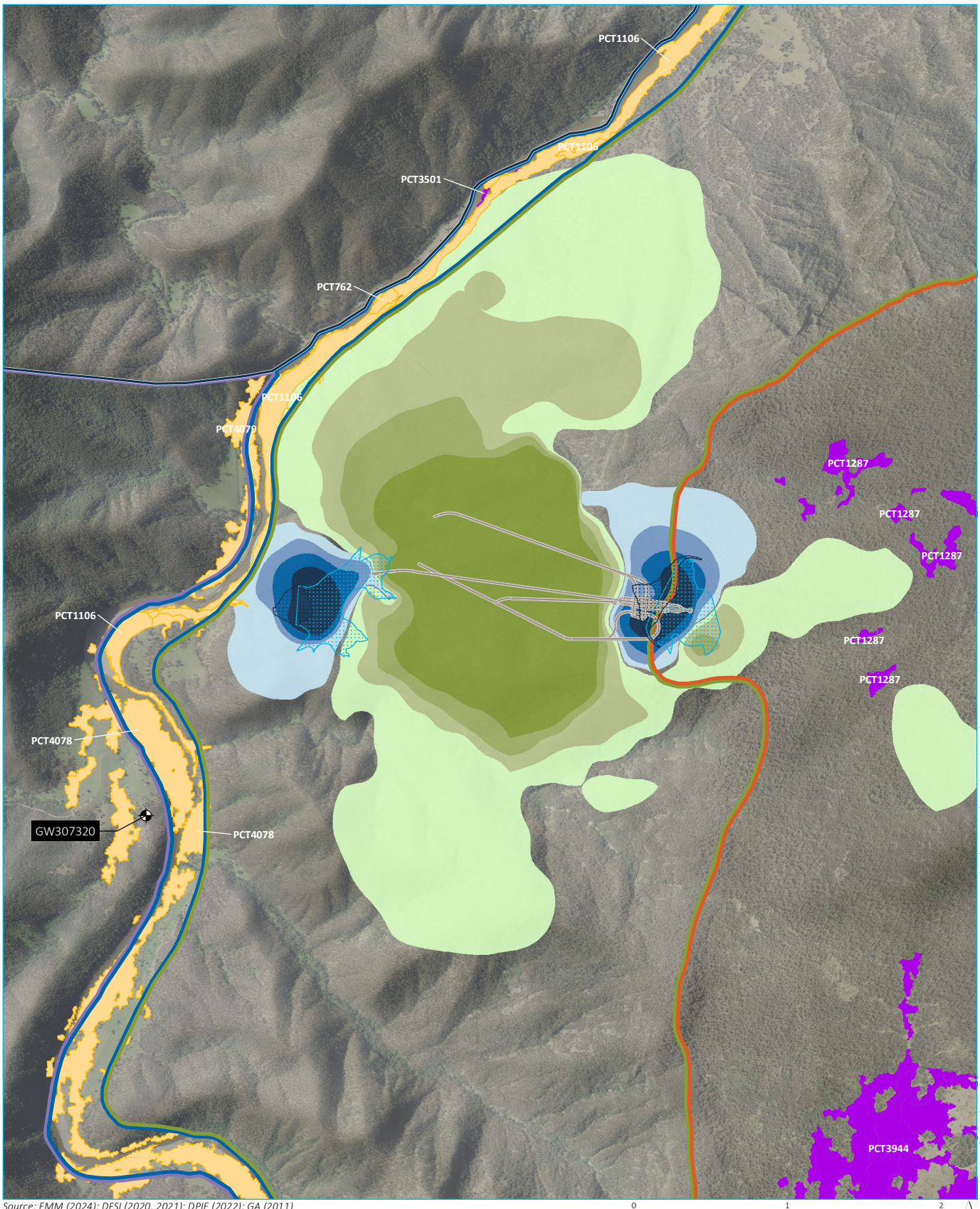

Source: EMM (2024); DFSI (2020, 2021); DPIE (2022); GA (2011)

0 1 2 km

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KEY

- Study area
- Dam wall
- Reservoir
- Tunnels, portals, intakes, shafts

Focus area

- Escarpment
- Macleay River floodplain
- Plateau
- Western catchment

- Landholder bore

GDEs within study area

- Facultative – opportunistic
- Obligate

Operation water table mounding (m)

- > 10
- 5 - 10
- 2 - 5
- 0.2 - 2

Operation probabalistic drawdown (m)

- 0.2 - 2
- 2 - 5
- 5 - 10
- > 10

Predicted water table drawdown during operation of the Project (67th percentile)

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Figure 6.4

EMM
creating opportunities

iv Potential changes in impacts to those presented in the EIS

Table 6.4 summarises the potential groundwater impacts, particularly if they have changed to what was presented in the exhibited EIS.

Table 6.4 Potential changes in groundwater impact to those presented in the EIS

Potential impact	Changes in impact to those presented in the EIS
Changes to groundwater quality	
Contaminant mobilisation	In the event that groundwater flow was increased (i.e. by infiltration from the power waterway and reservoirs), it would be reasonable to assume contaminants may travel to the Macleay River and other creeks as baseflow. Groundwater derived baseflow to the Macleay River and adjoining watercourses is predicted to decrease during construction and operation of the Project. **The risk of contaminant mobilisation during operation of the Project is considered negligible.**
Material stockpiling	The potential for acidic or metalliferous seepage from the excavated spoil has been assessed as low, with results indicating the tested material as: • non-acid forming (NAF) • low risk for metalliferous drainage. Rainfall infiltrating through the stockpiles may mobilise minor concentrations of metals however, **the overall risk of infiltration to the groundwater system (noting the low infiltration potential of the prepared pad and geological units underlying the stockpile) is considered low**
Storage and transportation of chemicals and fuels	There is the potential for the Project construction works to cause contamination to the groundwater resource. This predominately encompasses either spills of hazardous materials/chemicals and/or the generation of solid or liquid waste. All scenarios have the potential to impact human and environmental health depending on the type of contaminant if not managed accordingly.
Changes to groundwater quantity – predicted water table drawdown	
Potential impacts on culturally significant areas	The Carrai Waterholes are approximately 12 km from the extent of project induced groundwater drawdown. **Impacts to the Carrai Waterholes are therefore negligible.**
Potential impacts on terrestrial GDEs	Water table drawdown is predicted within forty metres of two obligate terrestrial GDEs during construction, comprising PCT 1287 (Upland heath swamps of the New England bioregion), located on the plateau to the north-east and east of the proposed upper reservoir. Drawdown is not predicted (within the minimum drawdown threshold) during operation. Drawdown was not predicted at the remaining two obligate GDE communities during either construction or operation. There are no high priority GDEs within the study area and in accordance with the minimal impact criteria presented in the AIP **Invalid source specified.**, **there is no impact to high priority GDEs**
Potential impacts on facultative opportunistic terrestrial	Terrestrial GDEs with a facultative and opportunistic dependence on groundwater (including PCT 1106 and PCT 762) predominantly depend on rainfall infiltration and adjacent surface watercourses to meet their water requirements, accessing groundwater opportunistically and seasonally when the water table is sufficiently close to the rooting depth of the particular PCT. Water table drawdown has been assessed approximately forty metres from the identified facultative/opportunistic, terrestrial GDEs. **Given the flow in the respective adjacent watercourse is likely to be sustained by rainfall runoff and releases from the upper reservoir during construction and operation, PCT 1106 and PCT 762 are at low risk of potential impacts.** It is again noted that the drawdown predictions should be viewed as worst case based on conservative hydraulic conductivity values in the model and unmitigated tunnel and underground power station construction methods.

Potential impact	Changes in impact to those presented in the EIS
Potential impacts on subterranean fauna	Only a relatively small area of the regional groundwater system (approximately 976 Ha) of habitat is predicted to be affected by drawdown, and species of stygofauna have not been identified during site investigations. **Therefore, it is anticipated that impacts to stygofauna communities will be low.** It is again noted that the drawdown predictions are worst case based on conservative hydraulic conductivity values in the model and un unmitigated tunnel construction methods.
Potential impacts on aquatic ecosystems	As discussed in the Project Groundwater Dependent Ecosystem assessment (EMM 2023) **aquatic ecosystems have been assessed as non-dependent on groundwater and are assessed as low risk for Project induced impacts.**
Predicted impacts on groundwater users	In accordance with the minimal impact criteria presented in the AIP (DPI 2012), a maximum of 2 m drawdown is considered minimal impact at any water supply work approval. Based on the numerical modelling, drawdown is not predicted at the East Kunderang Homestead bore (GW307320) and **Project induced impacts to groundwater users is considered low risk.**
Changes to baseflow - Baseflow reductions to the Macleay River and adjoining watercourses within the study area are predicted during construction of the Project.	
Predicted baseflow impacts during project construction and operation	Given the relatively low reduction in baseflow (0.2% and <0.1% during construction and operation, respectively) **reduced baseflow is not anticipated to have a significant impact.**

The proposed mitigation and management measures have been revised to address the Amended Project and incorporate feedback from DCCEEW. The updated measures are provided in full at Appendix C. The relevant changes include clarifying the overarching framework and guidance for water monitoring through construction and operation of the Project, including ensuring appropriate trigger, action and response plans are identified.

6.4 Surface water

6.4.1 Assessment approach

An assessment of surface water impacts was carried out for the Amended Project, using the same methods as applied in the EIS. A detailed description of the existing environment, assessment framework and methods applied, as well as the findings summarised in this chapter, are provided in detail in the *Surface Water Assessment* (EMM, 2024a), provided as Appendix E to the Submissions Report.

To incorporate changes to the Project as well as stakeholder feedback received since the EIS, the surface water assessment approach included:

- clarification of proposed extraction regime ('cease to pump' rules)
- construction water balance and quality model (WBQM) such that the relative impact of discharges to the receiving environment water quality could be estimated
- revised operational water balance to reflect proposed changes to Project infrastructure and layout, Project water requirements, and to incorporate model refinements to improve its representation of climate and catchment processes
- flood assessment of temporary bridges such that impacts can be appropriately quantified and mapped
- an updated water licensing strategy following continued engagement with DCCEEW (Water).

No material change to the water management approach is proposed for the Amended Project. The assessment considers residual impacts assuming the management approach has been implemented.

6.4.2 Assessment of Amended Project

i Water extraction conditions

The proposed extraction conditions for water take from the Macleay River for construction, initial storage fill, and operational top-up purposes for the Amended Project are summarised in Table 6.5. The key changes are:

- an increase in the construction water take from 365 ML/year in the EIS to up to 1,000 ML/year for the Amended Project, including an increase in the pumping rate from 1 ML/day to 2.8 ML/day
- a decrease in water take required for the initial storage fill from 6,500 ML in the EIS to 6,250 ML for the Amended Project
- a decrease in water take for ongoing operational top-up from 710 ML/year in the EIS to up to 130 ML/year for the Amended Project.

No change to operational pumping rates are proposed from those identified in the EIS.

The proposed extraction conditions have been used to assess potential construction and operation impacts of the Amended Project presented in the following sections.

Table 6.5 Proposed extraction conditions – Macleay River

Water take	Volume required	Estimated extraction period	Cease to pump trigger[1]	Pumping rate[7]	Additional conditions
Construction water	Up to 1,000 ML/year	4–5 years[5]	13 ML/day[2]	2.8 ML/day	• Water must only be taken when there is a visible flow in the water source at the location where water is to be taken.
Initial storage fill	6,250 ML	3–12 months	597 ML/day	Up to 86.4 ML/day (1 m^3/s)	• The 50th percentile streamflow value is to be maintained. • Pumping to cease if 30-day streamflow total[1] below 5-year ARI value of 1,936 ML. • No extraction for first seven days following a flow event greater than 50th percentile streamflow[1] value following extended dry period or drought[3]. • Water must only be taken when there is a visible flow in the water source at the location where water is to be taken. • Consideration of special circumstances[4].

Table 6.5 Proposed extraction conditions – Macleay River

Water take	Volume required	Estimated extraction period	Cease to pump trigger[1]	Pumping rate[7]	Additional conditions
Operational top-up	Up to 130 ML/year[6]	Ongoing	597 ML/day	Up to 86.4 ML/day (1 m^3/s)	• The 50th percentile streamflow value is to be maintained. • Pumping to cease if 30-day streamflow total[1] below 5-year ARI value of 1,936 ML. • No extraction for first seven days following a flow event greater than 50th percentile streamflow[1] value following extended dry period or drought[3]. • Water must only be taken when there is a visible flow in the water source at the location where water is to be taken. • Consideration of special circumstances[4].
			13 ML/day[2]	10% of streamflow	• In accordance with the rules of the Macleay WSP. • Maximum pumping rate of 10% of the observed streamflow in the Macleay River. • Water must only be taken when there is a visible flow in the water source at the location where water is to be taken.

Notes: 1. Streamflow measured at Macleay River at D/S Georges River Junction (206024) stream gauge.
2. 'Very low flow' conditions for the Macleay Gorges Water Source as defined in the Macleay WSP.
3. Extended dry period or drought refers to the 30-day streamflow total below 5-year ARI (1,936 ML) as defined in Appendix E of the Submissions Report
4. Special circumstances to be assessed on a case-by-case basis with the corresponding protocols to be documented in the SWMP.
5. Construction water will be required until construction of the Project is complete. Construction water may be required for more than the estimated 4-5 years if the construction program experiences delays.
6. The operational top-up volume is based on the water balance modelling described in Appendix E of the Submissions Report. Actual operational top-up volumes may exceed this value on occasion. The Proponent will hold all water entitlements prior to take occurring as described in Appendix E of the Submissions Report.
7. All values are based on a constant rate over a 24 hour period.

ii Residual impacts to streamflow

Residual impacts to the streamflow regime of the Macleay River are only anticipated to occur when extracting water for construction and operational purposes. The largest impact to streamflow will occur when extracting water for the initial fill of the Project dams and reservoirs. While the estimated volume required for construction and the one-off initial storage fill during the first year has changed since the EIS, it is consistent in that it still represents 1% of the average annual streamflow volume adjacent to the Project area.

Generally, streamflow impacts of the Amended Project are consistent with those presented in the EIS, except for the following:

- The maximum predicted annual top-up volume of 130 ML/year represents 0.01% of the average annual streamflow volume in the Macleay River adjacent to the Project area. This is a reduction from the 0.07% presented in the EIS.

- Extraction at lower pump-rates (e.g. 2.8 ML/day) for general construction purposes is predicted to result in less than a 3% impact on the streamflow regime for 90% of Macleay River flow conditions adjacent to the Project area. This is a slight increase in impact from the less than 1% impact predicted in the EIS (based on 1 ML/day pump-rate).

- The EIS predicted a minor increase in baseflow to several minor watercourses and the Macleay River during operation of the Project. This is no longer predicted for the Amended Project.

iii Residual impacts to water quality

A conceptual water balance and quality model (WBQM) was developed to estimate the quantity and quality of discharges during construction of the Amended Project. The conceptual WBQM advances the assessment in the EIS which was a simpler, qualitative assessment. Predicted water quality impacts resulting from construction phase discharges from the Amended Project are summarised as follows:

- Annual pollutant loads in the Macleay River adjacent to the Project area are predicted to generally increase by less than 1%. The largest increase in pollutant loads occurs for aluminium which is predicted to increase by up to 3% in a typical rainfall year.

- No impacts to water quality are predicted to occur for approximately 330 days per year (90% of the time). When water quality impacts do occur, they generally result in less than a 10% increase to existing/WQO values. Negligible impacts are predicted during typical discharge conditions.

- Water quality impacts that result in more than a 10% increase to existing/WQO values are expected to occur infrequently. All water quality impacts are predicted to be short term with impacts only occurring during and immediately following rainfall, when discharges are occurring.

- The modelled water quality in the Macleay River is predicted to be similar to the baseline water quality observed in minor watercourses and the Macleay River adjacent to the Project area. This indicates that while pollutant concentrations in the Macleay River may be elevated compared to the WQOs, the concentrations are predicted to be within water quality ranges that occur naturally within the catchment.

It is important to note that the water balance and quality modelling completed to inform the surface water impact assessment represents a worst-case scenario where all disturbance areas are occurring at once. In practice, construction will be staged so that disturbance areas are progressively rehabilitated to reduce the total area that could impact water quality at any one point in time.

During operation, inflows to the system in excess of the available storage capacity will be released from the lower dam and reservoir to the downstream portion of Fingerboard Crossing Creek and the Macleay River. Discharges from the Lower dam and reservoir are expected to have similar water quality to the Macleay River (which is the source of water for initial storage fill and operational top-up) and Fingerboard Crossing Creek (which is impounded by the Project). Any residual risk to water quality will be managed through operational procedures. Hence, no downstream water quality impacts are anticipated due to Project discharges during operations.

iv Residual impacts to water availability

There is no change to the assessment of water availability for the Amended Project from that presented in the EIS. Extracting water for construction, the one-off initial storage fill, and operations is not expected to impact the security of water supply to downstream water users, or availability of water to environmental receptors.

v Residual flooding impacts

Impacts to flooding in the Macleay River will primarily occur as a result of constructing infrastructure within the existing limit of flooding and due to water released from the Project dams and reservoirs in the event of a dam break. There is no change to the dam break assessment as a result of the Amended Project from that presented in the EIS. Flooding due to temporary bridges however, has been assessed in greater detail with additional flood modelling completed for the Amended Project (see Annexure D of Surface Water Assessment, EMM, 2024a).

Flood-related impacts that will occur as a result of the proposed temporary bridges near Georges Junction and Smiths Bluff are generally minor and localised in nature. Maximum increases in peak flood levels are predicted to be in the range 0.1-0.2 m for the 1% AEP event, with increases of 0.2-0.3 m for smaller events. Impacts do not translate into significant increases in flood extent. Maximum increases in velocity within the river channel and on immediate overbank areas are in the order of 0.5 m/s for the 1% AEP, with increases of 1.0-1.5 m/s for the 63.2% AEP event.

Increases in peak flood levels at identified buildings and along the Kempsey-Armidale Road reach a maximum of about 0.1 m for the 1% AEP event, with lower impacts for more frequent events. Impacts that occur will be short term in nature and will cease once the bridges and associated temporary road works are removed and disturbance areas rehabilitated.

vi Residual geomorphology impacts

There is no change to the geomorphology assessment for the Amended Project from that presented in the EIS.

vii Water licensing strategy

The water licensing strategy for the Project has been updated following update of estimated water requirements and following consultation with DCCEEW.

The estimated volumetric water requirements for the Amended Project include:

- up to 1,000 ML/year over approximately five years for construction activities such as road and site establishment, site facilities (including potable water), processing areas, dust suppression, concrete batching, and firefighting.
- 6,250 ML for the one-off initial storage fill. This will occur once during the latter stages of construction.
- up to 170 ML/year (for 100 plus years) for operational top-up and runoff intercepted by the Project dams and reservoirs.

Water requirements will be met primarily from surface water sources, with the main source for the initial storage fill being unregulated flows from the Macleay River.

It is proposed to licence the water required for construction and initial storage fill via a specific purpose access licence (SPAL), as provided for in the NSW *Water Management (General) Regulation 2018* (Water Regulation). The remaining Project surface water take will primarily be licensed via trade of existing unregulated river access entitlements under the rules of the Macleay WSP.

A summary of the water licensing strategy for the construction and operation of the Amended Project is presented in Table 6.6. The Proponent is well progressed in demonstrating the water requirements for the Project can be met through available entitlements.

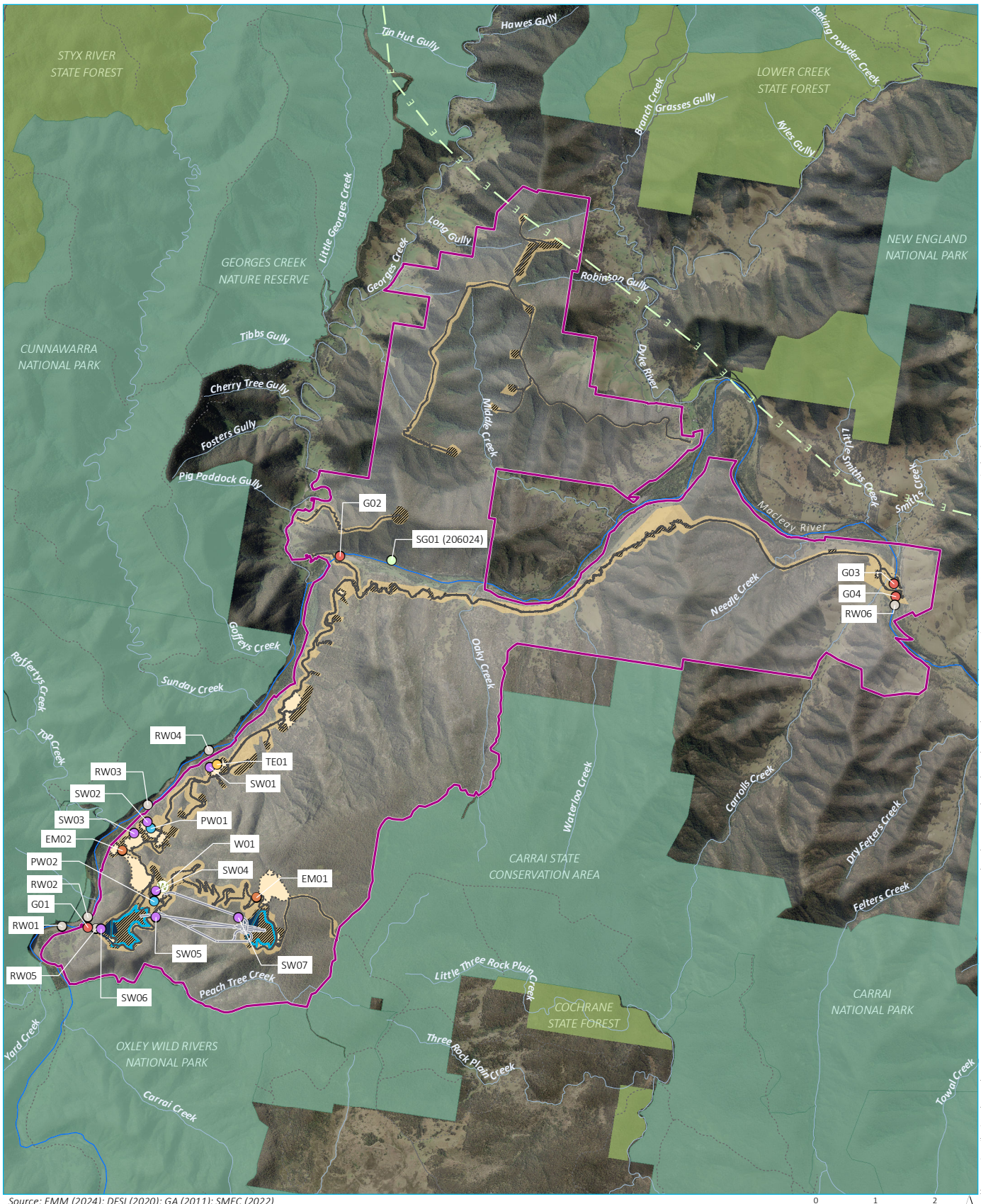
Table 6.6 Water access licence requirements

Water source	Water take	Licensing pathway	Volume	Status
Construction phase				
Macleay Gorges Water Source	General construction water	Specific Purpose Access Licence as provided for in Part 2, Division 1 of the WM Act.	1,000 ML/year	• SPAL mechanism agreed in principle with DCCEEW. • EIS and RTS to provide supporting information and justification. Formal application for SPAL to follow planning approval.
	Initial storage fill		6,250 ML	

Water source	Water take	Licensing pathway	Volume	Status
	Streamflow losses due to groundwater drawdown	Trade from existing unregulated river access entitlements.	<1 ML/year	• Alinta currently hold 22 ML entitlement which satisfies this requirement.
Macleay Valley Water Source	Eastern access road construction water		180 ML/year	• Negotiations and dealings with existing WAL holders to secure necessary entitlement is in progress.
Operational phase				
Macleay Gorges Water Source	Operational top-up and local catchment runoff	Trade from existing unregulated river access entitlements.	170 ML/year	• Alinta currently hold 22 ML entitlement. • Negotiations and dealings with existing WAL holders to secure necessary additional entitlement is in progress.

6.4.3 Updated mitigation measures

The mitigation measures proposed in the SWA remain relevant and have been consolidated for the Amended Project and are provided in Appendix C. The recommended monitoring program also remains relevant however has been expanded as part of response to submissions, with an additional monitoring location for receiving waters in Macleay River (downstream of the permanent bridge) and new locations proposed to monitor geomorphology in Fingerboard Crossing Creek and Macleay River (see Figure 6.5).



Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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KEY

- Project area
- Disturbance footprint
- Construction envelope
- Initial storage fill pump infrastructure
- Tunnels, portals, intakes, shafts
- Permanent road
- Surface works
- Reservoir
- Dam wall

Proposed surface water monitoring location

- Geomorphology
- Process water
- Receiving water
- Spoil emplacements
- Stormwater
- Stream gauge
- Treated effluent
- Weather station

Existing environment

- Macleay River
- Watercourse/drainage line
- Minor road
- Vehicular track
- Existing transmission line
- Existing transmission line
- NPWS reserve
- State forest

Proposed surface water monitoring locations

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Figure 6.5

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6.5 Biodiversity

6.5.1 Assessment approach

An assessment of biodiversity impacts was carried out for the Amended Project, using the same methods as applied in the EIS, carrying out additional surveys where required, updating species habitat mapping and completing a revised assessment of predicted impacts and management recommendations. The key changes to the Project relevant to the biodiversity assessment are the change in layout (and therefore construction envelope and disturbance footprint) and revised design for the permanent spoil emplacements.

To incorporate changes to the Project as well as stakeholder feedback received since the EIS, the following was undertaken:

- Additional vegetation and threatened species surveys within the Project area completed in August and December 2023, and March 2024
- Additional survey for *Pultenaea rubescens* outside of the Project area to better understand the species occurrence and distribution, during October-November 2023
- Review and update of impacted plant community types (PCTs) and impacts to threatened species based on the revised Project layout and disturbance footprint
- Specific updates to the BDAR to respond to comments raised by BCS (listed in Table 1.2 of the BDAR), informed by additional surveys and revisions to the Project design.

A detailed description of the existing environment, assessment framework and methods applied, as well as the findings summarised in this chapter, are provided in detail in the *Biodiversity Development Assessment Report*, provided as Appendix E to this Amendment Report.

6.5.2 Assessment of Amended Project

i Avoidance and minimisation through design

The consideration of options and development of the Project was informed by iterative environmental constraint assessment comprising both desktop and field survey, with the aim to reasonably avoid and minimise significant impacts to the environment, including biodiversity values, as presented in the EIS. Since the EIS, additional measures to avoid and minimise impacts to biodiversity have been incorporated into the Amended Project and have included:

- Refinement of the access road between the lower and upper reservoir (UDAR) to avoid critical Brush-tailed Rock-wallaby denning and refuge habitat (shown in Figure 6.6).
- Re-design of the upper reservoir spoil emplacement and emergency access to avoid habitat for *Pultenaea rubescens* (shown in Figure 6.7).

To further reduce and avoid significant impacts to Brush-tailed rock-wallaby, the Project removed a north-south road linking the Main Access Road and the UDAR, an area which recorded a population of Brush-tailed Rock-wallaby and associated denning habitat. The UDAR was also redesigned to reduce impacts to native vegetation, including a reduction in the construction envelope to limit disturbance.

The EIS upper spoil design avoided recorded individuals of *Pultenaea rubescens* including a 30 m setback buffer from those individuals. Further avoidance has been incorporated into the design of the Amended Project to remove all direct impacts to suitable *Pultenaea rubescens* habitat (microhabitat), including a 30 m buffer of the microhabitat, moving the PSE further to the north and reducing the extent to which the PSE envelopes the *Pultenaea rubescens* on the eastern side. Indirect shading impacts were also considered as part of the design and the height of the PSE is reduced from the EIS design. Shading modelling shows that this area is already impacted by natural shading and the PSE will not create new shading to the habitat supporting *Pultenaea rubescens.*

ii Native vegetation

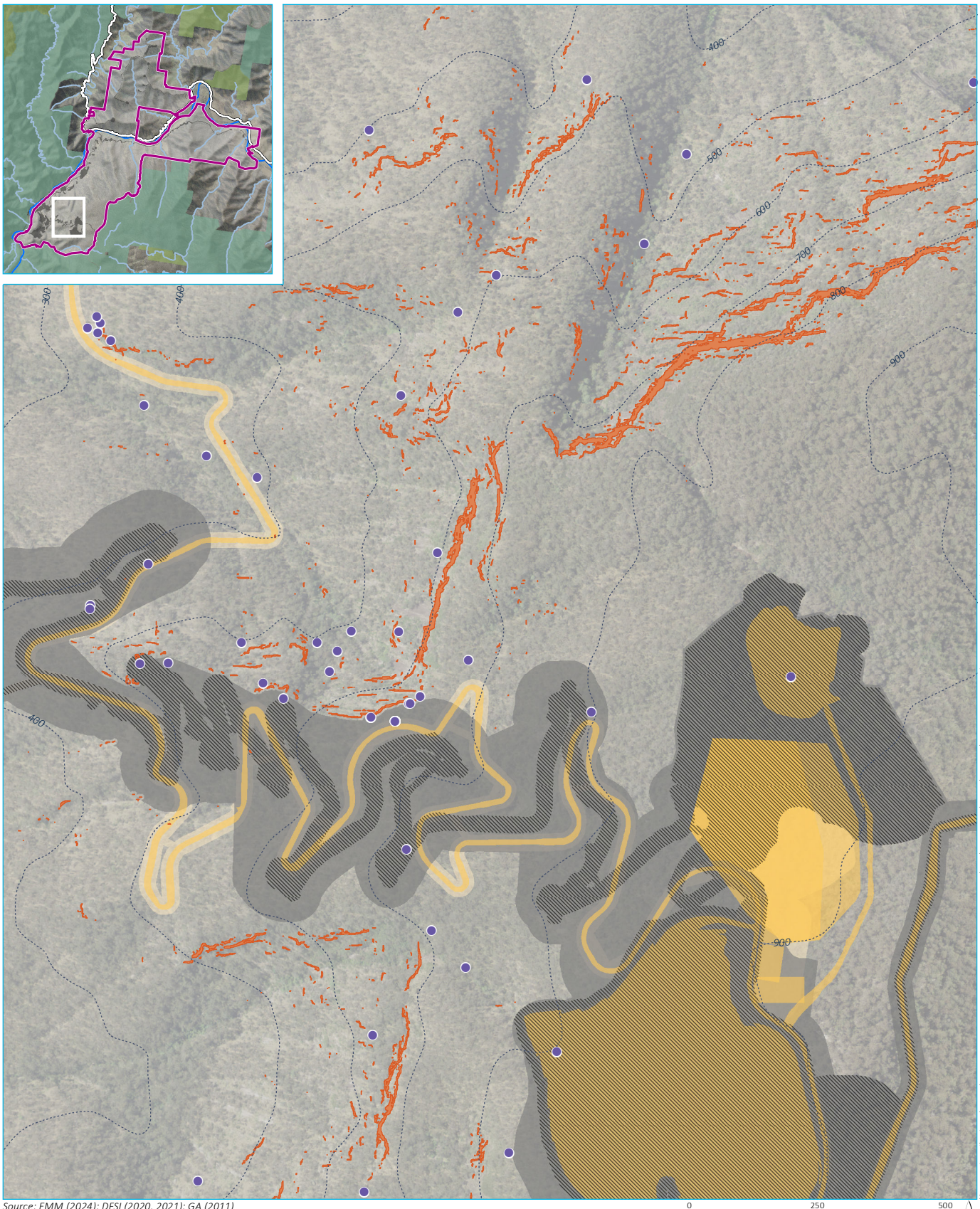
The EIS identified ten PCTs within the construction envelope, with up to 328 ha being directly impacted as result of disturbance. Five threatened ecological communities (TECs) listed under the *Biodiversity Conservation Act 2016* were recorded within the project area, with 7.43 ha impacted. A review of PCTs, informed by additional survey and assessment, identifies ten PCTs within the disturbance footprint of the Amended Project. They are:

- PCT 762 – Cabbage Gum open forest or woodland on flats of the North Coast
- PCT 842 – Forest Redgum – Broad leaved Apple dry open forest of the gorges of NSW North Coast Bioregion
- PCT 868 – Grey gum – Stringybark open forest of the gorges of the NSW North Coast Bioregion and New England Tableland Bioregion
- PCT 988– New England Blackbutt - Tallowwood moist shrubby forest of the escarpment ranges of the NSW North Coast Bioregion and New England Tableland Bioregion
- PCT 979 – New England Blackbutt - Diehard Stringybark dry open forest of the escarpment ranges of the eastern New England Tableland Bioregion and NSW North Coast Bioregion
- PCT 1106 – River Oak riparian woodland of the NSW North Coast Bioregion and northern Sydney Basin Bioregion
- PCT 1142 – Shatterwood Giant Stinging Tree Yellow Tulipwood dry rainforest of the NSW North Coast Bioregion and northern Sydney Basin Bioregion
- PCT 1215 – Spotted Gum – Grey Ironbark open forest of the Macleay Valley lowlands of the NSW North Coast Bioregion
- PCT 1268 – Tallowwood open forest of the coastal ranges of the NSW North Coast Bioregion
- PCT 1287 – Upland heath swamps of the New England Tableland Bioregion.

The Amended Project will result in the following direct impacts:

- loss of 362.8 ha of native vegetation and threatened species habitat of varying condition
- loss of 9.7 ha of TECs.

While the construction envelope for the Project has been reduced, the increase in loss of native vegetation and threatened species habitat and TECs is due to the overall increase in the disturbance footprint to accommodate the Project changes.



Source: EMM (2024); DFSI (2020, 2021); GA (2011)

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KEY

- Project area
- Construction envelope
- Current disturbance footprint
- Design disturbance (Nov 2020)
- Design disturbance (Aug 2022)
- Brush-tailed Rock-wallaby sighting
- Actual brush-tailed rock-wallaby denning and refuge (critical) habitat

Existing environment

- Macleay River
- Named watercourse
- Major road
- Contours (100 m)
- NPWS reserve
- State forest

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Additional avoidance in design measures for Brush-tailed Rock-wallaby

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Figure 6.6

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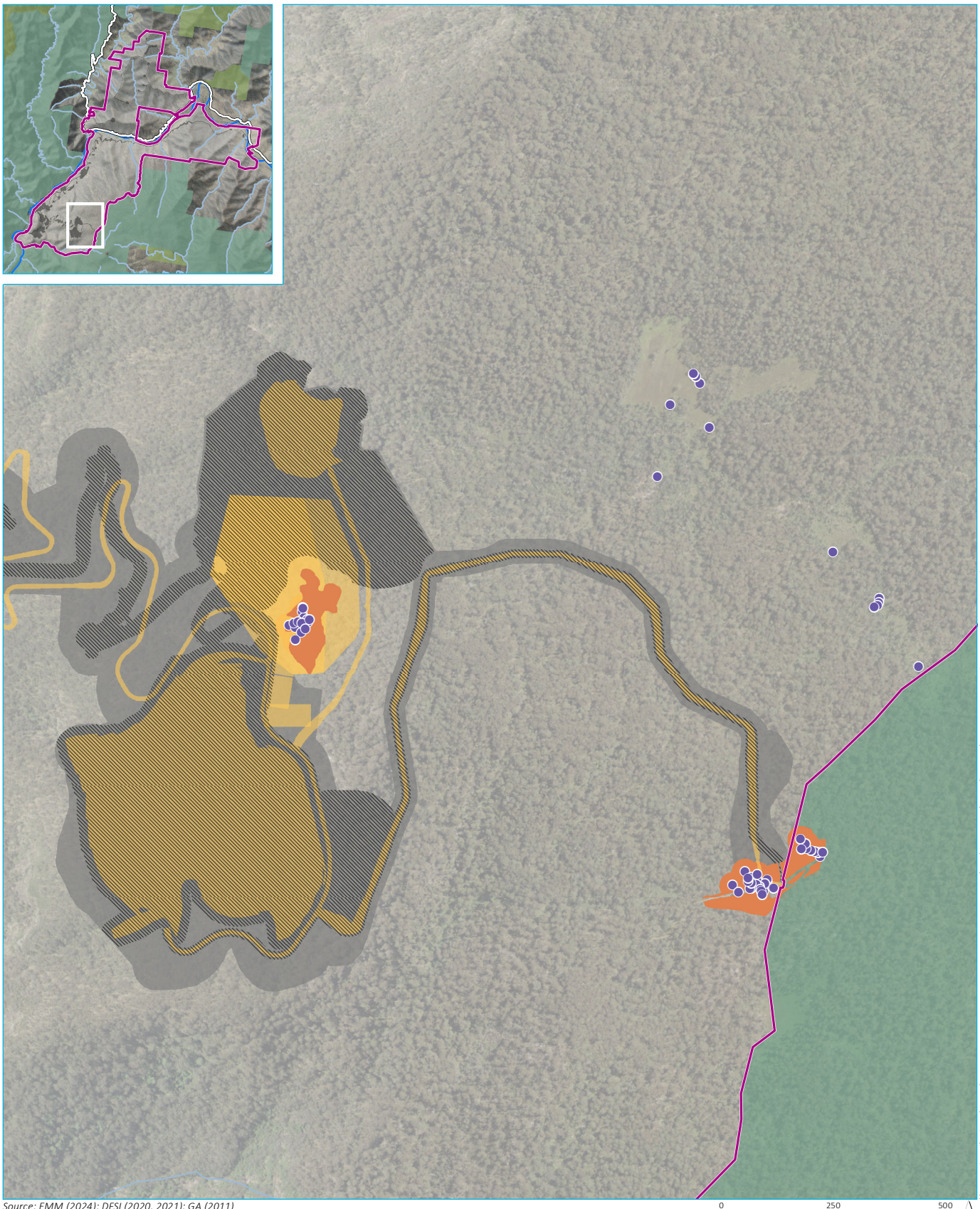

Source: EMM (2024); DFSI (2020, 2021); GA (2011)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Construction envelope
- Current disturbance footprint
- Design disturbance (Aug 2022)
- *Pultenaea rubescens*
- *Pultenaea rubescens* species polygon

Existing environment

- Macleay River
- Named watercourse
- Major road
- NPWS reserve
- State forest

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Additional avoidance in design measures for *Pultanaea rubescens*

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Figure 6.7

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iii Threatened species

A habitat assessment within the construction envelope was used to guide the candidate species assessment for the EIS and this was reviewed for the Amended Project. No change to the candidate species requiring further assessment were identified, with targeted surveys required for 30 flora species and 33 fauna species. To provide adequate survey coverage of the revised construction envelope, additional surveys were completed in August and December 2023 and March 2024. As a result of these surveys and additional assessment, assumed presence for the five species in the EIS have either been confirmed or excluded. The exception is one species, Cryptic Forest Twiner (*Tylophora woollsii*), which has been assumed present using a precautionary principle due to the species being genetically similar to the common *Tylophora paniculata*.

The following species were recorded within the construction envelope of the Amended Project:

- Guthrie's Grevillea (*Grevillea guthrieana*)
- Tall Velvet Sea-berry (*Haloragis exalata* subsp*. velutina*)
- Wandering Pepper Cress (*Lepidium peregrinum*)
- Pultenaea sp. Werrikimbe NP *(Pultenaea rubescens)*
- Southern Myotis (*Myotis macropus*)
- Glossy Black-Cockatoo (*Calyptorhynchus lathami*)
- Brush-tailed Phascogale (*Phascogale tapoatafa*)
- Greater Glider (*Petauroides volans*)
- Squirrel Glider (*Petaurus norfolcensis*)
- Brush-tailed Rock-wallaby (*Petrogale penicillata*)
- Koala (*Phascolarctos cinereus*) (old scat found in one location indicating species presence)
- Long-nosed Potoroo (*Potorous tridactylus*)

Direct impacts to threatened species and their habitat are due to clearing of native vegetation within the disturbance footprint.

Six serious and irreversible impacts (SAII) candidate species were recorded within the Project area. Of these, the Project is considered likely to have impacts on approximately 0.0059 ha of critical Brush-tailed Rock-wallaby denning and refuge habitat, impacting one colony containing a minimum of two individuals. Two individuals of Wandering Pepper Cress will also be impacted, impacting approximately 0.1% of the percentage of the NSW population and 2.51 ha of habitat for this species. Other SAII candidate species including *Pultenaea rubescens,* Scrub Turpentine, Little Bent-winged Bat and Large Bent-winged Bat will not be directly impacted by the Project.

iv Groundwater dependent ecosystems (GDEs)

The EIS predicted no impacts to obligate GDEs and no ongoing drawdown within 40 m of facultative/opportunistic GDEs between the lower reservoir and Macleay River. The Amended Project includes a revised underground arrangement and sizing that has been re-assessed through updated groundwater modelling (see Section 6.3).

The updates as part of the project design (revised groundwater modelling) predict that water table drawdown is predicted to occur during the construction period only to within 40 m of two obligate GDEs (both being PCT 1287). Drawdown is not predicted (within the minimum drawdown threshold) during operation. No ongoing drawdown is predicted within 40 m of facultative/opportunistic GDEs between the lower reservoir and Macleay River.

v Indirect impacts

The indirect impacts of the Amended Project have been identified consistently with the EIS, and include:

- edge effect on areas of retained native vegetation
- disturbance to native animals in adjacent habitat, particularly during construction
- interruption of animal movement
- vehicle strike and powerline collision impacts on animal populations
- increase in predatory and pest animal species, resulting in increased predation and competition and a consequent reduction in populations
- impacts from *Phytophthora cinnamomi*
- impacts to water quality during construction
- impacts from stormwater and surface water runoff
- impacts from change of fire regime.

Following feedback from BCS, the following additional indirect impacts have been identified and considered in the assessment:

- impacts from *Phytophthora cinnamomic* - impacts from *P. cinnamomi* has been identified as a key threat to the *Pultenaea rubescens (Pultenaea parrisiae* subsp. *parrisiae), Grevillea guthrieana* and Hastings River Mouse. Weed and pathogen management is recommended in the BDAR.
- impacts from stormwater and surface water runoff – a construction phase discharge impact assessment was completed as part of the Submissions Report and revised SWA (see summary of impacts in Section 6.4.2) and considered by the BDAR.
- impacts from change of fire regime - the Project may have the potential to indirectly impact on fire regimes on the Carrai, which would have implications for *Pultenaea rubescens*. No APZs are located near the microhabitat and no bushfire fuel management for the area surrounding the Project has been incorporated to manage risk of bushfire events. It is therefore considered that natural bushfire events will still occur within the Carrai where this species occurs.

Minimisation measures for all indirect impacts likely to occur due to the Amended Project are identified in the BDAR.

Consistent with the EIS findings, four prescribed impacts are expected to occur as a result of the Amended Project. These are:

- impacts on cliffs and rocks
- movement corridors

- water quality, water bodies and hydrological processes
- vehicle strikes.

These prescribed impacts may impact threatened species and mitigation and management measures are presented consistent with the EIS.

6.5.3 Updated mitigation measures

The mitigation and minimisation measures proposed in the BDAR remain relevant and have been consolidated for the Amended Project as provided in Appendix C. The relevant changes include clarifying the overarching framework and guidance for biodiversity impacts through the preparation of a Biodiversity Management Plan (BMP), and an additional measure to ensure bushfire fuel management is not carried out by the Project such that it might change the existing bushfire regime and impact threatened species.

6.5.4 Updated biodiversity offset strategy

The Project will result in clearing of 362.8 ha of native vegetation of varying condition and habitat for threatened species. A consolidated summary of the offset requirements is provided in Table 12.1 of the BDAR.

The EIS identified three stages proposed for the retirement of offsets. This has been refined for the Amended Project, with Stage 3 separated into the two spatially different portions of the transmission line (north and south). The updated staging strategy is provided in Table 6.7.

Table 6.7 Proposed timing and offsetting approach

Component	Impact	Offset timing
Stage 1: clearing for access roads and associated infrastructure	Direct loss of vegetation	Retirement of biodiversity credits within 12 months of construction and/or clearing works commencing on Stage , allowing for establishment of the on-site BSA..
Stage 2: clearing for reservoirs	Direct loss of vegetation	Retirement of biodiversity credits prior to construction and/or clearing works commencing on Stage 2.
Stage 3a: clearing for transmission line (including associated access roads & towers) south of the Macleay River at George's Junction	Direct loss of vegetation	Retirement of biodiversity credits prior to construction and/or clearing works commencing on Stage 3a.
Stage 3b: clearing for transmission line (including associated access roads & towers) north of the Macleay River	Direct loss of vegetation	Retirement of biodiversity credits prior to construction and/or clearing works commencing on Stage 3b.

Consistent with the EIS, prior to any development being carried out that would impact on biodiversity values a detailed Biodiversity Offset Package will be prepared detailing how the offset obligation would be met for each stage.

6.6 Aquatic ecology

6.6.1 Assessment approach

For the EIS, an aquatic ecology impact assessment (AEIA) was prepared by EMM's subconsultant Stantec (2023) and exhibited with the EIS. It was not expected that the Project would result in significant broad-scale impacts to key fish habitat or aquatic biodiversity within the Macleay River and associated waterways. Aquatic ecosystems were assessed as non-dependent on groundwater and were assessed as low risk for Project induced impacts. The assessment anticipated that impacts to stygofauna communities would be low as only a small area of stygofauna habitat was predicted to be affected by drawdown, and species of stygofauna had not been identified during site investigations.

Proposed mitigation measures include further field sampling, monitoring surface water flow and quality, and 'fish friendly' infrastructure for all water extraction activities. The overall finding of the aquatic ecology assessment was that, following implementation of appropriate mitigation measures, it is unlikely that significant direct or indirect impacts to aquatic ecology will occur as a result of the Project.

An Addendum to the Aquatic Ecology Impact Assessment (AEIA Addendum) has been prepared that incorporates the Project changes relevant to potential aquatic ecology impacts, and responds to the relevant submissions raised in relation to aquatic ecology. The AEIA Addendum is provided at Appendix F.

As outlined in Section 3, the proposed Project amendment that has the most direct influence on aquatic ecology is the additional inclusion of temporary bridge structures on the Macleay River. It is understood that a temporary bridge will be utilised prior to the construction of the two permanent bridges near Smiths Bluff (referred to as Eastern Access Temporary Bridge). A secondary, temporary access is proposed via the construction of a new, temporary bridge crossing of the Macleay River about 600 m north-east of Georges Junction (referred to as Western Access Temporary Bridge).

Further, changes to the water balance and consideration of the surface water receiving environment due to the Amended Project is a key aspect relevant to the assessment of aquatic impacts, and therefore has been a focus of the AEIA Addendum.

6.6.2 Assessment of Amended Project

i Avoidance and minimisation through design

As outlined in the EIS, the Project has committed to ensuring all waterway crossings comply with *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge 2003) and Policy and guidelines for fish habitat conservation and management (Department of Primary Industries 2013). These guidelines have informed ongoing design discussions regarding all waterway crossings to date and will continue to do so, they include:

- Minimising ground disturbance during the wet season, and or periods of heavy rainfall
- For smaller class streams (2-4) minimise the time in which streams are blocked, impounded, and or restricted water flow
- For all Class 1 waterways water flow and connectivity should be maintained during construction
- Designs structures need to meet high flow and low flow condition suitable to maintain fish passage for all conditions
- Installation of any scour protection should not impede the connectivity of the water and or become a barrier for fish to pass through the structure, additionally scour protection should only be where needed.

Additionally, updated mitigation measures for the Amended Project are detailed in the AEIA Addendum and incorporated into the overall list of mitigation measures for the Project in Appendix C of this report.

ii Potential impacts

Table 6.8 summarises the potential aquatic ecology impacts identified in the AEIA Addendum, particularly if they have changed to what was presented in the exhibited EIS.

Table 6.8 Potential changes in impact to those presented in the EIS – aquatic ecology

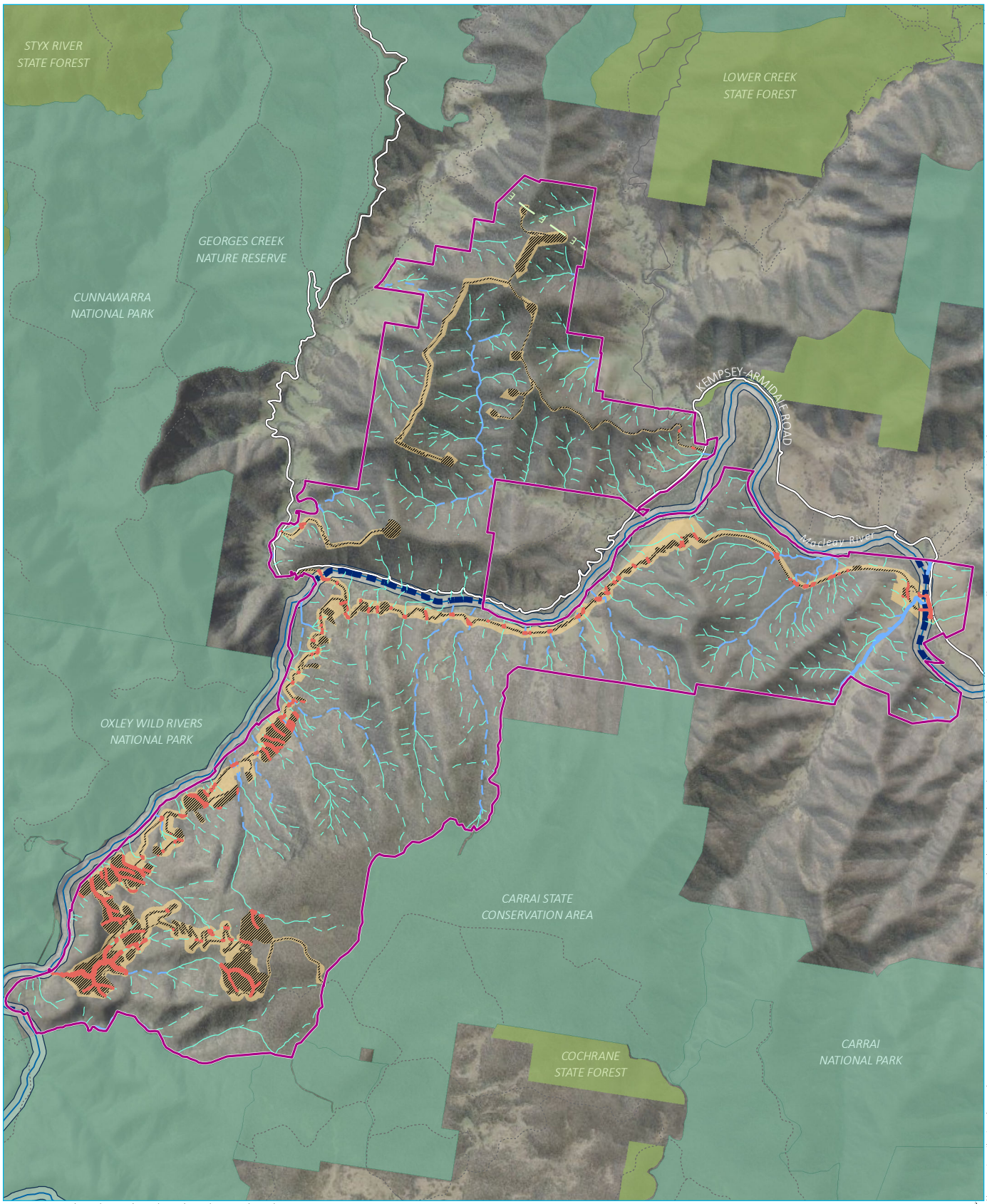
Potential impact	Changes in impact to those presented in the EIS
Fish passage and habitat – crossing structures	Crossing structures have potential to temporarily or permanently blockages to fish passage and impact riparian and key fish habitat. The impact to fish movement across the temporary structures will not be significantly impeded, as the spanning structure is an open structure, however adverse conditions may make crossing more challenging, given the narrowing of the river channel in these locations. However, some habitat will be lost due to the temporary bridge abutments, access, and scour protection. As such these areas have been included in estimating impacts to key fish habitat. While the temporary structures will be removed and rehabilitated the habitat will be lost and or modified for the period in which the structures are in place for potentially the duration of the construction phase. The location of the permanent bridges across the Macleay River and Carrolls Creek (i.e. Smiths Bluff bridge) remain unchanged. Additionally, the permanent structures are as proposed in the EIS and will be multi-spanning bridges that will have a wider span pushing the abutment structures further back into high bank providing more channel open for the flow of water during higher flow periods.
Adverse effects of pumping on native fish populations that may inhabit Macleay River and the reservoirs.	Essentially, due to the high turnover of water and regular fluctuation in height of the water, it is unlikely fish populations will likely be able to establish and maintain significant numbers due to the lack of habitat and food availability. As the system is an off-river closed-loop system there should be minimal opportunities for fish species to re-establish in the reservoir locations. While screens at the river intake will not be completely restrict all larvae and or egg, the screening will significantly reduce the risk of transferring species into the reservoir. The following measures have been considered in the AEIA Addendum and incorporated in the updated mitigation measures for this potential impact: • The Project will need to conduct intake screen assessments to determine if fish larvae and or eggs are being captured by the screens at the intake of the Macleay River. • Periodic monitoring will still need to occur in the reservoirs to understand if a fish population has reestablished in the reservoir and upper catchment for Fingerboard Creek. If a population has established with the reservoirs efforts to destock the reservoirs may be required. • As a mitigation measure, the Project will undertake a de-stocking effort on Fingerboard Creek during the dry season to minimise the initial presence of species within the reservoir sections. This will involve pushing species downstream of the reservoir locations and then blocking off access for the species to move back upstream.

Potential impact	Changes in impact to those presented in the EIS
Flow modifications on the life cycle of fish	To account for modifications to flow and water quality impacts, an additional range of species have been reviewed for how the Project construction and operation may affect the various life stages for more common species found within the MacLeay River catchment in the AEIA Addendum. A select number of species have been used as proxy species for the likely aquatic biodiversity may be impacted by the Project. Flow modifications for the amended Project were considered in three phases: the initial fill, construction water and the operational top-up. Additionally, discharges during construction were also considered. Each phase and associated flow modifications are summarised below. However, broadly and based on the additional assement undertaken to date, it is not expected that the Project will have measurable change and or impact to the various life stages of common aquatic species under normal conditions. During more extreme events there is potential to have localised influence on the water quality, however the predictions are based on extreme events. Additionally the take of water is unlikely to adversly effect the life cycle of these species with the water take controls in place to minimise the effects of flow and maintain adequate environmental flows.
	Initial fill The initial fill will see the most water collected to fill the storages; this will occur for 3-12 months. The duration is limited to the availability of flow condition for the MacLeay River. This phase will have the highest impact on the aquatic ecology of the immediate section of the MacLeay River. As discussed in the updated SWA report appended to the Submissions Report, the take of water will be considerably minor in the overall volumes of the catchment and current water allocations. It is predicted that pumping will occur from approximately December through March to meet the pumping limitations. Many of the reviewed proxy species for the wider catchment biodiversity suggests that there may be some interactions during the initial fill of spawning periods (Australian Smelt), and juvenile movements of other species . There is no way of removing all interactions with species present in the system, however the restrictions around pumping periods will mean adequate water levels are present in the Macleay River, where there is adequate space to move around the intake structure and utilise natural available in the wider channel. In addition to the pumping controls, the fish friendly intake and screen designs will further limit the potential impacts to small, bodied fish, eggs and larvae within the Macleay River system. As several factors require consideration when designing an effective fish-protection screen, the Proponent will continue to consult with NSW DCCEEW Water and NSW DPI Fisheries over the fish screen design moving forward and into detail design. The implementation of appropriate fish screens is expected to mitigate the potential risks associated with pump operation.
	Construction water Water take will be required to meet construction demand for the Project. The SWA (Appendix E of the Submissions Report) has predicted the potential impacts on baseflow to the Macleay River and adjoining watercourses. It is estimated the maximum reduction realised in the fourth year of construction at approximately 193 ML/yr, representing approximately 4% reduction from the pre-Project baseflow conditions. Given the relatively low (and short-term during construction) reduction in baseflow, reduced baseflow is not anticipated to have a significant impact, given the relatively small impact of the take of water for construction it is not expected to have a measurable impact on fish species and or stages of the local species life cycle. As the total volumes of pumping will occur periodically, not all at once, and only when there is visible flow. Additional considerations in regard to the location and types of pumps used for construction water has yet to be completed. The proposed locations of these construction pumps will be provided to DPI Fisheries when the final designs have been submitted for review/ approval.

Potential impact	Changes in impact to those presented in the EIS
	Operational top up Currently, the design for operational top up of water through the loss of evaporation has yet to be confirmed. There are two avenues of design utilise the larger pump and volume for top up of the system and then be restricted to the current proposed controls of the pumping regime and or reduce the pump size and therefor pump volume collected over a longer period that may allow for more frequent pumping occurrences across less prohibited pumping regimes. These details have yet to be confirmed but it being considered that with the reduction of the pump requirements to maintain the reservoir levels a smaller pump size and slower take volumes are an option for the operation phase. Given the small volumes of water predicted to be taken each year for operational top up the impact is considered overall negligible to the wider system and will have less of an impact of taking water compared to any other phases of water taking.
	Discharges While discharges will occur during construction, the overall impact is considered quite low, as impacts to water quality will be limited to the immediately downstream environment and will dilute the further downstream from the Project Area. This is based on the Discharge Impact Assessment (EMM, 2024b) that assessed the worse case scenario and did not include the assumption that sediment basins would be used for particular events. Based on the additional assement undertaken to date in regards to discharges for the amended design, it is not expected that the Project will have measurable change and or impact to the various life stages of common aquatic species, under normal conditions. During more extreme events, there is potential to have localised influence on the water quality, however the predictions are based on extreme events. Additionally the take of water is unlikely to adversly effect the life cycle of these species with the water take controls in place to minimise the effects of flow and maintain adequate environmental flows.
Riparian impacts	The Project will impact on an extensive area of riparian habitat, mostly on minor waterways for stream orders of 1-3. The impacts to riparian land are shown in Figure 6.7. Riparian impacts specific to the Macleay River are detailed further in Table 5.1 of the AEIA Addendum and total an area of 2.45 ha. Impact areas have been calculated for all other streams across the Project area and are summarised in Appendix B of the AEIA Addendum. It should be noted that the loss of riparian habitats have been addressed as part of the clearing impacts in the BDAR. It has been requested by DPI Fisheries that a Buffer Area be applied to the Macleay River of 100m. This has been reviewed and the majority of the 100m buffer around the Project area except for the bridge structures, and a few locations of the access road will remain mostly intact.

6.6.3 Updated mitigation measures

The proposed mitigation and management measures have been revised to address the Amended Project and incorporate feedback from DPI Fisheries and DCCEEW. The updated measures are provided in full at Appendix C. The relevant changes include providing an overarching framework and guidance for the management and monitoring of aquatic impacts through the preparation of an Aquatic Ecology Monitoring and Management Plan. The plan will confirm monitoring requirements and will provide an adaptive management framework for the project before construction commences. This will include but not be limited to survey effort, locations of survey sites, screen maintenance investigation, and trigger actions and corrective actions. Additional surveys and destocking of Fingerboard Creek will also be implemented to minimise impacts to fish and other aquatic species.



Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Impacted riparian buffer zone
- Disturbance footprint
- Construction envelope
- Macleay River 100m buffer

Strahler stream

- 1st order
- 2nd order
- 3rd order
- 4th order
- 5th order
- 6th order
- 9th order

Existing environment

- Macleay River
- Kempsey-Armidale Road
- Minor road
- Vehicular track
- Existing transmission line
- NPWS reserve
- State forest

Impacts to riparian habitat

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 6.8

EMM creating opportunities

\\emm.local\xdrive\2021\210465 - OMPS EIS - Generation Component\GIS\02_Maps_RTS_AquaticEcology\AQUA001_RiparianBufferZones_20240729_02.mxd 1/08/2024

6.7 Aboriginal cultural heritage

6.7.1 Assessment approach

An Addendum Aboriginal Cultural Heritage Assessment (ACHA) was prepared following the exhibition for the EIS. The revised ACHA responds to submissions from Heritage NSW and assesses the impacts associated with the project amendments. The Addendum ACHA is provided in Appendix G.

The methodology for the assessment of Aboriginal heritage impacts for the amended project was consistent with the methodology present in the ACHA. Since the EIS, the following activities have been carried out to inform the Addendum ACHA:

- Additional/new consultation with Registered Aboriginal Parties (RAPs)
- additional archaeological survey completed in May 2024 targeting additional areas from the amended construction envelope, additional escarpment landforms and reinspection of some previous sites requiring further analysis and/or validation
- additional test excavation programs completed in July 2023 and May-June 2024
- additional desktop assessment in relation to AHIMS data and landform mapping
- specialist investigation of six stone arrangements, 27 culturally modified trees, two rock shelters and one grinding groove
- assessment to determine the cultural significance of identified items and assessment of impacts on new Aboriginal items/sites identified
- consideration of the need for further mitigation measures.

Surveys have now been completed across the whole construction envelope for the amended project and test excavations have been carried out to complete the original test excavation program and in accordance with the Heritage NSW submission on the EIS.

6.7.2 Assessment of Amended Project

i Consultation process

Due to a gap of >6 months in late 2023, Aboriginal consultation was re-started in accordance with Heritage NSW guidelines in early 2024. This included formal notification and provision of various assessment documentation to 20 RAPs. These included a mixture of those organisations previously involved, and newly identified individuals and/or organisations both local to the Project and the surrounding region. The process followed by the Heritage NSW *Aboriginal cultural heritage consultation requirements for Proponents I NSW* guidelines. A complete consultation log is provided in Appendix B.4 of Appendix G.

Several of these RAPs were invited to undertaken additional on-Country activities for the addendum report, including further field survey and a small excavation program on the upper reservoir between May and June 2024. In addition to EMM undertaking the consultation process in accordance with Heritage NSW guidelines, the Proponent has engaged GIRA as a First Nations Advisor to the Project. GIRA has undertaken extensive interactions and discussions with the local Bellbrook, Kempsey and Armidale communities since late 2023.

In relation to the addendum report, Appendix B.10 of Appendix G presents an extract of GIRA's activity undertaken throughout the field campaign. This indicates some 168 interactions were undertaken with the participating RAPs during the April – June 2024 period.

ii Further archaeological survey

An overview of the archaeological survey undertaken for the EIS is detailed in Section 5.2.1 of Appendix G. Building on the work of the EIS ACHA, the additional field survey completed as part of this addendum report targeted field survey of three discrete project components:

- the additional areas proposed to be part of the construction footprint in the proposed upper reservoir site on the Carrai Plateau
- investigate the extent of escarpment landforms, if any, in relation to the proposed construction envelope
- reinspection of #21-5-0142 in response to further information provided by Iwatta Aboriginal Corporation, specifically in regards to the size and cultural significance of the site.

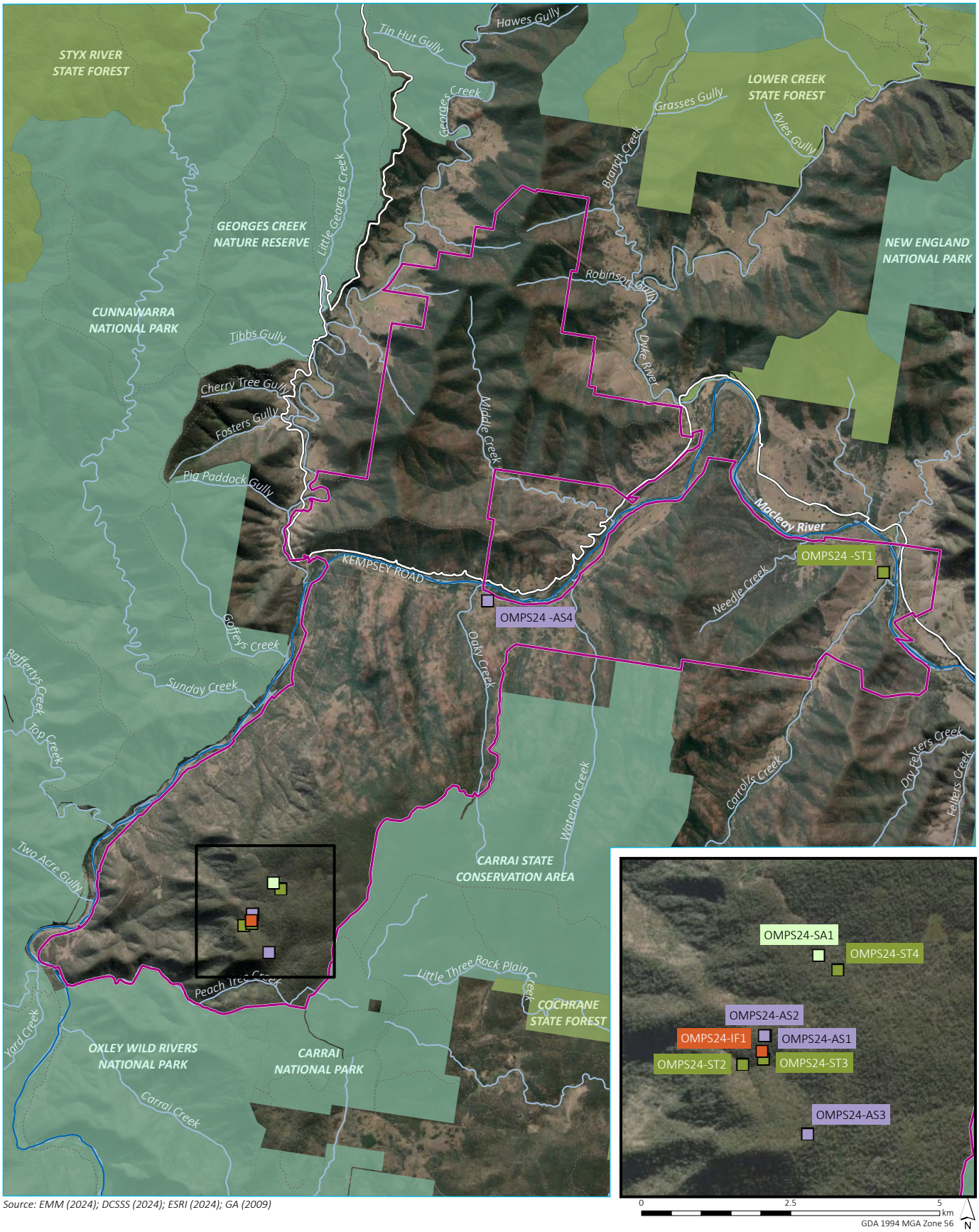
The addendum report investigations identified a further nine previously undocumented Aboriginal objects and sites, and revisited several previously documented sites. This includes three low density artefact scatters (OMPS24-AS1 – AS3 inclusive), an isolated object (OMPS24-IF1), and four culturally modified trees (OMPS24-ST1 – ST4 inclusive). Figure 6.9 presents a summary of these findings. In the case of the stone artefact sites, these were all below the 24/m^2 threshold identified by the EIS ACHA as reflecting the broader background scatter; and as such are presented subsequently in the report as part of OMPS-BS1 (#21-5-0278). Due to the position of the additional investigation areas on the peripheries of the previously surveyed construction envelope and resulting from poor visibility during the survey, some of these sites were identified in the ACHA.

As noted above, in addition to the formal survey undertaken in the additional investigation areas of the upper reservoir, #21-5-0142 was reinvestigated in light of new information provided by Iwatta Aboriginal Corporation. Observations made during this reinspection have not changed the definition of #21-5-0142 as described in the ACHA, as this curtilage captures the densest expression of this site and the foci of occupation in this locale.

iii Test excavation findings

An overview of the test excavations undertaken for the EIS is detailed in Section 5.3.1 of Appendix G. Following the finalisation of the EIS ACHA in late 2022, Ozark were engaged by EMM to complete the test excavation program. OzArk's supplementary report on these works is presented in Appendix D.2 of Appendix G. These excavations were located along the EAR, running along the alluvial terraces and spurcrests near the Macleay River. The program consisted of 61 test pits, totalling 15.25 m^2, along discrete transects encompassing the construction envelope. As a result of the excavations a total of 32 artefacts were recovered from seven of the 61 test pits.

Following comments on the EIS ACHA, another excavation program was undertaken in May-June 2024, focussing on the steep, rugged terrain of the proposed upper reservoir. Overall, 29 test pits were excavated across the ridges, spurs and slopes of the Carrai Plateau where it abuts the steep, dramatic drop into the Macleay River. Only five (17%) of the 29 test pits excavated contained artefacts, with a total of 140 Aboriginal objects recovered.



Source: EMM (2024); DCSSS (2024); ESRI (2024); GA (2009)

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KEY

Project area

Identified Aborginal site
- Artefact scatter
- Culturally modified tree
- Isolated find
- Stone arrangement

Existing environment
- Major road
- Minor road
- Vehicular track
- Macleay River
- Named watercourse

Named waterbody
NPWS reserve
State forest

Identified Aboriginal sites

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 6.9

EMM
creating opportunities

iv Further desktop assessment and specialist investigation

Additional desktop information in relation to AHIMS data and landform mapping has been provided in Section 4 of Appendix G. The AHIMS data is comparable with that of the EIS ACHA, but includes a further 51 Aboriginal objects and sites. Of these, 48 reflect site recordings as part of the Project, with three others >5 km from the Project area. Some 38 sites are within the Project area, with 22 in the construction envelope, all of which are documented in the EIS ACHA.

Additional desktop and/or specialist investigation was undertaken of six stone arrangements, 27 culturally modified trees (including three recent additions outlined in Section 5), two rockshelters and one grinding groove, all previously identified as of tentative classification. This concludes:

- a regional review of stone arrangements identified seven criteria that indicates anthropogenic creation. One, OMPS-SA1, met enough of these criteria to be considered cultural. The remaining sites did not meet the criteria and are proposed for de-classification
- both desktop and on-site inspections of 28 potential culturally modified trees was undertaken by an arboriculturist. Fifteen of these were considered to be from Aboriginal activities (OMPS-ST01, OMPS-ST02, OMPS-ST04, OMPS-ST07, OMPS-ST12, OMPS-ST19, OMPS-ST22, OMPS-ST24, OMPS24-ST1, OMPS24-ST2, OMPS24-ST3, OMPS-ST4); OMPS-ST13, OMPS-ST14, and OMPS-ST18 and are also anthropogenic, but are now outside the Project area. The remaining were considered to be of natural, mechanical and/or non-Aboriginal origin
- OMPS-R2 and OMPS-Q1 are outside the construction envelope and do not require further consideration. OMPS-R1 and OMPS-GG1 are considered unlikely to be anthropogenic based on a lack of comparable examples in the local or regional context.

Table 4.3 of Appendix G presents the previously recorded Aboriginal sites, which are dominated by the findings of the EIS ACHA, and provides an indication of the general distribution of cultural materials by landform. As was identified in Section 7 of the EIS ACHA and remains valid in Table 4.3, cultural materials are dominated on slopes and ridges. This is in large part due to the majority of the Project area being dominated by these landform types.

v Updated Significance assessments

The updated assessment of scientific significance for the Project area is provided in Table 7.1 of Appendix G and summarised in Table 6.9.

Overall, when considering the entire cultural assemblage, some eight sites are identified as of high significance, 33 of moderate significance and one of low significance. When considering only the construction envelope these values can be modified to two high, 28 moderate, one of low significance. This compares closely with the EIS ACHA that identified 15 of high value, 44 of moderate value and one of low significance, noting that several sites were de-classified, are now outside the Project area following refinements, and/or the consideration of only sites within the Project area rather than further afield.

vi Avoidance and minimisation through design

All proposed amendments for the Project are relatively minor in spatial extent, and no further avoidance or risk minimisation has resulted from the addendum report. The proponent remains committed to the avoidance opportunities outlined in the EIS ACHA, which most notably include the development of the EAR and permanent roads away from OMPS-FA7 and the axe production site (AHIMS #21-5-0142). A temporary bridge across the Macleay River is proposed in contrast to the EIS ACHA, but this has been designed to be located north and away from the main Georges Creek Junction and away from the identified cultural materials in this vicinity. The temporary bridge will be removed at completion of construction and the area rehabilitated, removing any longer term visual impacts, but would still result in adverse impacts to cultural materials within its footprint.

In response to Heritage NSW comments (Table 1.1 of Appendix G), mitigation measures in Section 6.3.3 include the ongoing requirement to explore avoidance and risk minimisation during the finalisation of the Project design. These would be incorporated into the Aboriginal cultural heritage management plan (ACHMP) proposed to inform Aboriginal heritage management following any Project approval, and prior to construction.

vii Potential impacts

The test excavation program and previous archaeological investigations have provided evidence for the presence of surface and subsurface Aboriginal objects within the disturbance area.

The EIS ACHA found 12 sites within or near to the Project area that would be subject to direct impacts that would result in partial or complete loss. Seven of these sites are still within the disturbance footprint and would be subject to impact. Of these, two are considered of high significance, OMPS-SA1 (#21-5-0207) and OMPS-FA16 (#AHIMS TBC). however, four sites, all culturally modified trees (OMPS24-ST1, OMPS-ST1, OMPS-ST4 and OMPS-ST22), are all on the periphery of the construction envelope, and avoidance of many of them is considered probable.

The EIS ACHA initially identified 15 discrete foci zones encompassing 11.28 ha of significant buried cultural deposits, with approximately 5.74 ha (~51%) being directly affected. This impact included the entirety of OMPS-FA1, OMPS-FA3, OMPS-FA4, and OMPS-FA12, as well as parts of OMPS-FA2, OMPS-FA8, OMPS-FA9, OMPS-FA10, and OMPS-FA11-15. Notably, OMPS-FA7, which contains the highest densities of artifacts, was entirely unaffected, along with the remaining 49% of these deposits.

After the Project changes, there are now 18 cultural deposits encompassing 14.37 ha. Of these, approximately 6.58 ha (~46%) fall within the disturbance footprint and would be directly impacted. This includes three cultural deposits—OMPS-FA1, OMPS-FA3, and OMPS-FA4—entirely within the disturbance footprint, particularly around the lower reservoir. However, the impact on other deposits varies from ~14% to ~82%, depending on their location. Importantly, 3.22 ha (~22%) are outside any project activities and are unaffected, including the entirety of OMPS-FA7. An additional 4.58 ha (~32%) are within the construction envelope but are substantively avoided, including OMPS-FA5 and OMPS-FA6.

In relation to cultural materials outside the Project area, four have been identified in Sections 3 and 4 of Appendix G as being in close proximity and potentially indirectly impacted. These include George's Creek Camp (OMPS-CS4 [#21-5-0215]), George's Creek (#21-5-0023), OMPS-AS1 (#21-5-0203), and OMPS-AS36 (#21-5-0200). Both the artefact scatters were assessed to have low or no aesthetic significance in the EIS ACHA, and as such any view changes – the primary indirect impact – by the Project would not result in a material change to these values, and as such can be considered unaffected.

Table 6.9 summarises the changes in potential impacts to Aboriginal sites under the proposed amendments and since the exhibition of the EIS ACHA. The cells colour coded orange are amended status to issues identified in the EIS. Those colour coded green are newly identified sites. The table below is a summary and further detail can be found in the ACHA addendum in Appendix G.

Table 6.9 Summary of potential impact to Aboriginal objects and/or sites

Site ID	AHIMS #	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
Outside Project area									
George's Creek Camp (OMPS-CS4)	21-5-0215	Post-Contact camp site	Valid	High	**Indirect**	At Georges Creek Junction, west of Project area	Partial	**No loss of value**	While visual impacts are expected, the site is already situated within an increasingly urbanised environment.
George's Creek	21-5-0023	Aboriginal ceremonial and Dreaming place	Valid	High	**Indirect**	Within Macleay River, west of Project area	Partial	**No loss of value**	The site has values associated with water flow and aquatic ecology. Neither are expected to be adversely affected with suitable measures proposed by the Project.
Within Project area, but outside construction envelope									
George's junction scarred tree	**21-5-0143**	**Culturally modified tree**	**Valid**	**High**	**N/A**	**-**	**-**	**-**	
Kunderang Station; Oven Mountain;	**21-5-0011**	**Stone arrangement**	**Valid**	**High**	**N/A**	**-**	**-**	**-**	
OMPS-R2	21-5-0159	Rockshelter	**Valid**	High	N/A	-	-	-	**The site was previously situated within the construction envelope, but is now outside it due to a reduction in the envelope's size.**
OMPS-ST2	21-5-0185	Culturally modified tree	**Valid**	Moderate	N/A	-	-	-	
OMPS-ST7	21-5-0190	Culturally modified tree	**Valid**	Moderate	N/A	-	-	-	
OMPS-ST7	21-5-0190	Culturally modified tree	**Valid**	Moderate	N/A	-	-	-	

Site ID	AHIMS #	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
OMPS-ST12	21-5-0195	Culturally modified tree	**Valid**	Moderate	N/A	-	-	-	
OMPS-ST24	21-5-0208	Culturally modified tree	**Valid**	Moderate	N/A	-	-	-	
Within construction envelope									
OMPS24-ST1		Culturally modified tree	**Valid**	Moderate	**Direct**	Eastern end of EAR	**Whole**	**Complete loss of value**	Section 6.3.3 includes mitigation measures to avoid or minimise impacts to this site.
OMPS-ST1	21-5-0184	Culturally modified tree	**Valid**	Moderate	**Direct**	South of Georges Creek Junction on permanent road	**Whole**	**Complete loss of value**	Section 6.3.3 includes mitigation measures to avoid or minimise impacts to this site.
OMPS-ST4	21-5-0201	Culturally modified tree	**Valid**	Moderate	**Direct**	Eastern end of EA	**Whole**	**Complete loss of value**	Section 6.3.3 includes mitigation measures to avoid or minimise impacts to this site. **Previously situated outside of the construction envelope.**
OMPS-ST22	21-5-0205	Culturally modified tree	**Valid**	Moderate	Direct	North of upper reservoir	Whole	Complete loss of value	Section 6.3.3 includes mitigation measures to avoid or minimise impacts to this site.
OMPS-FA5		Cultural deposit	Valid	Moderate	**Partial**	Permanent road north of lower reservoir	**Partial**	**Partial loss of value**	**Some 0.29 ha (~46%) is within the construction envelope, the remainder is within the Project area.**
OMPS-FA6		Cultural deposit	Valid	Moderate	**Partial**	Permanent road north of lower reservoir	**Partial**	**Partial loss of value**	**Some 0.06 ha (~9%) is within the construction envelope, the remainder is within the Project area.**
Within disturbance footprint									
OMPS24-SA1		Stone arrangement	**Valid**	Moderate	Direct	On the edge of the surface activities north of the upper reservoir	Whole	Complete loss of value	**OMPS is exploring whether this site can be avoided through minor design footprint amendments. This would be addressed in the ACHMP if achieved.**
OMPS24-ST2		Culturally modified tree	**Valid**	Moderate	Direct	Within upper reservoir	Whole	Complete loss of value	

Site ID	AHIMS #	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
OMPS24-ST3		Culturally modified tree	**Valid**	Moderate	**Direct**	Within upper reservoir	**Whole**	**Complete loss of value**	
OMPS24-ST4		Culturally modified tree	**Valid**	Moderate	**Direct**	Within surface works near upper reservoir	**Whole**	**Complete loss of value**	
OMPS-Q2	21-5-0205	Quarry	**Valid**	Moderate	**Direct**	Within lower reservoir	**Whole**	**Complete loss of value**	
OMPS-SA1	21-5-0207	Stone arrangement	**Valid**	High	Direct	Surface works, north of the lower reservoir	Whole	Complete loss of value	
OMPS-ST19	21-5-0172	Culturally modified tree	**Valid**	Moderate	Direct	Access road near upper reservoir	Whole	Complete loss of value	
OMPS-FA2		Cultural deposit	Valid	Moderate	**Partial**	Surface works, north of the lower reservoir	Partial	Partial loss of value	**Some 0.07 ha (~7%) is within the construction envelope, and 0.81 ha (~82%) is within the disturbance footprint.**
OMPS-FA8		Cultural deposit	Valid	Moderate	**Partial**	Permanent road north of lower reservoir	Partial	Partial loss of value	**Some 0.05 ha (~8%) is within the construction envelope, and 0.5 ha (~79%) is within the disturbance footprint.**
OMPS-FA9		Cultural deposit	Valid	Moderate	**Partial**	Permanent road north of lower reservoir	Partial	Partial loss of value	**Some 0.05 ha (~7%) is within the construction envelope, and 0.37 ha (~59%) is within the disturbance footprint.**
OMPS-FA10		Cultural deposit	Valid	Moderate	**Partial**	Permanent road north of lower reservoir	Partial	Partial loss of value	**Some 0.35 ha (~55%) is within the construction envelope, and 0.29 ha (~45%) is within the disturbance footprint.**
OMPS-FA11		Cultural deposit	Valid	Moderate	**Partial**	Permanent road north of lower reservoir	Partial	Partial loss of value	**Some 0.60 ha (~49%) is within the construction envelope, and 0.62 ha (~51%) is within the disturbance footprint.**
OMPS-FA13		Cultural deposit	Valid	Moderate	**Partial**	Permanent road north of lower reservoir	Partial	Partial loss of value	**Some 1.12 ha (~68%) is within the construction envelope, and 0.23 ha (~14%) is within the disturbance footprint.**

Site ID	AHIMS #	Site type	Site status	Significance	Type of Harm	Location and/or activity of harm	Degree of harm	Consequence of harm	Notes
OMPS-FA14		Cultural deposit	Valid	Moderate	**Partial**	Permanent road north of lower reservoir	Partial	Partial loss of value	**Some 0.62 ha (~42%) is within the construction envelope, and 0.46 ha (~31%) is within the disturbance footprint.**
OMPS-FA15		Cultural deposit	Valid	Moderate	**Partial**	Within the EAR	Partial	Partial loss of value	**Some 0.14 ha (~22%) is within the construction envelope, and 0.07 ha (~11%) is within the disturbance footprint.**
OMPS-FA16		**Cultural deposit**	**Valid**	**High**	**Partial**	**Within upper reservoir**	**Partial**	**Partial loss of value**	**Some 0.33 ha (~52%) is within the construction envelope, and 0.31 ha (~48%) is within the disturbance footprint.**
OMPS-OS1	**21-5-0218**	**Cultural deposit**	**Valid**	**Moderate**	**Partial**	**Within the EAR**	**Partial**	**Partial loss of value**	**Some 0.37 ha (~73%) is within the construction envelope, and 0.14 ha (~27%) is within the disturbance footprint.**
OMPS-OS2	**21-5-0219**	**Cultural deposit**	**Valid**	**Moderate**	**Partial**	**Within the EAR**	**Partial**	**Partial loss of value**	**Some 0.33 ha (~65%) is within the construction envelope, and 0.17 ha (~35%) is within the disturbance footprint.**
OMPS-OS3	**21-5-0221**	**Cultural deposit**	**Valid**	**Moderate**	**Partial**	**Within the EAR**	**Partial**	**Partial loss of value**	**Some 0.21 ha (~43%) is within the construction envelope, and 0.29 ha (~57%) is within the disturbance footprint.**
OMPS-BS1	21-5-0178; See note 3	Low density artefact scatter	Valid	Low	**Partial**	Across disturbance footprint	Partial	No loss of value	This site is considered to extend discontinuously and disparately across the entire construction envelope and extend beyond it. Several discrete observations of this site are documented in note 3. Given the prevalence of this site across the region, no loss of value is expected.

Notes: 1. The type, degree and consequence of harm definitions are based on DECCW's Code of Practise for the Archaeological Investigation of Aboriginal objects in NSW.

2. The type, degree and consequence of harm to Aboriginal objects and/or sites is based on the project's design at the time of preparation of the ACHA.

3. OMPS-BS1 incorporates OMPS-IF1 (#21-5-0217), OMPS-IF2– IF35 inclusive, and OMPS24-IF1, OMPS-AS1– AS25 inclusive, OMPS-AS27– AS32 inclusive, OMPS-AS34– AS42 inclusive, OMPS24-AS1– AS4 inclusive, and OMPS-OS4 (#21-5-0220).

4. Cells in green denote additions since the exhibition of the EIS ACHA, cells in orange denote modifications since the exhibition of the EIS ACHA

6.7.3 Updated mitigation measures

A number of the previously proposed mitigation measures have been updated to respond to the submission from Heritage NSW and the Amended Project. These are detailed in Section 9.4 of the revised ACHA provided in Appendix G. The key updates and additional measures include:

- Ensuring the Aboriginal Cultural Heritage Management Plan (ACHMP) includes description and methods of actions to minimise any inadvertent impacts to identified Aboriginal objects and/or sites and areas of archaeological sensitivity outside of the disturbance footprint
- A cultural values mitigation offset package developed in consultation with relevant Elders and key knowledge-holders. This document will explore mitigations for the perceived social and cultural impacts to Georges Junction and associated cultural values of the Macleay River corridor
- Ensuring consultation is maintained with the RAPs during the finalisation of the assessment process and throughout the pre-construction and construction phase of the Project.

The updated mitigation measures are provided in Appendix C.

6.8 Traffic

6.8.1 Overview of Assessment approach

A traffic impact assessment (TIA) was prepared by EMM for the EIS in accordance with the Austroads Guide to Traffic Management Part 12, and the Roads and Maritime Supplements to Austroads.

The TIA included an analysis of the existing background traffic conditions, the Project's likely traffic generation during the construction phase, the adequacy of the local road network to accommodate the Project's predicted traffic volume, and the availability and adequacy of on-site parking for site personnel. This analysis was used to assess the potential impacts associated with construction traffic for the Project including safety and capacity, vehicular (including heavy vehicles) accessibility, and travel routes.

As the construction of the Project will take place over several years, the TIA assessed one worst-case scenario, corresponding to the maximum traffic volumes generated by the Project. The impact of Project-related vehicles on key intersections along the Project's main haulage route were assessed.

SIDRA modelling results showed that the Level of Service (LOS) will remain at B or better for all intersections, except Smith Street/Belgrave Street intersection, Kempsey where the LOS will be E in the PM peak. The poor LOS D and E results were primarily attributed to the existing heavy traffic flow and congestion at this intersection. The traffic generated by the Project was not expected to significantly further impact this intersection.

Austroads design standards for rural roads were met for the majority of road sections along the Project's main haulage route with the exception of some sections in proximity to the Project along Kempsey Armidale Road for which road improvement works were proposed.

An amended TIA has been prepared by EMM and is provided in Appendix H of this report. The amended TIA provides an update of the predicted traffic impacts associated with the Amended Project and also responds to comments raised by Councils and Transport for NSW (TfNSW) on the TIA presented in the EIS.

6.8.2 Assessment of Amended Project

i Amendments affecting the TIA

The amendments with the most potential to affect traffic and transport were the proposed changes to site access, with five site access locations now proposed as shown in Figure 6.10. Traffic volume distribution was assessed in relation to the following:

- establishment of the Western Access Temporary Bridge providing additional site access
- initial mobilisation via Carrai access road providing initial, short-term site access.

To minimise impacts on the Kempsey city centre, the Amended Project requires that all vehicles, including OSOM vehicles, travel via Macleay Valley Way (North) to the Project area.

ii Revised impacts

The impact of Project-related vehicles on key intersections along the Project's main haulage route was assessed. With the updated traffic volumes and reassigned traffic, the revised SIDRA modelling results showed that the LOS would remain at B or better for all intersections.

Austroads design standards for rural roads were met for the majority of road sections along the Project's main haulage route with the exception of some sections in proximity to the Project along the KAR. Improvement works are proposed along these sections. The Proponent has been in discussions with ARC and KSC to establish MoU/HoAs that will outline how the proposed upgrade works required by the Project will be integrated with the proposed works for the Kempsey Armidale Road Recovery Program. The works required for the KAR linked to the Project would be funded by the Project but with Council being the proponent for their approval within their respective LGAs. The HoA with KSC has been signed. The HoA with ARC is still in progress. Given this process, much of the impacts and mitigation require for KAR identified in the EIS will be subject to Council approval and not assessed further for the Amended Project.

As heavy vehicles will be avoiding the Kempsey town centre during construction, potential traffic impacts on existing public transport, cyclist, and pedestrian infrastructure services will be negligible.

There will be no construction heavy vehicle movements during 7:30 am to 9:30 am and 2:30 pm to 4:30 pm in school zones on the sections of KAR and North Street that are used by school bus services. Therefore, the potential traffic impacts on school bus operations would be negligible. However, there will be no haulage traffic restriction during school holidays and trucks will operate 24 hours per day, as necessary.

6.8.3 Updated mitigation measures

Many of the recommendations in the TIA were in relation to KAR. Noting that the Proponent will enter into a separate assessment and approval process with Councils, these recommendations have been synthesised and consolidated for the Amended Project. Key refinements include:

- A driver code of conduct be prepared as part of the Construction Traffic Management Plan (CTMP)
- Temporary and permanent signage be installed to manage safety along the haulage route
- As part of the HoA with Councils, the proponent develop and agree the scope of works required for the KAR and ensure they are designed and staged to allow safe access for heavy vehicles during construction, and are upgraded to a level suitable for OSOM movements prior to OSOM transport. The scope of works are to address key safety risks identified in the Traffic Impact Assessment (TIA)

- That the swept path assessments for the OSOM vehicle identify any road modifications required and are incorporated into the Council works program in accordance with the HoA.

A consolidated list of mitigation measures refining those presented in the EIS is provided in full at Appendix C.

6.9 Noise and vibration

6.9.1 Overview of Assessment aproach

A noise impact assessment was prepared by EMM for the EIS in accordance with the *Interim Construction Noise Guideline* (DECC 2009) and *Noise Policy for Industry* (EPA 2017) (NPfI) and is provided in Appendix T of the EIS.

The Project amendments include allowing blasting as a construction method for the reservoirs and road works. Additionally, up to three fly camps will be established near Smiths Bluff, the intersection of the Main Access Road and the EAR, and the upper reservoir.

A technical letter has been prepared by EMM to assess how the amendments will impact the outcomes of the noise impact assessment (Appendix I of this report).

6.9.2 Assessment of Amended Project

i Construction noise

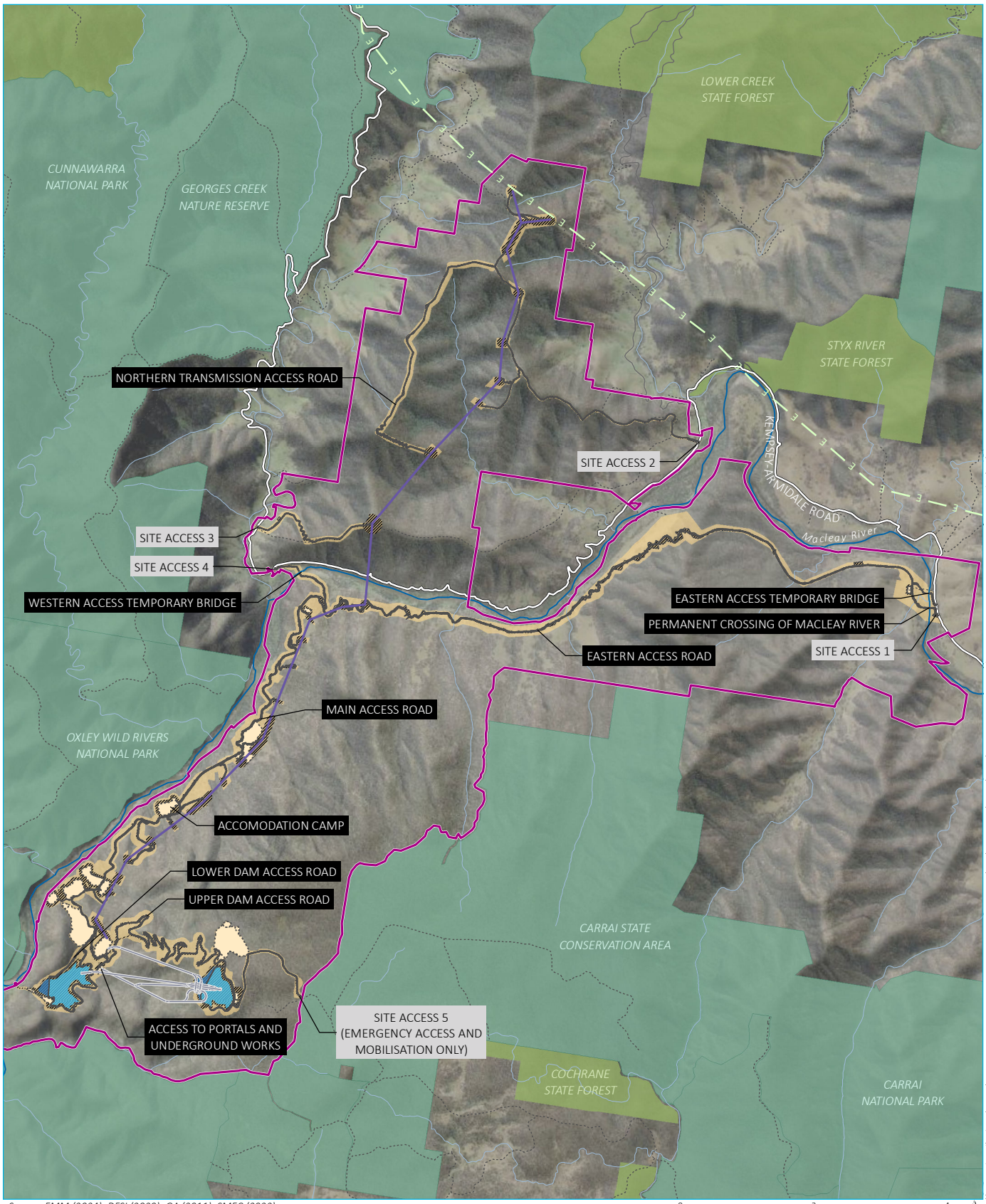
Construction noise levels will meet ICNG NMLs at all locations except R2 and R27, which may experience negligible 2 dB exceedances during out-of-hour work in adverse weather, and potential sleep disturbance exceedances up to 4 dB, both due to their proximity to the northern transmission tower access tracks. These assessment locations are shown in Figure 6.11.

ii Blasting impacts

There are eight assessment locations located within 370 m of the northern transmission access tracks (R2, R25-R28), Eastern Access Road (R40) and the temporary Western Access (R1 and R53), however given their specific locations, blasting for road excavation is unlikely to be required within close proximity to these locations. Therefore, blast impacts on residential receivers are considered highly unlikely. The ANZEC blasting guideline recommends that blasting be conducted during the day period (9:00 am to 5:00 pm Monday to Saturday) to avoid potential impacts during the more sensitive evening and night periods. For the Project, the distance and intervening topography between the proposed blast locations and nearest residences is significant and would provide a high level of air blast attenuation.

Although unlikely, blast practices will be reviewed and modified during the night period if higher air blast levels are generated that cause adverse impacts on residents.

A number of specific areas of significance have been identified in the Aboriginal Cultural Heritage Assessment (EMM 2022) and Historic Heritage Assessment (EMM 2022), such as The Kunderang East Homestead, a stone arrangement, and Long Flat Station, are all located well outside of blast offset zones. Therefore, there will be no impact on these heritage items. Should work methods or locations change, these areas will be reassessed to prevent any potential adverse impacts. Additionally, any newly identified vibration-sensitive items within the blast offset zone will be carefully managed to ensure their protection.



Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022)

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KEY

- Project area
- Disturbance footprint
- Construction envelope
- Tunnels, portals, intakes, shafts
- Power and communications lines
- Transmission overhead lines
- Permanent road
- Surface works
- Reservoir
- Dam wall

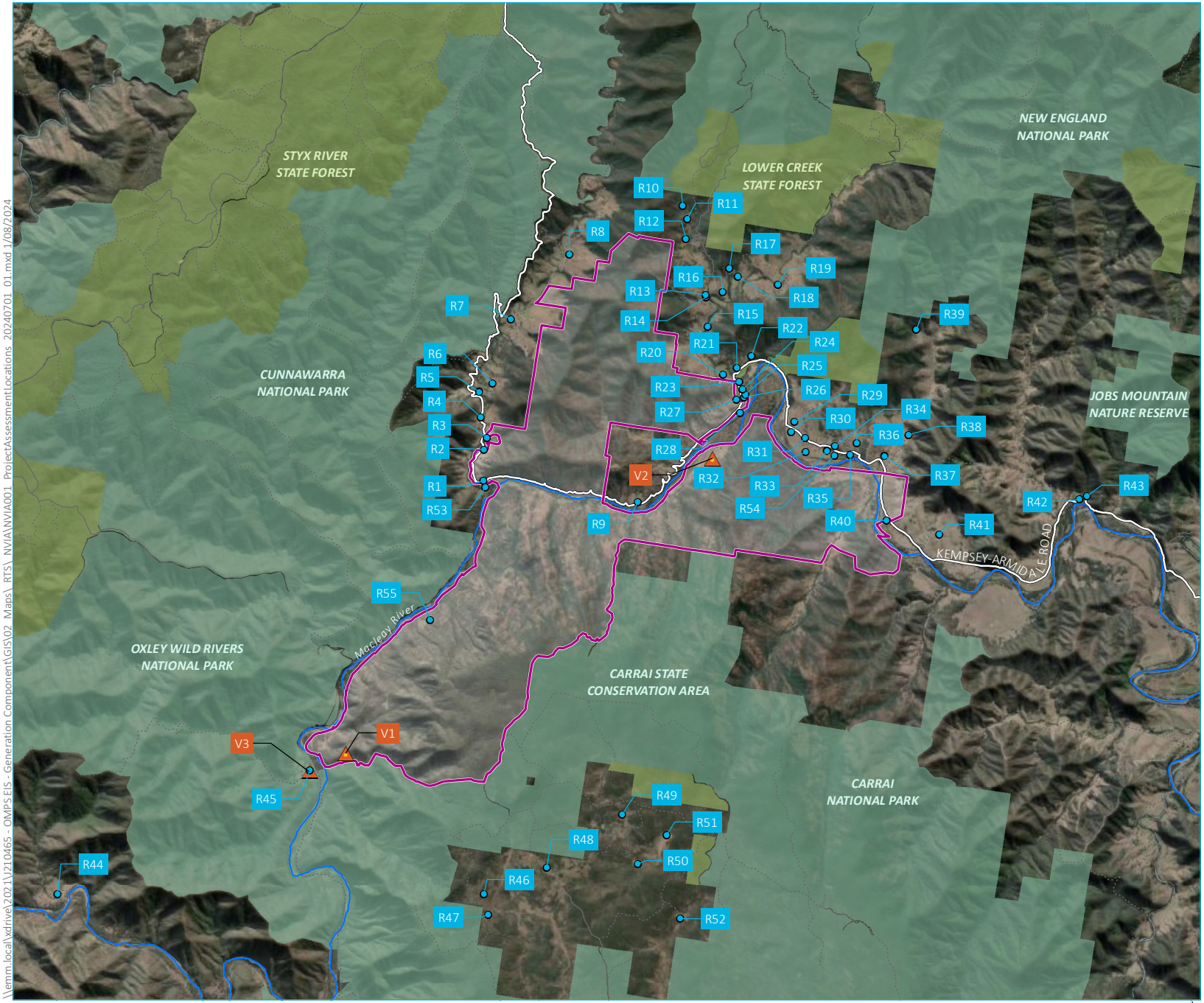
Existing environment

- Macleay River
- Watercourse/drainage line
- Kempsey-Armidale Road
- Minor road
- Vehicular track
- Existing transmission line
- NPWS reserve
- State forest

Site access

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 6.10

EMM creating opportunities



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Source: EMM (2024); DFSI (2020); GA (2011); SMEC (2022); ESRI (2022)

Receptor locations

Oven Mountain Pumped Hydro Energy Storage Project
Amendment Report
OMPS Pty Ltd
Figure 6.11

EMM
creating opportunities

iii Temporary or fly camps

The temporary camps will contribute a sound power level of 117 DB, $L_{Aeq,15minute}$ during Phase 1 mobilisation and access road construction, consistent with levels from the main accommodation camp and site offices. Phase 2, involving the main construction works, typically results in the highest cumulative sound power levels from each construction area. However, since the three temporary camps will be demobilized at the end of Phase 1, they will not contribute to the cumulative sound power level during the peak construction period. Therefore, their impact was not included in the assessment, as it does not represent the worst-case scenario.

iv Road traffic noise

The EIS concluded that although road traffic noise levels will increase during the Project's construction, they will remain below the RNP residential baseline criteria. In areas where current traffic noise levels exceed the RNP base criteria, the predicted noise increase due to Project traffic will be within the acceptable 2 dB RNP allowance. As such, road traffic noise levels are predicted to satisfy the RNP assessment requirements. There is no change to this conclusion for the Amended Project.

6.9.3 Updated mitigation measures

The proposed amendments do not warrant additional mitigation or management measures in relation to noise impacts. Minor refinements have been made to improve the overarching management framework for the Project. A consolidated list of updated mitigation measures is provided at Appendix C.

6.9.4 Conclusion

The noise impact of the amendment will be substantially the same as assessed in the noise impact assessment.

Construction noise levels will meet ICNG NMLs at all locations except R2 and R27, which may experience negligible 2 dB exceedances during out-of-hour work in adverse weather, and potential sleep disturbance exceedances up to 4 dB, both due to their proximity to the northern transmission tower access tracks.

Project operation is predicted to comply with operational noise criteria at all assessment locations.

A draft construction noise management plan has been prepared in accordance with the Interim Construction Noise Guideline (DECC 2009) and will be updated prior to construction.

6.10 Air quality

6.10.1 Overview of Assessment approach

An air quality impact assessment (AQIA) was prepared by EMM for the EIS in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA 2022).

The AQIA assessed one worst-case construction scenario corresponding to peak construction activities at the Project. Emissions of total suspended particulates (TSP), particulate matter less than 10 micrometres (µm) in aerodynamic diameter (PM_{10}) and particulate matter less than 2.5 µm in aerodynamic diameter ($PM_{2.5}$) were estimated and modelled. Ground-level concentrations at assessment locations (e.g. residences) were presented for both the project in isolation (i.e. incremental) and the project plus background (i.e. cumulative). Predicted incremental and cumulative TSP, PM_{10}, $PM_{2.5}$ concentrations and dust deposition levels were below the impact assessment criteria at all assessment locations.

An amended AQIA has been prepared by EMM and is provided in Appendix J of this report. The amended AQIA provides an updated assessment of potential air quality impacts due to the Amended Project.

6.10.2 Assessment of Amended Project

i Amendments affecting air quality

The amendments with the most potential to affect air quality were assessed. These were as follows:

- Realignment of the EAR resulting in an increase in length from approximately 11.4 km as assessed in the EIS, to 12.1 km for the Amended Project.
- Drilling and blasting of the tunnel portals.
- Crushing and screening of materials in the lower and upper reservoirs.
- Increase in the size of the spoil emplacement areas from approximately 14 ha as assessed in the EIS to 33 ha for the Amended Project.

In addition, for the worst-case assessment scenario, the amount of spoil moved decreased by approximately 1.8 Mt/year, CBP materials decreased by approximately 7 t/year, and diesel consumption decreased by approximately 2.4 ML/year.

ii Revised emissions and results

The emissions inventory developed for the AQIA to support the EIS was revised to include the Project changes described above. Estimated TSP, PM_{10} and $PM_{2.5}$ emissions decreased by 23%, 20%, and 16% respectively as a result of the Amended Project.

Dispersion modelling results showed that the predicted incremental and cumulative TSP, PM_{10}, $PM_{2.5}$ concentrations, and dust deposition levels during the Amended Project's construction phase were below the impact assessment criteria at all assessment locations.

Predicted incremental TSP, PM_{10}, $PM_{2.5}$ and dust deposition results at all assessment locations were lower for the Amended Project compared to the EIS. Predicted cumulative results were the same or lower between the two assessments.

6.10.3 Updated mitigation measures

Given the decrease in predicted concentrations, there were no additional mitigation measures recommended as a result of the Amended Project. The mitigation measures described in the EIS and the Amendment Report are considered appropriate in minimising the likelihood of adverse air quality impacts at sensitive locations, and are consolidated in Appendix C.

6.11 Social

6.11.1 Overview of Assessment approach

Social impacts and benefits were presented in a Social Impact Assessment (SIA) in Appendix W of the EIS. The assessment was prepared in accordance with the *Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021). The Project was predicted to have various social impacts and benefits, accruing particularly in the local area but also in more urban areas across the region.

The potential local impacts and benefits identified included impacts related to sense of community and social cohesion during construction (high); impacts associated with a perceived decrease in value of nearby properties (medium); impacts associated with stress and anxiety related to perceived dam break (medium); and benefits related to opportunities for local business (high).

Issues for infrastructure and services included the impact associated with a decline in rental affordability and availability for residents during construction (high); impacts associated with a reduced supply of short-term and emergency accommodation for vulnerable groups during construction (high); and benefits associated with improved access to telecommunications and power stability (very high).

Traffic-related impacts and benefits identified included impacts related to increased public safety risks (high); impacts related to traffic congestion and road delays (medium); benefit related to improved road conditions as a result of the Project (very high).

The potential livelihood impacts and benefits identified included benefits related to local employment and training opportunities during construction (high) and operation (medium); benefits related to regional business procurement opportunities during construction (high) and operation (medium); and benefits related to employment and training pathways for Aboriginal people for construction and operation (high).

The potential water access matters included impacts on perceived water quality, flow and water security for local downstream receivers (medium).

Recreational matters included impacts associated with reduced amenity at recreational areas and facilities during operation (medium); and impacts related to reduced availability of tourist accommodation during construction (high).

Increased pressure for housing and accommodation was identified as a key risk, considering the cumulative construction of a number of other energy projects in the New England REZ and the proposed workforce estimated for the Project. A workforce housing and accommodation strategy is proposed to be developed as part of mitigation measures, detailing how the construction workforce will be housed prior to the completion of the accommodation camp.

6.11.2 Assessment of Amended Project

A SIA Amendment (SIAA) was prepared and is provided in Appendix K of this report. The main approach was the detailed review of the previously identified social impacts and benefits of the Project, to determine how the previous SIA findings are altered by the proposed amendments and updated community feedback.

The SIAA assessed that there were three social impacts and benefits that were materially affected by the proposed amendments and 20 social impacts and benefits that were not likely to be materially affected by the proposed amendments. Materially affected is defined as a relevant and significant change resulting in an assessed change to the significance rating of a social impact or benefit.

The three effects that are materially affected by the amendments relate principally to the addition of fly camps and are:

1. Local housing availability and affordability
2. Availability of short-term and emergency accommodation
3. Community and social cohesion.

These three factors are discussed below.

i Local housing availability and affordability

Given the high levels of housing stress in the regional area, high level of disadvantage in Kempsey LGA, and that demand for housing in Kempsey and Armidale is stretched (below market equilibrium) in addition to demands from the tourism and education sectors, it is expected that the Project may significantly impact on rental affordability and availability, despite the changes proposed in the amendment. The addition of the fly camps reduces the significance of this impact.

The assessment of impacts and benefits associated with the amended Project concludes that the addition of the fly camps reduces the significance of some key social impacts which would otherwise be experienced by the community. Specifically, the amendment reduces the impact on local housing availability and affordability during the construction phase of the project. The unmitigated significance of decline in rental affordability and availability for residents as a result of the Project as is assessed as **high** (which is a reduction from **very high**). The likelihood of potential impact occurring is assessed as being **likely** (which is a change from almost certain) and the magnitude of the impact is assessed as being **moderate** (which is a reduction from **moderate**). The mitigated significance of decline in rental affordability and availability for residents as a result of the Project as is assessed as **medium**. The likelihood of the potential impact occurring is assessed as being **likely** and the magnitude of the impact is assessed as being **moderate.**

ii Availability of short-term and emergency accommodation

The amendment adds an additional capacity for 205 staff in onsite accommodation. The updated analysis shows a potential undersupply of onsite accommodation for 172 Project staff in year 1 (Q2, 2026), prior to the establishment of the main accommodation camp. This influx of people will increase the competition for short-term accommodation in the area, and hence reduce the supply available to vulnerable groups.

It is estimated there are a total of 129 rooms available in Kempsey township and 203 in Armidale city. Prior to the completion of the accommodation camp, the predicted shortfall of accommodation during year 2 of construction is 172 rooms. This leaves an excess of 160 rooms available in Kempsey and Armidale. It is assessed that the current supply of short-term accommodation is sufficient to meet Project requirements.

In addition, a proportion of local workers may choose to source short-term accommodation closer to the site rather than driving to site daily, to reduce fatigue. Considering potential demand from local workers for short term accommodation, and due to the high level of disadvantage in Kempsey LGA and the strong competition for short term accommodation in Armidale LGA, it is expected that the Project will contribute to a reduction in supply which could impact on the ability of vulnerable groups to access this accommodation.

The unmitigated significance of infrastructure and services impacts related to reduced supply of short-term and emergency accommodation for vulnerable groups during construction is assessed as **high** (which is a reduction from **very high**). The likelihood of the impact occurring is **likely** (which is a change from almost certain), and the magnitude of the impact is **major**.

Short term accommodation requirements can be reduced by hiring more local workers. This can be achieved by focussed recruitment strategies and providing training to upskill more local workers.

The mitigated significance of reduced supply of short-term and emergency accommodation for vulnerable groups during construction is assessed as **medium** (which is a reduction from **high**). The likelihood of the impact occurring is **likely**, and the magnitude of the impact is **moderate**.

Due to the relatively small number of operation workers and the expected number of locally hired workers, it is not expected that the supply of short-term and emergency accommodation will be impacted during the operation phase.

iii Community and social cohesion

Population changes often associated with large scale development Projects, which require construction and operations workforces to be accommodated and serviced, can result in a range of social impacts such as changes to the sense of community and social cohesion.

Population change underpins many of the social impacts associated with State significant developments. According to established population change benchmarks developed by Burdge (Burdge, 2015), population change above or below a threshold of 5% may result in impacts on social cohesion due to:

- the limited capacity of the communities to absorb newcomers (i.e. housing availability)
- the loss of social capital and connections
- the ability of a community's physical and social infrastructure to provide required social services.

This benchmark has been referenced in assessing the extent of predicted population change attributable to the Project.

During SIA engagement, multiple community members in the local area described the community as resilient, generous and supportive, and explained how the community can be resourceful in times of crisis. Engagement feedback also indicated strong social cohesion in the Lower Creek and Bellbrook communities. Both communities value their 'isolated', 'quiet', and 'peaceful lifestyle' with residents noting they are a 'tight knit' community that have the same common passion for the land and the environment. Multiple residents noted that "the people feel connected and bonded" through these shared values.

During the 100-year period when the Project is operational, between 30–50 workers will be employed to operate and maintain the scheme. The proposed workforce for the operation phase remains unchanged. The Project will be operated and monitored remotely and maintenance will be periodically required. Several houses may remain at the accommodation camp to house workers as needed. It is assumed that 20% of workers will be locally hired and 80% will move to Kempsey or the local area for the duration of their employment. It is assumed that this population increase would occur over several years. This would result in an increase of 0.3% of the population in Kempsey and the local area.

The EIS SIA assessed impacts on sense of community and social cohesion as a result of the Project during operation as **medium**. After the application of recommended mitigations, the impact was assessed as **medium.** As a result of the SIAA, the unmitigated significance of impacts related to sense of community and social cohesion during operation is now assessed as **low.** The likelihood of the impact occurring is **possible,** and the magnitude of the impact is **minor**.

To reduce the risk of the impact further, it is proposed that the Project encourage operation workers to contribute to the local community through volunteerism or other initiatives.

The mitigated significance of impacts related to sense of community and social cohesion is assessed as **low** (which is a reduction from **medium**)**.** The likelihood of the impact occurring is **possible,** and the magnitude is assessed as **minimal** (which is a reduction from **minor**).

6.11.3 Updated mitigation measures

The mitigation measures presented in the EIS are still relevant to the Amended Project. However, as fly camps have been introduced to reduce impacts on accommodation, and to incorporate stakeholder feedback, the mitigation measures have been refined and updated. This includes measures to be considered in design and in development of the Construction and Environmental Management Plan to accelerate the construction schedule and/or increasing the capacity of the main accommodation camp, extending the operation of fly camps and/or increasing the capacity of fly camps for the four month period where a shortfall of accommodation has been identified.

A consolidated list of mitigation measures refining those presented in the EIS is provided in full at Appendix C.

6.12 Other issues

6.12.1 Visual

i Summary of visual assessment in the EIS

The EIS concluded that the Project is expected to have negligible to moderate landscape character impacts.

Visual impacts during construction are considered temporary with the construction period estimated to be around five years. During this time, the main temporary visual impacts are from traffic and vehicle movements, temporary laydown areas (though these are generally located away from receptors), clearing and earthworks for roads and transmission infrastructure and from construction night lighting. These impacts are most likely to be experienced by receptors closest to construction activity, such as residences near the access roads or transmission line infrastructure.

The Project's design disturbance footprint and placement of infrastructure have evolved, minimising visual and landscape impacts where possible. The reservoirs and operations buildings are expected to be visible only from a limited stretch of the National Trail and Macleay River. The proposed pump facility will also be partly visible from this location as it will be located on the river bank below the lower reservoir.

Although the visual landscape will be altered from its current state for the duration of the operation of the Project, no representative viewpoints or surrounding residences had a high impact rating. East Kunderang Station has no predicted visual impacts. Mary's View has a moderate predicted visual impact from distant views. Both of these sites are located within the Oxley Wild Rivers National Park.

ii Proposed amendments relevant to visual

The only project amendment relevant to visual is the change in height of both the lower and upper PSE areas and the establishment of the WATB. The maximum height of the lower and upper PSE areas has been amended (reduced) to approximately 35m.

iii Potential changes in impacts to those presented in the EIS

As the overall height of the lower and upper PSE areas has been reduced during the redesign, it is considered that the landform will blend well into the natural topography and no additional visual impacts have been identified. If anything, with the reduction in height for both spoil emplacement areas, the visual impact may have been reduced. The WATB is a temporary element in the landscape that will be removed before operation of the Project. This is considered a temporary construction impact and provided rehabilitation measures are appropriately implemented, no change to the landscape character or visual impact of the Project is expected.

iv Proposed changes to mitigation and management measures

No changes to the exhibited mitigation and management measures are proposed.

6.12.2 Hazards and risk

i Summary of hazards assessment in the EIS

a Electromagnetic fields

The EIS concluded that electromagnetic fields (EMF) hazards have been assessed and found to be negligible. After the high voltage (HV) powerline and associated substations have been installed, it is recommended that another EMF survey be conducted for assuring compliance with the applicable health and safety and radio frequency interference requirements.

b Bushfire

The EIS concluded that bushfire risk will be a significant hazard for the Project, however it has been assessed against the specifications and requirements of Planning for Bush Fire Protection 2019 (PBP) and it is determined that the Project is able to comply. A wide variety of mitigation measures will be incorporated in the final design phase and also employed during throughout the construction and operation of the Project to manage bushfire risk.

ii Proposed amendments relevant to hazards

a Electromagnetic fields

The project amendments related to EMF include adjusting the alignment of the 132 kV transmission line to fit within the disturbance footprint of the realigned UDAR. Additionally, the inclusion of three temporary fly camps, specifically the Western and Southern fly camps, being situated near the 132 kV transmission lines.

b Bushfire

Project amendments have been assessed within an Addendum Bush Fire Assessment, provided at Appendix L. Project amendments relevant to bushfire include:

- the addition of three temporary fly camps for early works
- new (temporary) bridge crossings and minor changes to road alignments. This will allow workers to access work sites from the Armidale direction for a short duration, reduce the overall construction timeframe of the Project and provide additional emergency access and egress during construction
- changed main access tunnel (MAT) portal location to align with an amended underground arrangement and sizing of powerhouse cavern and tunnels
- minor change in location for the office building and communication tower.

The other Project design components remain unchanged or are considered to be consistent with the Project exhibited in the EIS, and have not been reassessed within the addendum.

c Other potentially hazardous risks

Additional blasting is likely to be required based on findings of more recent geotechnical investigations. Blasting will still be required for construction of the tunnels and portals, and additionally for the reservoirs and road works.

iii Potential changes in impacts to those presented in the EIS

a Electromagnetic fields

There are no anticipated changes in EMF impacts, as the proposed transmission line easement adheres to EMF reference levels in accordance with applicable health and safety guidelines, ensuring public safety. Additionally, there should be no risk of interference with general electronic equipment outside the easements, as the predicted maximum power-frequency magnetic fields at the boundaries of the 132 kV easements are below the interference immunity limits for general electronic equipment in Australia.

b Bushfire

The addition of three temporary fly camps for early works will increase the number of emergency access points and fire safety protocols required onsite. This change will also accommodate a greater number of workers on site than presented in the EIS during early works. No refuge buildings are currently proposed as part of the indicative layouts for fly camps however are recommended due to the sites isolated location. However, refuge buildings require increased APZs and the Western fly camp and Southern fly camp locations will require expanded footprints or be re-located within the construction envelope to achieve this. The Eastern fly camp can suitably accommodate a refuge building and increased APZ in its current location.

The proposed new WATB will provide an additional evacuation route during construction. An alternative emergency egress road will also be established from the upper dam and reservoir site, to link with existing fire trails in Carrai State Conservation Area to the east. This road will utilise an existing access track and would only be used for alternative emergency egress (i.e. in the case of a bushfire). The road can also be used by NPWS and RFS fire crews to access the Project area for bushfire response or management purposes.

There are no other potential changes in impacts to bushfire.

c Other potentially hazardous risks

Other potentially hazardous risks identified are associated with the transport and storage of dangerous goods, including explosives needed for blasting methods during construction. The Project would obtain a licence for the transport of any dangerous goods in accordance with the *NSW Work Health and Safety Act 2011* and storage would comply with the requirements of AS 2187.1:1998, with appropriate designated storage areas to be located within the disturbance footprint. Therefore, there are no potential changes in impacts to dangerous goods.

iv Proposed changes to mitigation and management measures

The amendments do not warrant additional mitigation or management measures in relation to EMF and dangerous goods impacts. As such, the proposed measures remain unchanged from the EIS and are listed in full in Appendix C. Additional measures have been identified to manage additional bushfire risk related to temporary fly camps, including providing perimeter roads around each of the fly camps to improve access, increased water supply for firefighting, and increasing the available APZs for the fly camps (or re-locating them) during detailed design to ensure appropriate refuge buildings can be included. .

6.12.3 Historical, National and World heritage

i Summary of heritage assessment in the EIS

The EIS included a Statement of Heritage Impact (SOHI) (EMM 2023b) prepared to assess the impacts of the Project on historical heritage values and a World and National Heritage Assessment (HHA) (EMM 2023c) was prepared to specifically assess the impacts of the Project on the Gondwana Rainforests of Australia (GRA).

Potential impacts to historical heritage values were identified, including to built heritage, archaeological resources and cultural landscapes, summarised in Table 6.10. Overall however, impacts to historical cultural values were not predicted to be significant and would be managed through a number of management and mitigation measures.

Table 6.10 Summary of heritage sites and management approach in EIS

Site name	Significance	Impact type	Management or mitigation option
Kunderang East Pastoral Station	State	Visual Setting	Archival recording
Long Flat Station	State (squatting phase) Local (pastoral phase)	Physical	Archaeological test excavation
The National Trail	Local	Avoidance	Avoidance
Squatting runs	Local	Physical	Unexpected finds procedure
Travelling stock camp Crown Reserve No. 1075	Local	Physical	Unexpected finds procedure
TSR No. 1076	Local	Physical	Unexpected finds procedure
Cultural landscape	Local	Various – physical, visual, setting	Archival recording
All other sites, i.e. archaeological sites that were not definitively identified through survey and research, but may exist (such as stock camps).	Local to State	Physical	Unexpected finds procedure

No direct impacts to the GRA would occur as a result of the Project and a series of indirect impacts were assessed, including edge effect on vegetation, disturbance to native animals in adjacent habitat, interruption of animal movement, blasting and construction noise during the construction of the dams and reservoirs impacting on the setting, and alterations to views. The assessment considered the findings of the relevant EIS technical studies, including air quality, noise, visual, water and biodiversity, against the relevant significant impact criterion.

Overall, no significant impact to the World Heritage area and National Listed property and the Project area heritage values was identified.

ii Proposed amendments relevant to historical, National and World heritage

The proposed changes of the Project relevant to historical, National and World heritage include the realignment of the EAR, WATB and subsequent changes to the physical disturbance areas for the Amended Project. The following table summarises the assessment of the Amended Project.

Table 6.11 Summary of heritage sites and management approach for Amended Project

Site name	Significance	Impact type	Management or mitigation option
Kunderang East Pastoral Station	State	Nil. Kunderang East Pastoral Station is outside of the Project area and thus the built heritage elements of Kunderang East Pastoral Station will not be impacted. Visual impact assessment in the EIS showed that Project works will not have any visual impact on Kunderang East Pastoral Station	No-Go Area/Avoidance
Long Flat Station (structures)	Local (pastoral phase)	Nil. The known sites are avoided by the Project layout.	No-Go Area/Avoidance

Site name	Significance	Impact type	Management or mitigation option
Long Flat Station (squatting runs) – aligns with TSR	State (squatting phase)	Physical or indirect. While likely avoided by the Project layout, the exact archaeological resource is not known and as such precautionary approach is required.	Unexpected finds procedure
Towel Creek Station squatting runs	Local	Physical. The Project layout impacts the Towal Creek Station squatting run, considered of low archaeological sensitivity.	Unexpected finds procedure
Travelling Stock Camp [Crown Reserve No. 1075] –	Local	Physical The Project layout impacts the Travelling Stock Camp (unavoidable) and potential for relics is considered low to moderate.	Unexpected finds procedure. Interpretation if relics are found.
TSR No. 1076	Local	Physical The Project layout impacts the TSR (unavoidable), considered of low archaeological sensitivity.	Unexpected finds procedure
The National Trail	Local	Nil. The Project layout avoids impacted the National Trail.	No-Go Area/Avoidance
Cultural landscape	Local	Various – physical, visual, setting	Archival recording
Any other heritage items identified.	Local to State	Physical or indirect. Relics have not been definitively identified in any other location in the Project area, but the potential for their existence is *low* to *moderate*.	Unexpected finds procedure

Any updated impacts of the Amended Project (such as amenity, water and biodiversity) have been considered for any resultant impacts to heritage values, in particular to the GRA. The findings of each of the assessments (see Section 6.2-6.12.1) suggest that all impacts are generally consistent with the EIS, albeit physical disturbance has slightly increased.

It is considered there is no material change to the assessment of impacts in relation to the significant impact criterion, and consistent with the EIS, no significant impact to the World Heritage area and National Listed property and the Project area heritage values are identified.

iii Proposed changes to mitigation and management

Mitigation and management measures remain consistent with those presented in the EIS. However, in response to feedback from NSW Heritage Council, further refinement of the measures has been provided to clarify the specific management measures for each heritage site predicted to be directly or indirectly impacted. These clarifications are provided in Appendix C.

6.12.4 Greenhouse gas

i Summary of greenhouse gas assessment in the EIS

A greenhouse gas assessment (GHGA) was prepared by EMM for the EIS. The GHGA formed part of the air quality and greenhouse gas assessment (AQGHGA) report.

The GHGA included Scope 1, Scope 2, and Scope 3 emissions for the construction and operation of the Project. The estimation of GHG emissions for the Project was based on the Australian National Greenhouse Accounts Factors (NGAF). Annual average total GHG emissions (Scope 1, 2 and 3) generated by the Project's construction represented approximately 0.05% of total GHG emissions for NSW and 0.01% of total GHG emissions for Australia, based on the *National Greenhouse Gas Inventory* for 2020. Annual average total GHG emissions generated by the Project's operation represented approximately 0.01% of total GHG emissions for NSW and 0.003% of total GHG emissions for Australia.

ii Proposed amendments relevant to greenhouse gas

A revised GHGA has been prepared by EMM which addresses issues raised in submissions from NSW EPA as well as changes due to the amended Project. The revised GHGA is summarised in the Submissions Report for the Project. The relevant project changes considered in the revised GHGA are:

- Decrease in fuel consumption during construction.
- Increased area of vegetation cleared during construction.
- Increase in net electricity consumption (i.e. electricity purchased from the grid minus electricity supplied to the grid) during operation.

In addition to the above, as new information was available for the GHGA for the Amended Project, the following emission sources were added:

- Embodied emissions from aggregate, cement, and steel used in the construction of the project.
- Emissions from burning of vegetation during construction.
- Fuel use (for emergency) during operations.

Given the changes described above, a direct comparison of the GHG emissions estimated for the EIS and for the Amended Project cannot be made.

The revised GHG emissions estimates are summarised as follows:

<u>Construction (2025 to 2029)</u>

- Total Scope 1 and 2 emissions: 179,406 t CO_2-e. It is noted that as there are no Scope 2 emissions as electricity is not consumed during construction.
- Total Scope 3 emissions: 62,802 t CO_2-e.

<u>Operation (2030 to 2050)</u>

- Total Scope 1 and 2 emissions: 307,051 t CO_2-e.
- Total Scope 3 emissions: 1.402 t CO_2-e.

iii Proposed changes to mitigation and management

All mitigation measures remain as presented in the EIS. However, additional considerations based on feedback from stakeholders and the revised GHGA are included for the Amended Project, such as measures to improve re-use, minimise haul distances, sourcing low carbon alternatives and on-site renewables. The updated measures are included in Appendix C.

6.13 Updated mitigation measures

The EIS identified the proposed approach to environmental management and the mitigation measures that would be adopted to avoid or reduce the potential impacts of the Project. These measures were compiled in Appendix E of the EIS.

Following public exhibition of the EIS and after consideration of the issues raised in the submissions, revisions to the mitigation measures included in the EIS have been identified (as described throughout this Section 6). Mitigation measures have been revised in order to provide further guidance on the overarching environmental management approach, further minimise environmental impacts, and meet the expectations and requirements of stakeholders. The full list of mitigation measures including all revised environmental mitigation measures is provided in Appendix C.

7 Justification of amended project

This chapter provides an update to the evaluation in Chapter 7 of the EIS. It draws from that chapter, being updated where applicable to the design changes that have occurred since then. In addition, further information to the evaluation is provided on the basis of the submissions received.

7.1 Project objective and need

The Project's objective is to provide vitally needed long duration electricity storage capabilities, ensuring a reliable, resilient, and renewable future energy supply for NSW. It is anticipated the Project will play a critical role in ensuring the stability of the future electricity network, complementing other local renewable energy sources such as solar and wind. This objective and need are supported by the Project's designation as CSSI by the NSW Minister for Planning and Public Spaces.

7.1.1 Supporting the clean energy transition

Changes to the NSW and Australian electricity system and market have rapidly created a need for large scale pumped hydro energy storage projects such as the Project. As with many electricity markets around the world, the NEM is undergoing a paradigm transformation that has been brought about by significant shifts in energy efficiency, rapidly decreasing costs of wind and solar generation, coal-fired power station retirements, increasing coal and gas costs, Australia's participation in global commitments to reduce carbon emissions, consumer choice, and more recently strategic energy security.

Over recent years, as noted in the EIS, the pace of energy transition has pushed the upper bounds of modelled expectations (AEMO 2024), with costs of utility-scale renewable generation continuing to fall and coal closures brought forward. The 2024 Integrated System Plan (ISP) was released as a finalised document by AEMO in June 2024. The transition is in progress and the report notes that it the biggest transformation of the NEM since the NEM was formed 25 years ago. The transition includes the shift from coal to renewables as well as a tripling of capacity to meet future demand. The report identifies pumped hydro as one of the generation and storage technologies that are on an optimal development path. The technology is mature, and they represent a consistent energy source (as opposed to wind and solar which are variable).

While wind and solar generators provide energy during model conditions, the challenge for these sources is they are dependent on weather conditions, and during periods when wind and/or solar is not available or when market conditions are particularly challenging, they may not operate. Pumped hydro energy storage projects help build power system resilience to unfavourable weather and market events by storing surplus renewable generation for use at times when these resources are scarce and allowing more constant operation of less flexible existing generation. This, in turn, creates a more dispatchable and reliable power system, while helping to keep prices down for consumers including by maximising use of existing, low-cost, thermal generation assets.

A large pumped hydro energy storage system such as the Project (with a capacity of 7.2 GWh and capable of delivering approximately 2,500 GWh of annual generation) can provide significant energy storage capable of delivering large-scale generation within minutes at times when variable renewable energy (VRE) such as wind and solar power is not operating. During these times the Project will be capable of meeting the needs of approximately 600,000 to 900,000 NSW households. Studies have shown that the Project is also an enabler of renewable energy being able to support up to 1.6 GW of additional inverter based renewable generation through the provision of grid system strength capabilities.

7.1.2 Consistency with strategic context

The development of the Project is consistent with several Commonwealth and NSW strategic planning and policy objectives. At the Commonwealth level, it is consistent with the *Paris Agreement*, the CC Act, LRET and the 2024 ISP. At the State level, it is consistent with the Electricity Strategy, the Electricity Roadmap, the *NSW Energy Security Target*, the *NSW Climate Change Policy Framework*, the *Net Zero Plan Stage 1 2020–2030*, and the *Pumped Hydro Roadmap*. The Project will directly support objectives of the NSW *Electricity Infrastructure Investment Act 2020*.

In recognition of the need to manage the transition and future energy mix in the NEM, the Project was declared CSSI by the NSW Minister for Planning (now Minister for Planning and Public Spaces) under the NSW EP&A Act in September 2020. As CSSI, it is recognised that the Project is considered essential for the State for economic, environmental and social reasons. It was declared as critical for the energy security and reliability needs of NSW.

On 25 May 2023, the NSW Government announced it had commissioned a team from Marsden Jacob Associates (MJA) to undertake an Electricity Supply and Reliability Check Up. The Check Up was an exercise to identify any additional steps that NSW needs to take to deliver the Electricity Infrastructure Roadmap to ensure a reliable supply of clean, affordable energy. It was necessary given global competition for investment has intensified, supply chain constraints and skills shortages have become more acute, and some regulatory, planning and community issues have become apparent.

On 4 August 2023, MJA submitted the Check Up report to the NSW Government. The report sets out findings across three themes and makes 54 recommendations to the NSW Government.

The Electricity Supply and Reliability Check Up (Office of Energy and Climate Change, September 2023) is the NSW Government response and it notes that progress in the pumped hydro space has been slower than had been anticipated. It also notes that more may need to occur to maintain the focus on execution of these projects.

The Project is within the New England REZ which is expected to be a source of significant energy production as NSW's energy mix shifts to be more reliant on renewable energy technologies. The Project supports the site selection (its proximity to existing electrical infrastructure and the compatibility of its existing land uses with renewable energy production) and energy generation objectives of the REZ.

The proponent has reviewed the pumped hydro energy storage potential of the Project area considering key development attributes including natural terrain, capacity, grid connection, water access, community as well as planning and environmental constraints. The Project area provides optimal conditions for the development of an off river pumped hydro energy storage project and associated infrastructure. As part of Project development, avoidance and minimisation measures have been incorporated (further discussed below in Section 7.4.1).

7.1.3 Key benefits

The key benefits of the Project are summarised as follows:

- It would make a significant contribution to the continued decarbonisation of the economy.
- It provides large-scale energy storages at least cost to allow more flexibility to respond to seasonal variability when compared to other VRE generators and batteries.
- It will improve the overall efficiency and stability of the NEM by absorbing and storing excess energy from the system at times of excess generation (through pumping) and generate at the critical times of peak demand.
- Provide essential grid services to support system stability and security.

- Being a closed loop, off river system, the Project can move water between reservoirs and not rely on natural inflows that may vary seasonally, offering valuable seasonal storage and insurance against drought risk.
- As a 900 MW plant, it will have the capability to run for up to 8 hours continuously before it needs to be 'recharged'.
- It will contribute social and economic benefits to the nearby communities, including employment and business investment opportunities to locals.
- It has a 100 year design life and will operate for generations to come.

The Project would result in benefits distributed to the wholesale electricity market, retailers, and consumers. The scale and centralised location of the Project in the NEM, particularly the newly created New England REZ, enables the system stability, energy reliability and firming capability benefits to be enjoyed by all segments of the NEM.

The results of consultation indicate that the Project has strong support from the community given the economic opportunities it will create for the region, how it will improve the reliability of a transitioning renewable electricity network, help generate lower energy prices and increase and expand sources of reliable, renewable energy to reduce reliance on fossil fuels which will have an overall benefit to the environment.

An economic report commissioned to assess the potential benefits of the Project to the REZ and NEM more generally indicated that in 2030–31 a 900 MW project would:

- Reduce demand-weighted wholesale electricity prices by $7–9/MWh in NSW and $4–5/MWh in the other mainland regions. This amounts to approximately a $1 billion reduction in total mainland customer retail bills.
- Result in $50–70 million savings in fuel costs NEM wide.
- Reduce CO_2-e emissions by 400,000 t in 2030/2031 based on the ISP Step-Change scenario (EY 2022).

7.2 Design development

7.2.1 Design principles

Consistent with the principles of ecologically sustainable development (ESD), the Project has been designed to avoid and minimise impacts where possible. These principles were implemented through an iterative design and assessment approach (known as DIAA), supported by consultation with numerous technical specialists and government agencies with the objective to identify and avoid sensitive locations, to minimise the construction footprint and maintain as much of the existing natural environment as is reasonable and feasible.

Throughout the design process, the objective was to identify and avoid sensitive locations where possible, to minimise the disturbance footprint and maintain as much of the existing natural environment as is reasonable and feasible. In the first instance this included environmental conditions and consideration of site suitability based on design and construction needs and existing infrastructure (such as road access). The dam type selection was also based on sourcing the majority of materials required for construction from site (such as aggregate) rather than importing materials.

Since the exhibition of the EIS, further constructability assessment and preliminary designs prepared by the Project's engineering and design consultants including AECOM, Lombardi, SMEC, Beca, Praxis and Local Government Engineering Services have been undertaken. This has resulted in several changes to the Project which are the subject of assessment in this Amendment Report. These changes include many that will reduce impacts including:

- removal of a section of the north-south aligning UDAR which reduces impacts to Brush-tailed Rock-Wallaby habitat
- amendment of design to the spoil emplacement area to increase set-backs around the Bush-pea thereby reducing impacts to this plant species
- introduction of a temporary bridges at the eastern and western end of the EAR, and temporary use of the Carrai Road to reduce construction time.

7.2.2 Design challenges

The challenges for the design team included the need to develop solutions that balance the need to protect the environmental values of the Project area with the need for developing a functional pumped hydro system and a safe working environment for the construction phase, including the safe movement of plant, equipment, materials and personnel across the site.

The EIS was based on a concept design provided by experienced engineers in designing pumped hydro systems, transmission lines and access roads. The design was undertaken to a level that suitably informed the creation of a feasible disturbance footprint.

The design has since been further refined on the basis of progressed engineering and so the disturbance footprint is greater (as this includes optimised design elements such as spoil emplacement and temporary bridges), but the construction envelope is smaller. This is because there is a higher degree of confidence as design progresses which removes the need for large scale flexibility in the construction envelope.

During detailed design, it is expected that the precise location of the disturbance footprint may move within the broader construction envelope and consequently there will be some further refinements to the disturbance footprint. The construction envelope is the maximum extent within which the disturbance area corridor can move to allow the final siting of infrastructure through the detailed design process.

Construction sites and access roads make use of existing cleared and disturbed areas to the maximum extent possible which has contributed to the ability to avoid and minimise impacts. The design principles also provide for the rehabilitation of disturbed areas.

As stated above, as a result of this process, the design of the Amended Project has been informed and refined by the results of field surveys and consultation with key stakeholders. On this basis, a number of potential significant impacts on biodiversity, cultural and historic heritage, recreation and land use, for example, have been minimised and/or avoided.

7.2.3 Preferred design

Informed by extensive studies since the 1990s, design analysis identified the Project area as the preferred site location for a pumped hydro energy storage development capable of delivering large-scale generation output. Several design arrangements were considered for the scheme, including reservoir locations, reservoir arrangements, dam types, and cycle time, as well as options and alternatives for other design elements such as (but not limited to) intakes, spillway and powerhouse.

The preferred design forms the basis of this Project and has been selected over other proposed development options considered as it:

- has the highest economically feasible hydrological head of any site assessed, thereby minimising reservoir sizes, waterway diameters (tunnelling extent), and scheme water requirements
- has the shortest horizontal distance between the two reservoirs, therefore reducing the amount of tunnelling required (and therefore reducing cost, increasing capacity factor and increasing operational efficiency and responsiveness)
- ensures the hydro generation infrastructure and reservoirs are situated within private property
- allows for further optimisation of power output and energy storage using the same lower dam and reservoir location (e.g. a 900 MW and at least an 8 hour cycle time).

Further design and optimisation will need to be performed by a detailed design and construction contractor and informed by ongoing and future consultation for the Project. The design process will continue to utilise the same process approach to minimise environmental impacts where possible.

7.3 Engagement

The proponent has a proactive, adaptive and transparent stakeholder engagement strategy for the Project which aims to meet the needs of a diverse range of stakeholders who have different levels of involvement in the Project and a wide range of interests. A wide range of tools and established communication channels continue to be used to support engagement with the Project such as a dedicate website, 1800 number and email address, regular newsletters and SMS notifications.

Feedback from the local community, local industry groups and special interest groups on the Project is mainly positive, particularly as a result of the many benefits and positive flow-on effects available. Notwithstanding this, concerns have been raised by the community regarding the potential impacts of the Project on local roads, particularly the Kempsey Armidale Road, impacts on nearby Aboriginal cultural heritage sites such as the Carrai waterholes, impacts on historic heritage items such as East Kunderang Homestead, social and amenity impacts, and concerns regarding the transparency of communications with the community.

In response to community feedback, the Project investigated and developed an alternate access road on the southern side of the Macleay River, referred to as the EAR, which could potentially be considered for further developed as a public road in the future if the need arises. Further, a suite of mitigation measures has been identified to help minimise potential social impacts, such as the use of fly camps to reduce pressure on local townships for accommodation primarily during early stages of construction. Feedback from Aboriginal representatives has also been incorporated into the recommendations of the ACHA for the management of Aboriginal heritage sites and places. The Project team have liaised with landowners on different design and access options and continue to work with government authorities to deliver the best outcome for the region.

Engagement with government agencies during the EIS, Submissions Report and Amendment Report development has been and continues to be a priority for the Project. Primary matters raised during these engagement sessions reflected matters raised by the community such as the need to include potential impacts to local water quality during construction, potential impacts on reservoir water quality from the excavated material placement, impacts on native and threatened species, and traffic impacts across the Project.

The proposed approach to community engagement, if the Project is approved, is to focus on providing engagement activities and communication materials that provide up to date Project information to those likely to be affected during construction and also allow the community to communicate concerns with the Project. A stakeholder engagement framework has been developed for the Project that provides a structure for the management of stakeholder relations and communication related to the Project. The proposed engagement approach is tailored to each stakeholder group, is flexible and will be reviewed regularly following engagement activities.

7.4 Biophysical, social and economic considerations

Potential impacts of the Project have been comprehensively assessed in Chapter 6 of the EIS and in this Amendment Report which includes supporting technical studies. This section provides a summary of the key predicted impacts from the Project as amended.

7.4.1 Avoidance and minimisation

A key focus of Project design has been to avoid and minimise impacts identified during field surveys, preliminary assessment and throughout consultation. Implementation of the DIAA process to optimise the design resulted in some significant environmental improvements and outcomes. This includes the following:

- Siting of the proposed access roads, powerline routes and ancillary infrastructure primarily in areas of non-native- and highly modified vegetation, where possible. This includes use of cleared areas and existing access tracks where possible to avoid impacts to biodiversity and heritage, namely the emergency egress road from the upper dam and reservoir to a fire trail utilises existing tracks and utilising a portion of an existing transmission easement in the southern portion of the Project area.

- On site excavated material to be re-used on site an emplaced within the disturbance footprint to reduce traffic volumes on the external road network.

- Changes to the disturbance footprint to specifically avoid and minimise impacts to threatened flora and fauna species, namely:

    - The spoil emplacement at the upper reservoir and the emergency access road was reduced and modified to avoid direct impacts to all individuals and microhabitat recorded within the construction envelope for *Pultenaea rubescens*.

    - Relocation of the communications tower and site office at the upper reservoir to avoid impacts to four Cryptic Forest Twiner plants that were recorded in the construction envelope, avoiding direct impacts to all individuals recorded within the construction envelope.

    - Siting of transmission line towers were located to avoid approximately 98 *Grevillea guthrieana* plants along the transmission line. Clearance for the transmission line was also altered to avoid direct impacts to approximately 13 Scrub Turpentine plants, avoiding direct impacts to all individuals recorded within the construction envelope.

    - The disturbance footprint was moved outside of the floodplain area where Wandering Peppercress was recorded to occur or identified as having habitat that supports this species where possible. This design modification will result in the retention of over 1,500 plants with just two of the 1,577 plants recorded (0.12% of the population) impacted by the Project.

- Redesign of the access road proposed to connect the lower and upper reservoir, the objective was to avoid as much as possible impacts to cliff lines, rocky escapements, and features to support refuge areas for Brush-tailed Rock-wallabies. While this could not be completely avoided due to the large area of suitable habitat that separates the two reservoirs, impacts to this habitat (particularly refuge habitat) was reduced as much as possible to incorporate the road design.

- Modification to Project design to avoid and minimise impacts to heritage, namely:
  - Re-design of the access track and EAR to ensure avoidance of the curtilage of the axe production site (AHIMS #21-5-0142).
  - Discontinuation of the permanent bridge crossing of the Macleay River at Georges Junction proposed by the initial design location, following identification of cultural sites.
  - Minor changes to the disturbance footprint, notably along the access track and EAR, to avoid many of the identified sites, such as OMPS-FA7.
  - Removal of one of two initial options, including a design change to the preferred alignment, for the EAR joining the Kempsey Armidale Road following the identification of the Lower Creek/Long Flat Station (OMPS-CS5) in this general location.

- By amending the site access to go via the EAR, the Project removed the need for the Georges Junction permanent access (based on the original proposed location) and avoided impacts to recreational uses (Georges Junction campground and fishing) as well as potential heritage and biodiversity impacts (discussed above). The development of the EAR also enabled the Project to divert construction traffic from a problematic portion of Kempsey Armidale Road that would otherwise need significant road upgrades. The addition of a temporary bridge near this area was placed at 600 m distance to the north east, deliberately to avoid these areas of heritage interest.

- The disturbance footprint for Main Access Road does not intersect the National Trail (a historic and recreational trail) and access to the trail will be maintained at all times.

Where impacts could not be fully avoided, they have been minimised where possible. Unavoidable impacts are further discussed in the following sections.

7.4.2 Local impacts

Construction of the Project would result in the direct disturbance of up to 367 ha of land to enable its construction. Indirect impacts outside of this disturbance footprint are also likely to occur due to mobilisation of soil and water, changes in amenity (noise), and influx and movement of workers and construction traffic.

The key direct and indirect potential impacts to the local area during construction are summarised in Table 7.1.

Table 7.1 Summary of Project impacts

Assessment matter	Summary of Project impacts
Terrestrial ecology	The Project will involve clearing and inundation of land and will therefore result in loss of native vegetation of varying condition in affected areas. The Project will result in the loss of 362.8 ha of native vegetation and threatened species habitat and loss of 9.7 ha of threatened ecological communities. Indirect impacts include edge effects, disturbance to native animals in adjacent habitat, interruption of animal movement, vehicle strike and impacts to water quality during construction. A Biodiversity Management Plan will be prepared to mitigate and manage direct and indirect impacts to biodiversity during construction and operation. OMPS will compensate for these residual impacts through the implementation of a biodiversity offset strategy. The extent of GDEs and water table drawdown have been assessed, and given the flow in the respective adjacent watercourse is likely to be sustained by rainfall runoff and releases from the upper reservoir during construction and operation, facultative/opportunistic GDEs are at low risk of potential impacts.
Aquatic ecology	Potential impacts to aquatic ecology include impacts to key fish habitat, riparian and aquatic habitat and fish passage, in particular as a result of minor short-term decreases in surface water volume and flow within sections of the Macleay River and associated tributaries as a due to reservoir construction and one off filling. Habitat for threatened species is generally limited within assessed waterways and significant impacts to threatened species (Southern Purple-spotted Gudgeon and the Manning River Helmeted Turtle) are concluded unlikely to occur. Significant indirect impacts to aquatic ecology are concluded to be unlikely with the implementation of mitigation measures. Aquatic ecosystems have been assessed as non-dependent on groundwater and are assessed as low risk for Project induced impacts. It is anticipated that impacts to stygofauna communities will be low as only a small area of stygofauna habitat is predicted to be affected by drawdown, and species of stygofauna have not been identified during site investigations to date.
Aboriginal heritage	Additional consultation, survey and test excavation has been completed for the Amended Project which has allowed refinement of potential impacts and management of Aboriginal heritage of the Amended Project. The updated assessment identifies the presence of some 22 discrete identified sites, 19 areas of cultural deposits and a discontinuous and distribution of surface and shallowly buried stone artefacts (OMPS-BS1 [#21-5-0178]. Of these, 12 sites and 18 areas of cultural deposits are entirely or partially within the construction envelope. Another 13 sites (when including the additional findings from Section 5.2 of the ACHA addendum) are considered to have formed through natural processes and are considered non-cultural. . Consistent with the EIS, an Aboriginal Cultural Heritage Management Plan will be prepared to guide the process for management and mitigation of impacts to Aboriginal objects, with additional mitigation identified such as the need for a cultural values mitigation offset package and ensuring consultation with RAPs is maintained during finalisation of the assessment process, prior and during construction.
Historic heritage	The Project will result in some loss of significance of the existing cultural landscape, which consists of cleared fields, river crossings, fences and archaeological sites. While areas of high potential for archaeological relics have been avoided, there is potential for the Project to impact archaeological resources associated with Long Flat Station, as the full extent of buildings associated with the site is currently unknown, as well as sections of the travelling stock camp on Crown Reserve No. 1075. Overall, the historic heritage assessment determined the Project poses a low impact to the heritage significant of the Project area. An Historic Heritage Management Plan will guide mitigation and management, including identifying areas where further archaeological excavation may be required to inform these measures.
Water	Local effects on water resources will occur as a result of the Project, primarily related to water quality (erosion and water discharges during construction), and changes in streamflow when extracting water from the Macleay River for the initial one-off fill of the reservoirs and for construction and operation. However, extraction of water for the Project is not expected to impact the availability or security of water to downstream users. Any geomorphological impacts are expected to be restricted to Fingerboard Crossing Creek however potential impacts are limited by the creek's natural resistance to change. A negligible long-term impact on sediment transport processes is anticipated within the Macleay River. While groundwater drawdown has been predicted to extend locally, groundwater receptors (including the Carrai Waterholes and water supply bores) are not predicted to be impacted during construction or operation of the Project. The risk to GDEs is considered low noting that the drawdown predictions are worst case based on conservative hydraulic conductivity values in the model and un unmitigated tunnel construction methods. Leach testing indicates that the spoil samples are likely to be relatively unreactive and are unlikely to impact downstream groundwater quality.

Assessment matter	Summary of Project impacts
Land	Impacts to soils and land within the Project area is limited to the disturbance footprint with the implementation of erosion and sediment controls and other standard measures. Degradation or loss of soil and land resources will have a subsequent minor reduction on agricultural capability and productivity, with a permanent loss of some 280 ha needed for operational infrastructure. The agricultural viability of soils in the Project area was found to be limited. Potential land use conflicts have been considered and after mitigation those residual high-risk conflicts are all associated with Project-related construction risks (i.e. traffic-related safety and fire). They remain high risk due to the severity of consequence of these risks occurring, rather than the likelihood of them occurring. To address government agency concerns, revised designs for permanent spoil emplacement has been provided as part of the Project amendments. These designs provide for improved conceptual landforms that are sympathetic to the natural terrain and reduces erosion risks compared to the EIS design. A rehabilitation strategy has been prepared and identifies the final land use domains proposed for end of Project life, with these domains commensurate with the surrounding native vegetation and land uses.
Transport	Transport impacts are associated with an increase of construction traffic on the local road network, which at the peak of construction, would be about 213 daily vehicle trips. The volume of traffic would ramp up and down either side of this peak. The Austroads design standards are met for the majority of the roads along the haulage route. Road sections that have not met Austroads design standards are predominantly near the Project area where it is recommended to implement traffic control measures or road widening treatments, identified with consideration of the Project Road Safety Audit findings and recommendations. Some external road upgrades are required to sections of Kempsey Armidale Road to accommodate construction traffic access and these requirements are being progressed separately through a HoA with local councils who will manage the assessment and approval of those works.
Amenity	The key amenity impacts of the Project relate to changes to the landscape and visual impacts associated with the introduction of new infrastructure into the landscape, as well as noise impacts. Landscape and visual impacts are considered to be negligible to low with exception of one LCZ (Upper slopes) and two viewpoints (Mary's View, Carrai NP; and Georges Junction Campground) which are conservatively predicted to experience moderate impacts. Mitigation was not incorporated into the assessment however is identified as an opportunity during detailed design if required. Some minor exceedances of construction noise levels under noise-enhancing weather conditions and sleep disturbance were predicted at two residential receptors, attributed to temporary construction traffic. Mitigation measures to reduce levels as close to NMLs as possible have been identified.
Air	During construction, emissions will be generated from fugitive and combustion sources. Predicted cumulative concentrations and deposition rates for incremental TSP, PM_{10}, $PM_{2.5}$ and dust deposition during the Project's construction phase are below the applicable impact assessment criteria at all assessment locations. Standard management measures will be adopted to manage air quality emissions. The estimated GHG emissions for the construction phase of the Project are an average of 48,441 t of carbon dioxide equivalents (CO_2-e) per year and an average of 14,621 t of CO_2-e per year during operations. The emission saving for the Project associated with avoiding peak gas-fired generation was determined and includes around 780 kt CO_2-e/y in 2030 to around 805 kt CO_2-e/y in 2035 and beyond.
National heritage	The Project area is located partly adjacent to a portion of the curtilage of the World Heritage List (WHL) and National Heritage List (NHL) GRA. It encompasses, amongst other areas, part of the OWRNP. No part of the Project area is in the GRA or a national park. Activities undertaken in accordance with the Project would be restricted to the construction envelope, and as such no direct impacts to the GRA would occur as a result of the Project. Potential indirect impacts have been considered and it is concluded that overall the Project will not have a significant impact on the GRA.
Hazards	Bushfire risk will be a significant hazard for the Project and will be managed by implementing bushfire protection measures in accordance with the requirements of *Planning for Bush Fire Protection* (RFS 2019). Flooding by the Macleay River presents a risk which cannot be fully avoided, however the positioning of the Project elements predominantly above the 0.01% AEP flood level minimises the risk of harmful impacts. The potential for impacts to personnel to arise as a result of direct exposure to electric and magnetic fields has been assessed and found to be negligible.

Assessment matter	Summary of Project impacts
Social	The communities of the local area will most likely experience some direct social impacts associated with the Project due to its remoteness and existing lack of resources and services. Such social impacts are generally confined to construction and include those related to community cohesion, amenity (i.e. dust, noise, and visual amenity), traffic, demands on social infrastructure and services, housing and accommodation, employment, business and industry opportunities, and community health and wellbeing. Some of these potential impacts are short-term and there are long-term benefits to the local community, as a result of increased visitation and recreation, increased employment and expenditure on local goods and services, improved access to telecommunications and improved road conditions (due to upgrades).
Economic	There will be minor negative agricultural and economic impacts during the construction phase, such as an increase in competition for labour and other resources resulting in wage and price rises and shortages of supply to other sectors. OMPS proposes to work in partnership with the Armidale Regional and Kempsey Shire councils and the local community so that, as far as possible, the benefits of the projected economic growth in the region are maximised and impacts minimised wherever possible.
Waste	Waste streams to be generated by the Project have been identified and quantified. The Project will use the general hierarchy of waste minimisation principles such as reduce, reuse and recycle to minimise the quantity of waste that must be disposed off-site. This is maximised through reuse of excavated material in dam construction and emplacement and rehabilitation of residual material on site, and the reuse and recycling of cleared vegetation where possible.
Cumulative impacts	The remoteness of the site and distance from other major projects limits the potential for many direct and indirect cumulative impacts. While there are no identified developments within about 25 km of the Project site, the key matters that may be materially affected by cumulative impacts are changes to traffic, social and economic conditions. This includes consideration of cumulative construction workforce, operational workforce demand, employment benefits, population changes during construction, housing and short-term accommodation pressure, and social infrastructure.

Once post-construction rehabilitation is complete, there will be a residual operational footprint of 280 ha. While this does result in a permanent loss of some of the site's natural value, the operation of the Project is more likely to result in net positive impacts associated with the Project's long-term social and economic benefits, and conservation outcomes achieved through implementation of the biodiversity offset strategy. During operation, traffic generation and noise and air quality emissions would be minimal. Ongoing impacts requiring monitoring relate to the operating regime of the Project and the extraction and discharge of water, and the interaction of this regime with the biodiversity and groundwater environments.

7.4.3 Broader region

Some of the Project's predicted impacts are expected to be experienced at a regional level rather than on a local or site by site basis. These include economic, social and transport impacts that would have a broad area of influence.

The Project will deliver substantial economic benefits to the local region, NSW and NEM states, with key drivers being the direct investment to establish the Project, wage expenditure, reduced ongoing electricity fuel costs, and reduced electricity costs. At 900 MW, it will provide a significant opportunity for NSW to meet its legislated obligation under the EII(A) of 2GW of long-duration storage by 2030. The average annual impacts of the Project on the regional economic during construction is estimated at up to $248 million in annual direct and indirect output, $44 million in annual direct and indirect household income and generate up to 647 direct and indirect jobs over the construction period. The greatest effect will be experienced by the NSW economy with $535 million annual direct and indirect output, $147 million in annual direct and indirect household income and generate up to 1,653 direct and indirect jobs. As previously stated, a market benefits study indicated that in 2030/31 a 900 MW Project would reduce demand-weighted wholesale electricity prices by $7–9/MWh in NSW and $4–5/MWh in the other mainland regions. This amounts to approximately a $1 billion reduction in total mainland customer retail bills, and represents a significant step in decoupling NEM wholesale power prices from volatile internationally

traded energy commodities. It would also result in $50–70 million savings in fuel costs across the NEM and a reduction in carbon intensity by 400,000 t $CO_{2(e)}$ in 2030/2031 based on the ISP Step-Change scenario (EY 2022), primarily due to offsetting peaking gas fired generation.

The key social impacts relate to economic benefits, but also some potential negative impacts associated with housing affordability and increased demand for access to community services and infrastructure. The construction phase will see an influx of over 600 workers to the region. Baseline analysis of Kempsey Shire and Armidale Regional LGAs revealed an existing lack of available rental housing as well as high levels of housing stress in the regional area, which would be exacerbated with increased demand placed on accommodation by the Project, prior to the on-site accommodation camp being completed. It is also expected that tourist accommodation will be utilised by the Project and while this continues to provide income for tourist accommodation providers, it limits the accommodation available for other recreational users, tourists, and visitors to the region. This demand and potential impact to housing and tourist accommodation however is greatly reduced through the establishment of temporary or fly camps before the main accommodation camp is completed and investigating further opportunities to accommodate the workforce onsite.

Construction activities are expected to have some minor impacts on users of the Kempsey Armidale Road. Due to the current conditions of the Kempsey Armidale Road, upgrades of the road will need to take place for the road to be suitable for Project construction access, particularly for heavy vehicles, which may temporarily cause traffic congestion and delays for the local and regional community. However, this upgrade will benefit the community by reducing travel times, improving access to services and employment.

Other social benefits to be realised during operation include improved access for emergencies, improved communications generally, and for emergency services, static water source for fire fighting purposes and ongoing local employment.

7.4.4 Long-term benefits

As discussed in previous sections, once operational, the Project will provide numerous benefits to the local community, the NEM and NSW energy consumers. The Project will provide broad-scale environmental benefits through its long-term provision of low emission electricity and by physically firming and financially supporting VRE generation coming online.

The Project will also provide numerous long-term benefits to the local region particularly Kempsey and Armidale which are likely to be the main service centres to the Project. The Project development has identified several opportunities to provide a legacy of environmental, social and economic benefits through the comprehensive environmental impact assessment process and extensive community consultation. Some of the key long-term benefits that will be provided by the Project to the local region include the creation of employment, training and development opportunities, improved infrastructure and access, contributions to scientific research and understanding, provision of biodiversity offsets and creating economic growth in the region.

The rehabilitation of the temporary construction areas will be undertaken to ensure relevant site values are maintained. In the long-term improved access infrastructure along the Project main transport route will provide permanent access infrastructure assets to the community. The additional scientific research that has been completed for the Project will constitute a positive contribution to knowledge about the environmental values of the local area, particularly given its proximity to national parks, conservation areas and nature reserves. This includes significant ecological findings (e.g. identification of *Pultenaea rubescens,* larger population of the endangered Brush-tailed Rock Wallaby and mapping of a large number of Wandering Peppercress), additional investigations into the geology and hydrogeology of the local area, and increased evidence of Aboriginal and historical occupation of the local area.

While the Project would result in some intergenerational/cumulative loss to cultural materials, it is considered that there would be numerous cultural heritage benefits. These include the long-term preservation of substantive cultural material that would be either inaccessible and/or managed from future harm, a greater understanding of the past and contemporary values in the region, and opportunities for heritage interpretation and both Aboriginal and public outreach.

The Project will provide economic opportunities for the local region. It will provide opportunities for sub-contracting jobs and training associated with the Project construction and would provide economic growth to the local region. Community consultation has shown that the community is highly supportive and expects that the Project will provide lasting benefits for the region. There is also community recognition of the economic benefit that the Project has generated with work undertaken as part of the EIS.

The proponent will provide biodiversity offsets for the Project impacts to native vegetation, ecological communities and threatened species. The offsets will ensure biodiversity values of the local area are maintained by protecting, in perpetuity, a much larger area and number of species than what will be impacted.

7.4.5 Ecologically sustainable development

The principles of ESD are set out in Schedule 2 of the EP&A Regulation and in clause 3A of the EPBC Act. The Project has taken into account these ESD principles as summarised in Table 7.2.

Table 7.2 Evaluation of the Project against ESD principles

Principle	Evaluation of Project impacts against principle
Precautionary principle/ decision-making processes	A level of scientific certainty has been achieved through detailed research and field studies to establish a good understanding of the existing environment and incorporating avoidance measures. To allow for limitations in the assessments and adopting a precautionary approach, the EIS has been prepared with technical methodologies supporting a conservative approach to impact assessment. This includes assessing worst-case impacts and scenarios, such as noise-enhancing weather conditions in noise modelling, assessing threatened species for SAII impacts, and assuming presence of species where they could not reliably be discounted through survey (such as due to safety reasons) and incorporating this into the offset calculations for the Project. The Project has been designed to avoid environmental impacts where practicable, and mitigation measures are proposed to mitigate and manage the impacts where unavoidable. Any Project-related decisions would be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment and assessment of the risk-weighted consequences of various options.
Inter-generational equity	Future generations would benefit from the improved reliability of the NEM and a successful transition to a low carbon future. The Project responds to the challenges facing the NEM and the future consumer to provide a large scale, reliable, renewable energy supply. The Project and associated improvements to external infrastructure, such as roads and telecommunications, will provide local and regional community benefits. The EIS has identified the potential environmental impacts that may occur and appropriate protection, mitigation and/or management has been identified to ensure the health, diversity and productivity of the environment would be maintained into the future.
Conservation of biological diversity and ecological integrity	Detailed biodiversity assessments have been completed for the EIS and have informed iterations of the design and disturbance footprint to avoid and minimise impacts. The final land use domains identified as part of the Rehabilitation Strategy also supports a return of the land to native ecosystem at the end of the Project's life. The BDAR and Aquatic Impact Assessment were prepared in accordance with relevant legislation and have assessed the significance of effect on any threatened species, endangered communities, or their habitat. Any significant residual impacts on biodiversity would be offset to ensure the long-term conservation and integrity of like-for-like ecosystems.

Principle	Evaluation of Project impacts against principle
Improved valuation, pricing and incentive mechanisms	An Environment Protection Licence will be obtained for the Project for scheduled ancillary activities during construction and operation. The long-term Project benefits are considered to outweigh the Project impacts, with economic advantages expected during construction of the Project as well as during operation from increased energy reliability and supply to the NEM, and reduced consumer bills. The Project has been designed to avoid and minimise adverse environmental impacts where possible through a DIAA process. Any Project-related decisions have and will continue to consider environmental factors in a cost-effective way and be guided by the whole of life costs of providing goods and services.

7.5 Submissions and community views on the project

The EIS was publicly exhibited from the 19 September 2023 to 20 October 2023. Following the public exhibition period, 90 submissions were received by DPHI. Of these, 62 submissions were from the community (consisting of unique submissions), 11 from organisations, and 17 from government agencies.

Of the community submissions received, 17 submissions (i.e. 27%) were in support, 41 submissions were in objection and 4 submissions provided comments. In addition, of the submissions from organisations, two supported the project, seven objected to the project and two provided comments.

Themes raised in these submissions related to:

- Level of engagement and consultation with the indigenous communities.
- Potential impact on Aboriginal artefacts.
- Potential impacts on aquatic ecosystems and downstream water users.
- Water licensing and conditions of pumping within the Macleay Gorge water source area.
- Potential cumulative impact of vegetation loss.
- Justification of the project, particularly with regard to consideration of alternative sites and other long term storage methods (such as batteries).
- The Project's design and operation, including key concerns such as:
    - Access to site and road upgrades, specifically to the Kempsey Armidale Road. Many individuals raised comments for heavy vehicle traffic, safety concerns and Council rate increases as key concerns.
    - Flow and pumping rules for water take from the Macleay River, in particular with consideration of drought conditions.
    - Insufficient level of geotechnical information to inform design of a project of this scale.
- Impacts of the Project, including (but not limited to) impacts to environmentally sensitive areas, biodiversity, Aboriginal cultural heritage, landscape values and disturbance of contaminated land.
- Technical approach and modelling presented in the EIS, such as surface water modelling and climate change considerations, adequacy of the Aboriginal Cultural Heritage Assessment field investigations, and deferred management of impacts.
- Insufficient and/or inadequate level of engagement carried out by the Proponent with the community.

7.6 Approvals, environmental management and performance

The EIS was prepared to meet the requirements of the form and content specified in the EP&A Regulation, the SEARs, and guided by the *State significant infrastructure guidelines – preparing an environmental impact statement* (DPHI 2024). Supporting technical studies have been completed in accordance with the applicable technical requirements and guidelines and informed by consultation with relevant government agencies and other stakeholders.

The technical studies completed have been prepared on the basis of a construction footprint and preliminary design, noting that further advancement to a detailed design will occur. Where key uncertainties have been identified by technical studies or within the EIS, measures and actions have been recommended to provide further certainty prior to any construction impacts occurring. This includes completion of further Aboriginal heritage test excavations to satisfy any gaps in knowledge of the existing environment that may be impacted.

It is also noted that the Project relies on upgrades to external linear infrastructure for it to be constructed and operated as proposed. This includes:

- external road works to be implemented on sections of the Kempsey Armidale Road
- upgrade to Line 965.

These works will be subject to separate approval processes under the EP&A Act. These approval processes, and undertaking of the upgrades, would be undertaken by third parties.

Two main approvals are required for the Project: an approval under the CSSI provisions of the EP&A Act from the NSW Minister for Planning, and an approval under the EPBC Act from the Commonwealth Minister for the Environment.

Should the approvals be granted for the Project, a number of secondary approvals or licences would be required to be obtained. In the most part, these approvals would be required to be granted in accordance with the conditions of the approvals granted under the EP&A and EPBC Acts. This includes the preparation and approval of a suite of environmental management plans to guide the responsible construction and operation of the Project.

The mitigation measures proposed for the Amended Project are consolidated in Appendix C. It is anticipated that these measures would be consolidated to operate within an environmental management framework for the Project, and include:

- Construction Environment Management Plan (CEMP) and associated sub plans to manage impacts of the Project throughout the construction phase.
- Operation Environment Management Plans (OEMPs) and associated sub plans to manage impacts during operation and maintenance, including emergency management and response plans.
- Monitoring programs, including surface and groundwater, terrestrial and aquatic ecology, throughout the life of the Project.

7.7 Evaluation and conclusion

The Project will provide an additional 900 MW of dispatchable generating capacity, will be capable of delivering approximately 2,500 GWh annually[2] of long duration energy storage available to the NEM, and capable of meeting the needs of approximately 600,000 to 900,000 NSW households.

[2] Based on one pump-generation cycle per day, less an allowance for maintenance.

It will provide more flexibility for the NEM to respond to daily and seasonal variability when compared to other VRE and batteries. Most importantly, the Project will make a significant contribution to the continued decarbonisation of the economy.

Stakeholder engagement indicates that the Project has strong support from the community. Consultation to date identifies the public's expectation that the Project will contribute to reliability in the electricity network, lower energy prices, increasing and expanding sources of reliable renewable energy and minimising reliance on fossil fuels, minimising environmental impacts, increased drought-proofing and providing economic benefits to local communities.

The development of the Project is consistent with, and strongly aligns with Commonwealth and NSW strategic planning and policy objectives, including the *Paris Agreement*, LRET and the 2024 ISP, the Electricity Strategy, the Electricity Infrastructure Roadmap, the *Electricity Infrastructure Investment Act 2020*, the *NSW Energy Security Target*, the *NSW Climate Change Policy Framework*, the *Net Zero Plan Stage 1 2020–2030*, and the *Pumped Hydro Roadmap*. The Project will directly support objectives of the NSW *Electricity Infrastructure Investment Act 2020*.

The Project was declared CSSI by the NSW Minister for Planning under the NSW EP&A Act in September 2020. Projects can only be declared to be CSSI if they are of a category that, in the opinion of the Minister, is essential for the State for economic, environmental or social reasons. The declaration signifies the critical role that the Project will play in providing reliable energy and largescale long-duration storage to NSW as it transitions to a low emissions economy.

The Project has been designed to avoid and minimise impacts where possible in accordance with the principles of ESD. These principles were implemented through an iterative design approach (known as DIAA), supported by consultation with relevant technical advisors and government agencies. Throughout the design process, the objective was to identify and avoid sensitive locations, to minimise the construction footprint and maintain as much of the existing natural environment as is reasonable and feasible.

Most impacts from construction are localised and temporary and will generally be experienced for the duration of the approximately five-year construction period. These impacts will be managed through the implementation of appropriate environmental controls which will be documented in management plans and publicly reported against for consent and licensing purposes. However, some impacts will be permanent with the introduction of infrastructure into the site to operate the pumped hydro system and to transmit the power to the transmission network. These permanent impacts will predominantly be changes to the existing natural landscape and its setting, affecting biodiversity and Aboriginal heritage of the disturbed area. Biodiversity impacts will be offset to provide for long-term improvements and conservation outcomes for the local area.

The Project will deliver substantial economic benefits to the local region, NSW and NEM states, with key drivers being the direct investment to establish the Project, wage expenditure, reduced ongoing electricity fuel costs, and reduced electricity costs to consumers. A significant short-term effect will be experienced by the NSW economy during construction with economic modelling predicted $535 million annual direct and indirect output. The local economies of the Armidale Regional and Kempsey Shire LGAs will also benefit from the Project, with $44 million in annual direct and indirect household income. The proponent will continue to consult and engage with the stakeholders as the Project progresses through the assessment phase, and if approved, through the construction phase. The proponent will continue to engage with government agencies and to refine mitigation measures where required. The proposed approach to community engagement is to focus on providing engagement activities and communication materials that provide up to date Project information to those likely to be affected during construction and also allows the community to communicate with the Project should concerns arise.

There is a critical need to develop large-scale, renewable energy Projects to respond to the accelerated energy transition of the NEM. A do-nothing option would mean to forego the benefits of the Project and not satisfy this critical need. Through the implementation of proposed mitigation, management and offsetting measures, the EIS and this Amendment Report demonstrates that the Project could be undertaken without any significant long-term impacts on the local environment. As such, the Project is considered to be in the public interest.

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