Oven Mountain Pumped Hydro Energy Storage

Aboriginal cultural heritage assessment addendum

Prepared for Alinta Energy

August 2024

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E230869C Amendment Report - Aboriginal Cultural Heritage Assessment

August 2024

Version	Date	Prepared by	Reviewed by	Comments
V1	19 July 2024	Mikhaila Chaplin, Georgia Burnett	Alan Williams	Draft
V2	2 August 2024	Georgia Burnett	Alan Williams	Final Draft

Approved by

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2 August 2024

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Content warning

Aboriginal and Torres Strait Islander peoples are advised that the following report contains reference to, and images of, people who have died.

Acknowledgement of Country

EMM Consulting Pty acknowledges the Thunggutti, Dhungutti and Anaiwan traditional owners on whose land various parts of the Project are situated. We pay our respects to Elders past, present and emerging.

Executive Summary

ES1 Background and purpose

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.

The Project has been declared by the NSW Government to be critical State significant infrastructure (CSSI) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Infrastructure projects are declared to be CSSI if, in the opinion of the NSW Minister for Planning, they are essential to the State for economic, environmental, or social reasons. An Environmental Impact Statement (EIS) has been prepared to support the development application required for the project (SSI-12422997). An Aboriginal Cultural Heritage Assessment Report (hereafter EIS ACHA) was prepared as part of the EIS and provided an assessment of the potential Aboriginal heritage impacts associated with the Project. The EIS was placed on public exhibition from 19 September 2023 until 20 October 2023.

This report represents an addendum to the EIS ACHA to:

- provide information on additional field survey and test excavation undertaken following submission of the EIS to further supplement and refine the existing archaeological models and identified cultural assemblage
- provide information on additional field survey investigations undertaken for a series of proposed changes and amendments to the project since submission of the EIS
- provide clarifications and additional information to answer comments made by Heritage NSW during the public exhibition of the EIS documentation.

ES2 Aboriginal consultation

Additional information is provided in relation to missing documentation and activities that occurred between the EIS submission and present. We also provide additional information on the recovery and temporary curation of cultural materials impeding the assessment process in mid-2022, and which remain on Country.

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 registered Aboriginal parties. 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.

Since the finalisation of the EIS ACHA and the exhibition of the EIS, consultation has extended a further ~80 interactions between March 2024 and July 2024, and included a further 15 days of on-Country activity. When incorporating the EIS ACHA process, this amounts to over 280 interactions with Aboriginal individuals and/or organisations on the project since September 2021, and over 300 person days of on-Country participation.

Aboriginal feedback for the addendum report has focussed on fieldwork participation and who speaks for Country. There is significant disagreement within the local Aboriginal community on who should be involved in cultural heritage activities, and inclusion of Dhungutti and Anaiwan traditional owners previously omitted during the EIS has seen strong complaint from some Thunggutti participants. This has extended to the quantum of involvement in the field program. There have been some concerns over impacts to the cultural landscape with the site being situated within a highly ceremonial (male) region, although, with the exception of an artefact scatter (#21-5-0142) at Georges Junction, no specific places or locales have been identified within the Project area. In the case of #21-5-0142, this has only recently been identified as having gender specific (male) restrictions despite being documented in the EIS ACHA.

ES3 Summary of findings and an updated archaeological resource

The EIS ACHAR identified some 44 discrete identified sites and places, fifteen cultural deposits of substantive buried stone artefacts, and a discontinuous and complex distribution of surface and shallowly buried stone artefacts distributed across the Project area.

Additional desktop and field investigations have been undertaken, and which resulted in:

- the identification of previously undocumented culturally modified trees (OMPS24-ST1 -ST4 inclusive), and a stone arrangement (OMPS24-SA1)
- the identification of four further areas of high density buried stone artefacts, or areas of foci (OMPS-OS1 situated on transect 26, OMPS-OS2 situated on transect 27, OMPS-OS3 situated on transect 29, and OMPS-FA16 situated on test pit UR8)
- the de-classification of several previously documented Aboriginal sites that, through further desktop analysis and/or specialist investigations, have indicated that they are unlikely to be of anthropogenic and/or cultural origin
- some modification to Aboriginal site values due to changes and refinements of the Project area and construction envelope since the EIS ACHA.

When incorporating these activities, a revised cultural assemblage within the Project area can be developed. This now 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.

Overall, when considering the entire cultural assemblage, some 8 sites are identified as of high significance, 33 of moderate significance and 1 of low significance. When considering only the construction envelope, these values can be modified to 2 high, 28 moderate, and 1 of low significance. This compares closely with the EIS ACHA that identified 15 of high value, 44 of moderate value and 1 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.

While not within the Project area, as per the EIS ACHA, a number of cultural and archaeological sites are within the general environment of the Project, including OMPS-CS4, #21-5-0023, OMPS-AS1, and OMPS-AS36.

ES4 Potential impacts

The Project would consist of the establishment of new infrastructure, including off-river upper and lower water storage dams and reservoirs, transmission connection works and ancillary activities, tunnels, pumping stations, spillways, substation, access roads and tracks, quarries and temporary accommodation. These activities would impact cultural materials found generally on or near the current land surface, wherever they intersect the Project.

Of the 12 discrete Aboriginal sites within the construction envelope, 7 are within the disturbance footprint and would be adversely affected. This includes two stone arrangements, five culturally modified trees, and an artefact scatter. Of these, one is considered of high significance, OMPS-SA1 (#21-5-0207). Of the 18 cultural deposits identified, 15 are within the disturbance footprint, with 2 partially in the construction envelope and 1 outside of the construction envelope. The majority of these would only be partially affected by the Project, with ~46% of the deposits (totalling ~6.58 ha) within the disturbance footprint. Importantly, the highly significant OMPS-FA7 would be unaffected. The background scatter (OMPS-BS1 [#21-5-0178]) that extends intermittently across the Project area would also be adversely affected.

Four Aboriginal sites located just outside the Project area are also considered. Of these, two may be subject to indirect impacts from view-lines, and/or water level fluctuations - George's Creek Camp (OMPS-CS4 [#21-5-0215]) and/or George's Creek (#21-5-0023), respectively. In both cases, it is considered that the impacts would be negligible and result in no loss of value.

This is compared with 19 sites and 5.74 ha of cultural deposit proposed for direct and/or indirect impacts previously outlined in the EIS ACHA.

The potential impacts would result in some cumulative impacts to the regional cultural assemblage, notably in the loss of OMPS-FA16, which appears a rare cultural deposit on the top of the Carrai Plateau. As such, cumulative impacts are proposed to be offset through suitable mitigation and recovery of key sites and places where they are adversely impacted.

ES5 Mitigation measures

Updated post-approval requirements and mitigation measures are proposed for inclusion in the Project approval to offset potential and cumulative impacts and guide post-approval requirements for the protection and management of Aboriginal heritage.

These include:

- the development of an Aboriginal Cultural Heritage Management Plan (ACHMP) to provide a framework for such activities, as well as direction on its content and required archaeological mitigation requirements (further explored in Annexure E)
- the development of a cultural values mitigation offset package given the potential indirect impacts to intangible values in the vicinity of Georges Creek Junction
- the application of a Cultural Flow Management Plan to further explore and manage hydrological regimes downstream in relation to documented Aboriginal sites and contemporary activities along the broader Macleay River.
- the development of an Interpretation Strategy and Plan to provide acknowledgement and other visual/educational opportunities for the Aboriginal and broader local community.

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1 Introduction

1.1 Background and purpose of the report

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 (Figure 1.1 and Figure 1.2). 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 waterway connecting them via a hydro-electric power station. The Project will utilise the highly favourable natural terrain of the site to allow electrical energy from the main grid to be stored by pumping water from the lower reservoir to the upper reservoir. Energy can then be generated when needed by allowing water to flow back down to the lower dam and reservoir via the hydro-electric power station, effectively enabling the Project to act as a large battery.

The Project has been declared by the New South Wales (NSW) Government to be critical State significant infrastructure (CSSI) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). An Environmental Impact Statement (EIS) has been prepared to support the development application required for the project (SSI-12422997). An Aboriginal Cultural Heritage Assessment Report (hereafter EIS ACHA) was prepared as part of the EIS (Appendix K to the EIS [EMM Consulting Pty Ltd, 2023a]) and provided an assessment of the potential Aboriginal heritage impacts associated with the Project. The EIS was placed on public exhibition from 19 September 2023 until 20 October 2023.

Amendments and refinements to the design have been made since public exhibition of the EIS. This was done in response to feedback from stakeholders and to accommodate further development of the concept design, which aimed to optimise operation and minimise environmental impacts during construction where possible. This report assesses these changes in design in addition to responding to stakeholder feedback, and is a technical supplement to the Amendment Report.

This report represents an addendum to the EIS ACHA to:

- provide information on additional field survey and test excavation undertaken following submission of the EIS to further supplement and refine the existing archaeological models and identified cultural assemblage
- provide information on additional field survey investigations undertaken for a series of proposed changes and amendments to the project since submission of the EIS (Section 1.2)
- provide clarifications and additional information to answer comments made by Heritage NSW during the public exhibition of the EIS documentation (Annexure A). Heritage NSW acknowledged the amount of works undertaken, but sought further information on clarification of some of the Aboriginal consultation that extended across multiple years, any additional field survey and test excavation (portions of which were ongoing at the time of the EIS submission), further consideration of tentatively identified cultural materials, and additional information on avoidance and post-approval management of cultural materials.

This report has been prepared to supplement the EIS ACHA and to document information, context and further interpretation made as a result of the above tasks. This report should be considered to supplement, and not replace, the EIS ACHA, with information presented typically adding to previous archaeological and cultural data. However, Sections 5–8 have included some refinements or amendments to data and content of the EIS ACHA as a result of additional areas being investigated and further cultural materials being encountered. Typically, such changes from the EIS ACHA can be discerned through the use of the term 'updated' in the section headings. In the case of Heritage NSW comments, a summary is presented in Table 1.1, as well as where they are addressed in this report.

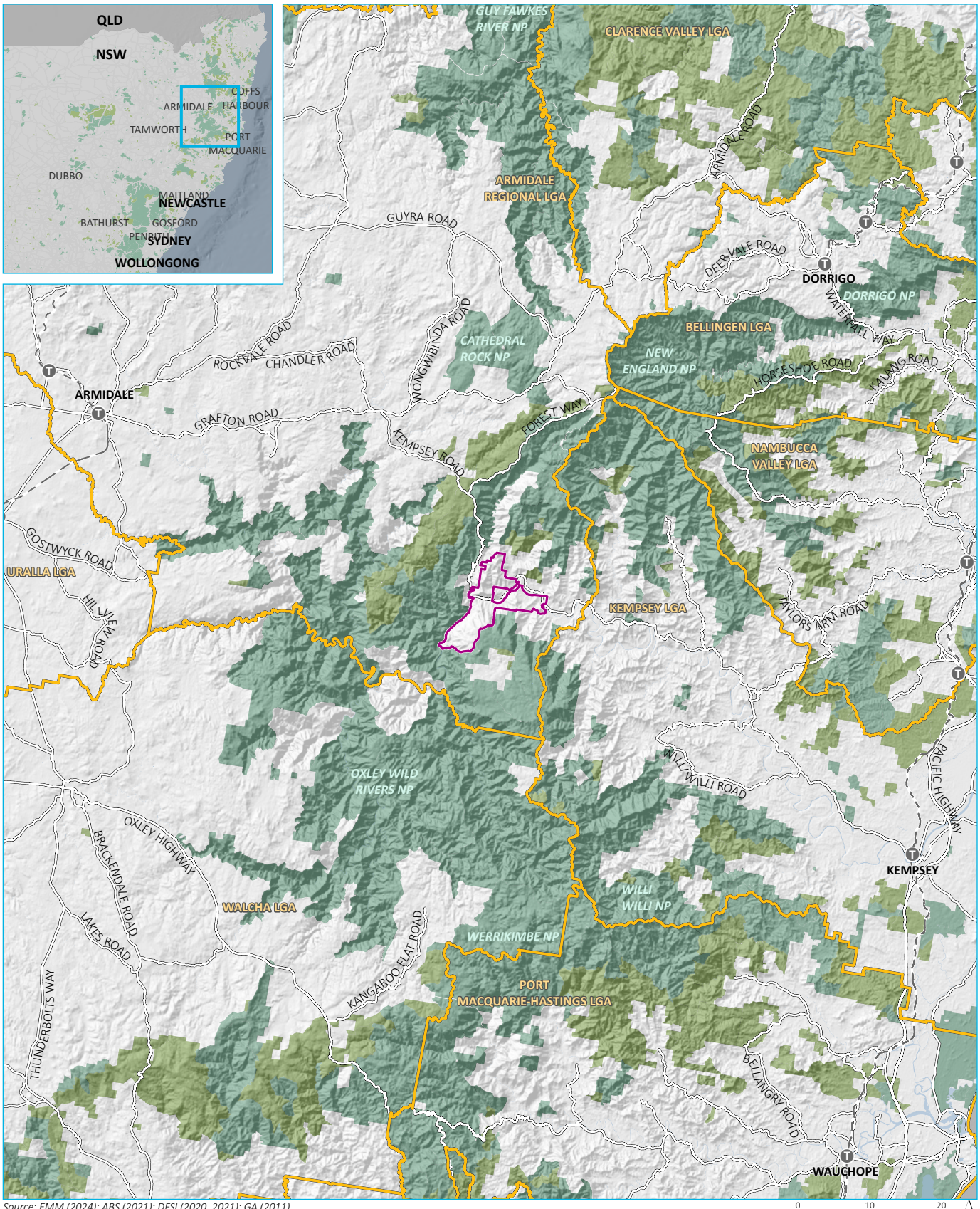
Table 1.1 Response to Heritage NSW comments on ACHA (DOC)

Item #	Heritage NSW comment	Section where addressed
1a	Please provide evidence of provision of both versions of the draft assessment methodologies (as dated November 2021 and February 2022) to all 19 Registered Aboriginal Parties.	Section 2 and Annexure B.1
1b	Please provide evidence that the draft ACHAR was provided to all Registered Aboriginal Parties (such as an email with all relevant email addresses shown).	Section 2 and Annexure B.1
2	Please provide a summary of any consultation that has been undertaken since December 2022, noting that under our guidelines, breaks in consultation of over six months may not constitute continuous consultation.	Section 2 and Annexure B.3
3	The ACHAR references the completion of cultural values mapping, however it is understood that the report is subject to finalisation. Heritage NSW require that a copy of Appendix D be provided for review, noting that if gender restrictions are specified in the cultural values mapping, an assessments officer of the appropriate gender only will review the report. Additional clarifications may be sought once the cultural values mapping report has been provided.	Section 3
4	The ACHAR recommends that the ACHMP should include provisions for ongoing consultation to discuss any potential indirect or visual impacts of the proposal on the areas of identified cultural value, being Kunderang East Station (OMPS-CS3), Lower Creek/Long Flat Station (OMPS-CS5) and George's Creek Camp (OMPSCS4). Heritage NSW recommends that these meetings and discussions occur prior to project approval, to provide accurate information on the nature of any such impacts.	Section 3
5	Lower Creek/Long Flat Station is recognised as having Aboriginal cultural value and potential but is identified as being subject to indirect impact only. However, the consideration of historical heritage provided in Chapter 6.5 of the EIS identifies that the project may directly impact archaeological resources related to Long Flat Station. Please clarify the potential for these archaeological resources to have Aboriginal cultural value and provide information on how impacts to these deposits will be managed with reference to Aboriginal cultural heritage.	Section 3
6	The Registered Aboriginal Parties have identified significant concerns regarding the importance of maintaining cultural flows within the Macleay River, both more generally and in relation to specific sites/places of cultural value. The ACHAR proposes that this will be further considered as part of water licensing processes. Please clarify why this cannot occur as part of the current assessment process.	Section 3
7	The ACHAR notes the presence of a 'significant part of the cultural landscape biographies of the Aboriginal women connected to Kunderang', being a travel route between the Georges Creek Camp and Kunderang Station. Please confirm how the potential impacts of the proposal on this portion of the cultural landscape have been considered.	Section 3
8	The ACHAR identifies that an escarpment is present within the project area but was not surveyed due to safety concerns. Please clarify whether this escarpment is within the construction envelope and, if so, whether there is potential to undertake survey of this area with a team with the appropriate level of physical fitness.	Section 5

Item #	Heritage NSW comment	Section where addressed
9	Please confirm that the survey transects shown in Figure 7.1 represent pedestrian survey. If these transects reflect a mix of pedestrian and vehicle survey, please adjust the figure to distinguish each of these survey methods.	Section 4
10	The mapping of survey effort shows an unsurveyed area on the construction envelope to the north-east of the intersection with Waterloo Creek. Given that the adjoining surveyed areas contain a relatively high distribution of artefact scatters/isolated artefacts, please confirm if there is an intention to survey this area, potentially in association with the finalisation of test excavations.	Section 5
11	The ACHAR does not include mapping of specific landforms within the project area. The mapping and definition of landforms across the project area is critical given that the acknowledged association between landform and the distribution of archaeological sites and deposits. To comply with Requirement 2 of the Code of Practice, please provide landform mapping using standard classifications, preferably referencing landform units as defined in the 'Landform' chapter of the Australian Soil and Land Survey Field Handbook (3rd edition).	Section 4
12	The ACHAR identifies that some planned test pits were 'discounted' on the basis that there were situated in areas considered to have low archaeological potential. In presenting the test excavation results, please provide clear explanation for the final distribution of test pits with reference to considerations of archaeological potential.	Section 5
13	It is understood that approximately 25% of the planned test excavation program could not be completed due to weather and access conditions. Heritage NSW strongly supports the recommendation in the ACHAR that the remainder of test excavation be completed prior to project approval in order to inform final consideration of harm to Aboriginal objects. This is particularly applicable to the eastern portion of the construction envelope, which is also identified as having the potential to contain deeper alluvial soils. The results of these test excavations will inform final consideration of the adequacy of proposed mitigation measures.	Section 5
14	The ACHAR states that test excavation was focused on elevated landforms (mainly spurs and crests) associated with the Macleay River and that limited test excavation was undertaken in the areas of moderate to steep relief associated with the proposed reservoir locations and no test excavation was undertaken in the elevated northern portion of the construction envelope. Given this, please justify the basis for extrapolating the results of test excavation to assess the entirety of the construction envelope as comprising low density artefact scatter. The response should consider the landforms across the construction envelope and the site density data by landform presented for the survey in Table 7.2.	Section 5
15	Please provide a table correlating recorded sites and test pits with identified focal areas.	Section 6
16	The ACHAR identifies that three recorded sites will be inundated as a result of the proposal but specifies that this will not result in any loss of value. Please clarify this statement with reference to the potential impacts to sites of this type from increased water movement, changes to site context and potential impacts on site accessibility.	Section 6

Item #	Heritage NSW comment	Section where addressed
17	The ACHAR identifies that six potential culturally modified trees and three potential stone arrangements will be subject to complete harm from the project, with indirect harm (through inundation) to a potential quarry site, potential stone arrangement and potential grinding groove. It is noted that the Registered Aboriginal Parties identified one tentatively recorded site subject to direct impact (OMPS-SA6) as possibly being associated with a burial. The ACHAR must confirm the status of these sites (as either Aboriginal cultural sites or not) and appropriately assess their significance to inform Heritage NSW's consideration of project impacts. Consideration should also be given to clarifying the status of other tentatively identified sites that are located outside the construction envelope however this may occur following project approval.	Sections 4.3 and 6
18	The ACHAR includes a recommendation that consideration should be given to optimising design to avoid harm to the identified sites. Please provide further information on the timing of this consideration and the likelihood of site avoidance.	Section 9
19	The ACHAR states that 'the current and proposed impacts of the Project and associated material culture loss, can be considered to have significant benefits.' Heritage NSW does not support this conclusion as harm to Aboriginal cultural heritage from the proposal is irreversible. The benefits referenced in the ACHAR are mitigatory only.	Section 8
20	An indicative methodology for further investigation and salvage of the identified foci subject to harm (as may be applied to OMPS-FA1-4 and 8-12) is provided. It is understood that a detailed methodology has not been provided pending design finalisation. Please clarify whether this detail will be available prior to project approval.	Section 9 and Annexure E
21	The detailed methodology will be developed on the basis that the sites subject to salvage have moderate significance. Heritage NSW recommends that the methodology should include a requirement that, where salvage excavation indicates that a site has a level of significance higher than that considered in the ACHAR, salvage excavation will be paused until additional consultation is undertaken with the Registered Aboriginal Parties and Heritage NSW to determine whether salvage should continue, should be modified or whether the significance is such that the site or portion of the site should be avoided.	Section 9 and Annexure E
22	Specific methodologies for the archival recording and proposed management of scarred trees, stone arrangements and quarry sites subject to harm by the proposal should be provided to Heritage NSW to review the adequacy of any such mitigation works. Given that work will be undertaken to confirm the status of these sites, the methodologies (if required) must be developed for all sites identified as valid.	Section 9 and Annexure E
23	Correspondence with Heritage NSW dated 28 June 2022 states that artefacts located on key access tracks would be moved off the access track but remain in the general vicinity of the identified location (generally no more than 15 metres from its current location). However, the ACHAR indicates that artefacts were collected and subject to several different storage options including temporary storage in a locked box attached to a tree, placement in the vicinity of an identified landmark and potentially storage in another location on site. Please clarify if any additional consultation was undertaken with Heritage NSW and the Registered Aboriginal Parties in relation to this apparent change in the agreed methodology.	Section 2 and Annexure B.2
24	The AHIMS searches provided in Appendix E are over 12 months old. Please undertaken an updated AHIMS search and confirm that there are no additional sites recorded within or immediately adjacent to the project area that require inclusion in the ACHAR	Section 4
25	Based on a review of AHIMS, a portion of the sites identified during the ACHAR have been registered on AHIMS. Please provide a table listing sites by name, AHIMS ID and site type for ease of comparison.	Section 6

Item #	Heritage NSW comment	Section where addressed
-	Kunderang East Pastoral Station (listed on the SHR as having significant Aboriginal cultural values) is located within the World Heritage and National Heritage listed GRA but is outside of the project area. The World and National Heritage Impact Assessment report has assessed that the Project will not result in visual impacts to Kunderang East Pastoral Station. However, the ACHAR identifies that additional consideration of potential indirect and visual impacts to this site is required. Any revised visual impact assessment for Kunderang East Pastoral Station may subsequently need to be considered in the World and National Heritage impact assessment.	Section 3
-	It is recommended that advice be sought from the Australian Government's Department of Climate Change, Energy, the Environment and Water (DCCEEW) regarding all Commonwealth matters of national environmental significance.	N/A – Section 3



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

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KEY

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

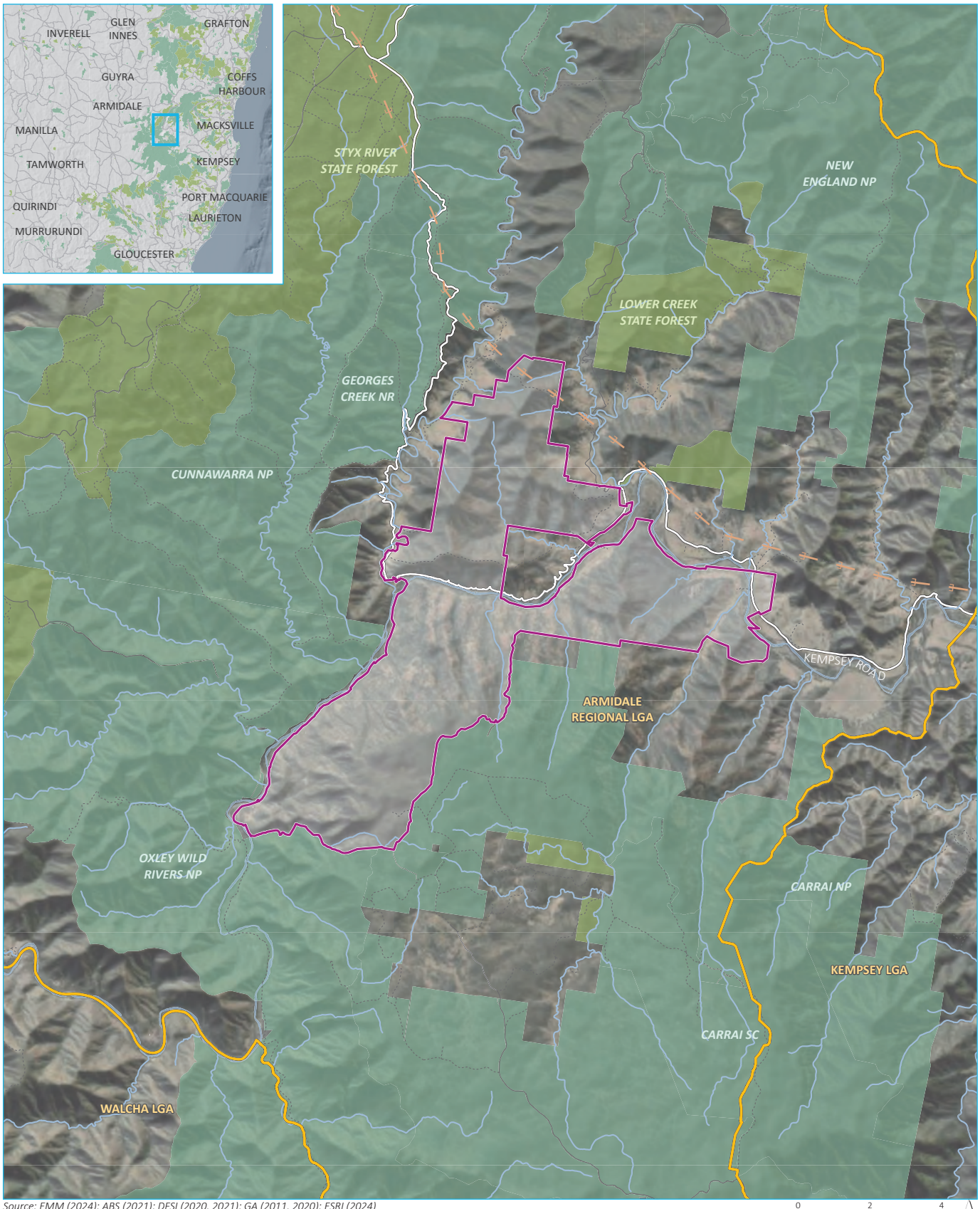
INSET KEY

- Major road
- NPWS reserve
- State forest

Regional setting

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 1.1

EMM creating opportunities



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KEY

- Project area
- Local government area

Existing environment

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

INSET KEY

- Major road
- NPWS reserve
- State forest

Local context

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 1.2

EMM creating opportunities

1.2 Project overview

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'), 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. During operation, the water will enable the generation of electricity as it passes through the underground power station while moving from the upper to the lower reservoir, from where it is pumped back up via the same waterway in a 'closed-loop circuit'. The pumped hydro system will be connected to the existing transmission network via new overhead high voltage transmission lines.

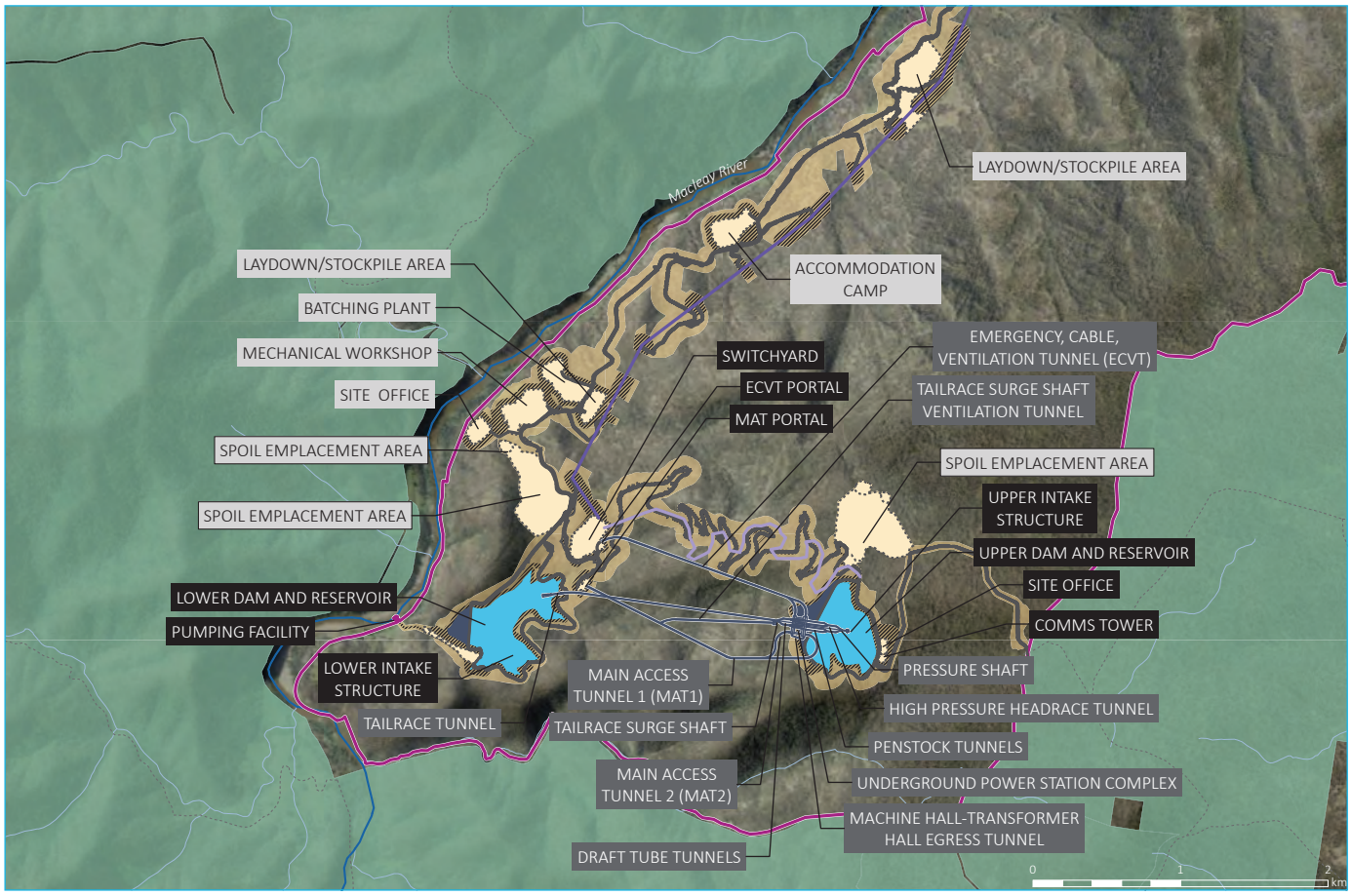
1.2.1 The Amended Project

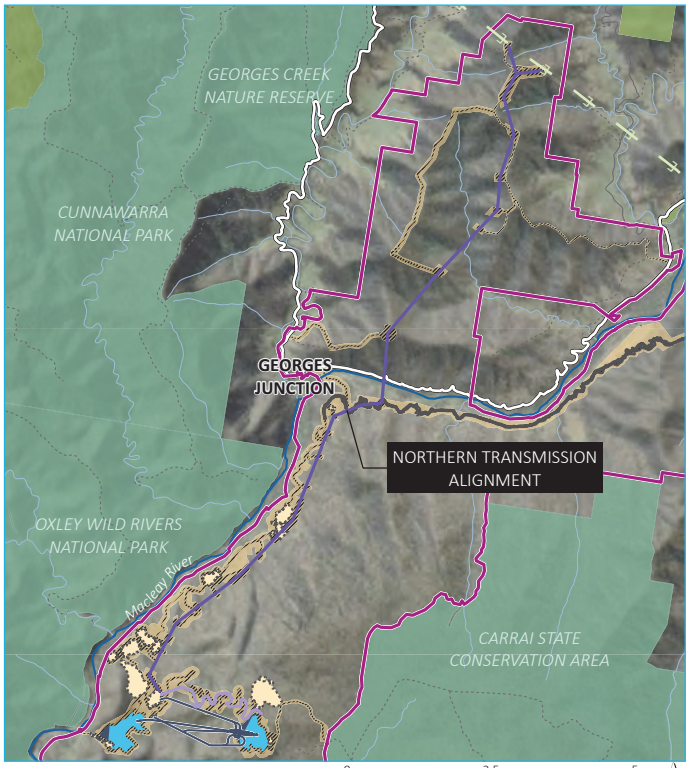
A detailed description of the Amended Project and its strategic context is provided in the Amendment Report which should be read in conjunction with this report. An overview of each of the amendments to the Project in comparison to the Project exhibited in the EIS is provided in Table 1.2. As part of these amendments, the project area, construction envelope, disturbance footprint and operational footprint, have also consequently all been revised to accommodate stakeholder feedback, design changes and refined construction requirements. The Amended Project is shown in Figure 1.3.

Table 1.2 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
Internal roads			
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
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 upstream and north-west 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. One permanent bridge.	Two temporary bridges: Eastern Access Temporary Bridge (EATB) and Western Access Temporary Bridge (WATB). One permanent bridge.
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
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.
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.
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

Project element	Description of change	Summary of the Project as exhibited in EIS	Summary of the amended Project
Construction envelope	Updates to the construction envelope to accommodate stakeholder feedback, design changes and refined construction requirements.	Approximately 780 ha	Approximately 768 ha
Disturbance footprint	Updates to the disturbance footprint to accommodate stakeholder feedback, design changes and refined construction requirements.	Approximately 330 ha	Approximately 367 ha
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
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 Mm3 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 only if surplus material.
Operational footprint	Updates to the operational footprint to accommodate design changes (including permanent spoil emplacement and transmission alignment along the UDAR).	Approximately 270 ha	Approximately 280 ha
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 up to eight hours of energy storage at full generating capacity.	Up to 900 MW and between 8 and 12 hours of energy storage. Underground arrangement and tunnel sizes reflect lower energy storage capacity	Up to 900 MW and up to 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.





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

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KEY

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

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

Label format

SURFACE PERMANENT INFRASTRUCTURE

UNDERGROUND PERMANENT INFRASTRUCTURE

TEMPORARY INFRASTRUCTURE

PERMANENT SPOIL EMPLACEMENT

Key project elements for the Amended Project

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 1.3

EMM creating opportunities

1.2.2 Project terminology

Approval for the Project is being sought based on feasibility and concept designs, as is common for projects of this size and scale. To accommodate minor changes and amendments to the design as it progresses, a 'Project area', 'construction envelope', 'disturbance footprint' and 'operational footprint' approach is being adopted for the Project. This approach is aimed at ensuring environmental impacts are assessed as accurately as possible, whilst accounting for the current level of design and the likelihood of design refinements occurring as the Project progresses towards construction.

- The *Project area* is the broader area within which the Project will be built and operated, and the extent within which direct impacts from the Project are anticipated. Importantly the Project area does not represent a footprint for the construction works, but rather indicates an area that was investigated during environmental assessments. The Project area has been further divided into different areas to facilitate the assessment of direct impacts from the Project.

- The *construction envelope* represents the maximum extent of where disturbance may occur during the construction of the Project. To derive the construction envelope, buffers have been applied to the key Project elements and infrastructure. The buffers used to derive the final construction envelope area reflect the confidence around the current siting of the asset or infrastructure and the likelihood that some minor amendments may be required prior to commencing the construction works as a result of the detailed design. Design updates have removed areas of the construction envelope that occur within rocky cliff areas and floodplains where development wouldn't occur regardless of location within the construction envelope. The construction envelope for the Project covers an area of ~768 ha.

- The *disturbance footprint* is located entirely within the bounds of the construction envelope sits, and reflects a smaller area that has been derived directly from the current level of design. The disturbance footprint represents the physical disturbance that is 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 in this report or any conditions of approval. The disturbance footprint for the Project covers an area of ~367 ha.

- Progressively and at the end of construction, temporary components that are required to support the construction of the Project will be rehabilitated and returned to a state representing their previous use. The exceptions to this are the areas required for the permanent operation of the Project, which would be retained (referred to as the *operational footprint*). The operational footprint of the Project covers an area of around 280 ha.

- *Additional investigation areas* are referred to with reference to amendments to the Project requiring additional assessment, or those areas identified for additional assessment by Heritage NSW. This is more explicitly described in Section 5.

The Project area is shown in Figure 1.4.

1.3 Authorship

This report was prepared by:

- Mikhaila Chaplin (EMM Archaeologist)

- Georgia Burnett (EMM Senior Archaeologist/Team Leader – Aboriginal Heritage).

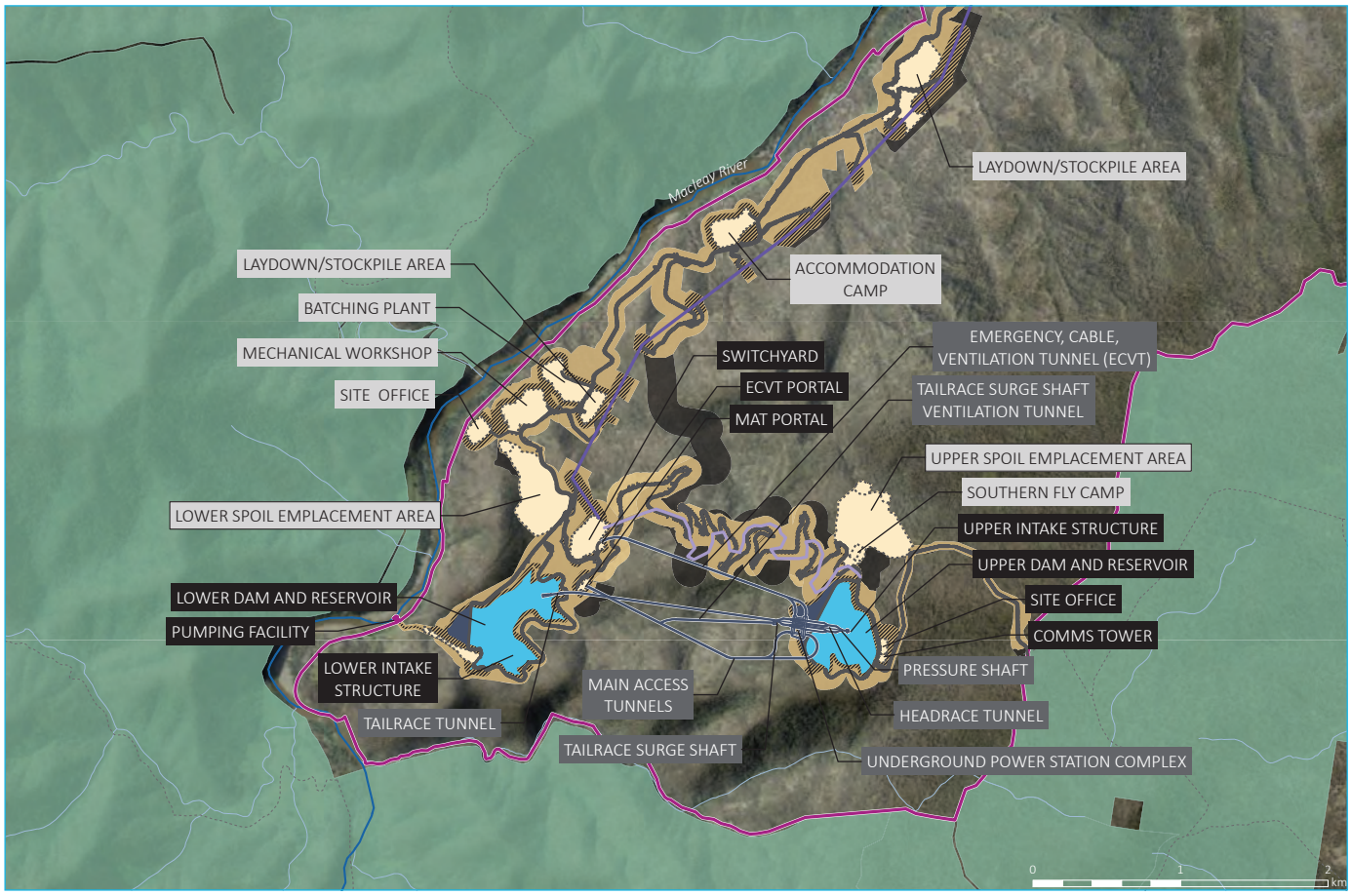
This report was reviewed by:

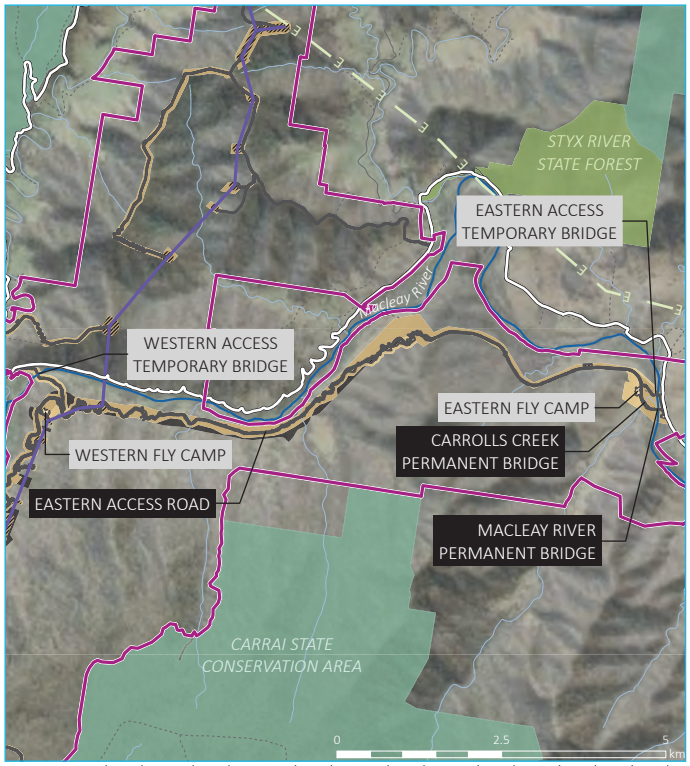
- Dr Alan Williams (EMM Associate Director/ Technical Lead – Aboriginal Heritage).

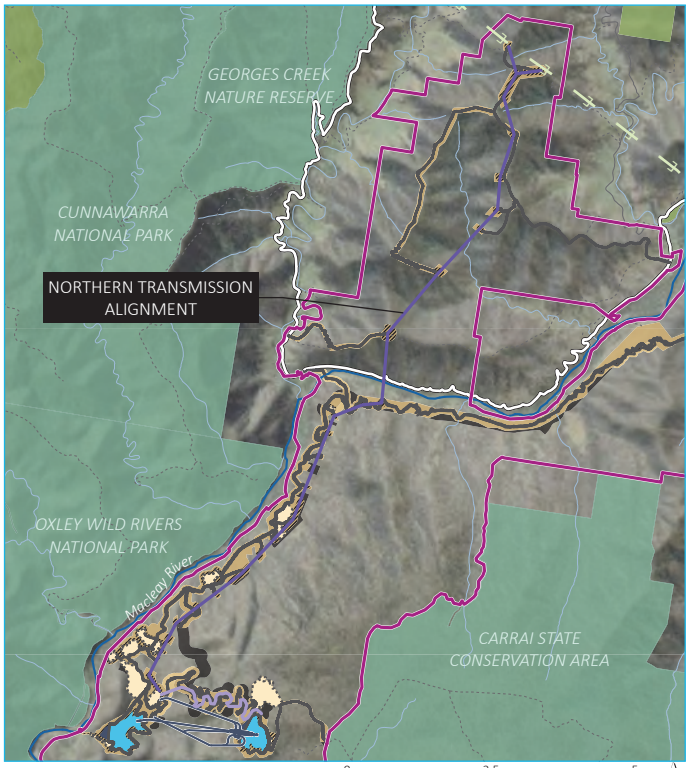
1.4 Limitations

This report is based on existing and publicly available environmental and archaeological information (including AHIMS data) and reports about the Project area. The background research did not include any independent verification of the results and interpretations of externally sourced existing reports (except where ground-truthing was undertaken). The report further makes archaeological predictions based on these existing data and targeted ground-truthing, and which may contain errors depending on the accuracy of these third-party studies and the extent of ground-truthing investigations.

This report does not consider historical and/or built heritage unless specifically related to Aboriginal heritage values. Such heritage items are addressed in the Statement of Heritage Impact (SOHI) appended to the EIS.







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

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KEY

- 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
- State forest

Label format

- SURFACE PERMANENT INFRASTRUCTURE
- UNDERGROUND PERMANENT INFRASTRUCTURE
- TEMPORARY INFRASTRUCTURE
- PERMANENT SPOIL EMPLACEMENT

Project area overview

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 1.4

EMM creating opportunities

2 Aboriginal consultation

2.1 Key findings

- Aboriginal consultation for the Project has been extensive from August 2021–present. Additional information is provided in relation to missing documentation and activities that occurred between the EIS submission and present. We also provide additional information on the recovery and temporary curation of cultural materials impeding the assessment process in mid-2022, and which remain on Country.

- 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 registered Aboriginal parties. 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.

- Since the finalisation of the EIS ACHA and the exhibition of the EIS, consultation has extended a further ~80 interactions between March 2024 and present, and included a further 15 days of on-Country activity. When incorporating the EIS ACHA process, this amounts to over 280 interactions with Aboriginal individuals and/or organisations on the Project since September 2021, and over 300 person days of on-Country participation.

- Aboriginal feedback for the addendum report has focussed on fieldwork participation and who speaks for Country. There is significant disagreement within the local Aboriginal community on who should be involved in cultural heritage activities, and inclusion of Dhungutti and Anaiwan traditional owners previously omitted during the EIS has seen strong complaint from some Thunggutti participants. This has extended to the quantum of involvement in the field program. There have been some concerns over impacts to the cultural landscape with the site being situated within a highly ceremonial (male) region, although with the exception of an artefact scatter (#21-5-0142) at Georges Junction no specific places or locales have been identified within the Project area. In the case of #21-5-0142, this has only recently been identified as having gender specific (male) restrictions despite being documented in the EIS ACHA.

2.2 Summary of EIS ACHA consultation (September 2021–December 2022)

The following provides a summary of key activities and/or findings of the consultation activities completed as part of the original EIS ACHA up to the completion of the EIS ACHA and submission of the EIS:

- The Project assessment adopted the processes and methods outlined in DECCW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010), as well as additional Project-specific communication strategies to promote transparent and frequent two way dialogue between the Aboriginal community and the Project. These latter activities included Aboriginal focus group meetings (face-to-face and online) throughout the assessment process, other meetings as requested by the local Aboriginal community, a cultural values mapping investigation with Elders and key-knowledge-holders, and the engagement of an Aboriginal liaison officer through the majority of the on-site activities (March–September 2022).

- Consultation with Heritage NSW has conformed with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010), and included provision of information on registered Aboriginal parties (RAPs), and notification of the various field survey and excavation activities associated with the Project. Various informal discussions with Heritage NSW were also undertaken and included the management and relocation of cultural materials in some parts of the construction envelope, investigative methods, and more recently in discussions of the content and finalisation of the report.

- Throughout the development of the project and progression of the EIS ACHA, EMM and OMPS Pty Ltd have been liaising with 19 RAP organisations and/or individuals since its inception in September 2021. These have been identified through the formal notification as part of the Heritage NSW consultation requirements. The RAPs include a large number of individuals and/or organisations based in Bellbrook, Armidale and/or surrounds, as well as a smaller proportion that are based in Sydney, Gunnedah, and Wollongong, but have ancestral connections to the region. The Project has registered any Aboriginal organisation and/or individual throughout the Project regardless of when they have become known or identified their interest.

- Opportunity for Aboriginal involvement in consultation for the Project was provided throughout the EIS ACHA, including: i) attendance at 15 meetings held with organisations and/or a large number of RAPs both face-to-face in the local region, and online; ii) participation in a five week field survey of the construction envelope; ii) participation in a four week archaeological test excavation of the construction envelope; iii) collection and relocation of cultural materials at risk of harm during the EIS investigative process; and iv) participation for key knowledge-holders to undertake interviews with a highly experienced anthropologist to discuss cultural values. Ultimately, over 100 interactions have been undertaken with the RAPs across these opportunities. Some six of the RAP organisations – identified in discussions between OMPS and Thunggutti LALC[1] – participated in these opportunities, totalling over 280 days on site cumulatively, and included Thunggutti LALC, Three Ducks Dreaming, Iwatta Aboriginal Corporation, Bruce Cohen, Gumaraa Aboriginal Experience Pty Limited and QMS.

- Discussions with the RAPs have been extensive and wide-ranging over the 16-month EIS ACHA assessment process. Feedback on the Project and assessment activities has been mixed. Specific inputs varied as the Project progressed, but included extensive discussion on who speaks for Country, who should participate in the on-site activities and how often, understanding the assessment process, and identifying concerns over broader environmental issues (notably the impacts to cultural flows of Macleay River). Later discussions focussed on key sites, including the axe quarry that has been avoided near Georges Junction, and a number of artefact scatters identified as part of the field activities. These are all acknowledged in the EIS ACHA report.

- Consultation for this addendum report is considered an extension of the above, and is outlined in detail in the following sections.

2.3 Additional information of previous consultation process

Heritage NSW sought several clarifications of documentation absent or omitted from the EIS ACHA. These have now been included in Annexure B.1, and include:

- a copy of the draft assessment methodology for the Project in an email to all Project RAPs on 11 November 2021 and 2 February 2022

- the Project draft ACHA report to all RAPs on 25 November 2022.

[1] Note that this report has adopted reference to the 'Thunggutti' people to align with the name and information provided by the LALC. It is recognised that research also identifies accepted indications such as Thunggutti, Dunghutti, Dhanggati and others.

2.4 Additional information on management of artefacts collected on tracks

During the on-Country investigations as part of the EIS ACHA, a number of cultural materials (stone artefacts) were encountered on access tracks across the construction envelope, and which were being used by OMPS and EMM personnel during the EIS process. The registered Aboriginal parties (RAP) requested that these cultural materials be protected, and as such a process of relocation was required. Due to legislative complexity of the Secretary's Environmental Assessment Requirements (SEARs) requiring the use of Heritage NSW's Code of Practise guidelines that require an Aboriginal Heritage Impact Permit (AHIP) to relocate these cultural materials, and the Project being CSSI, which turns off the need for an AHIP, a process of consultation with the registered Aboriginal parties (RAP) and Heritage NSW was undertaken to determine a way forward.

This initially included discussions with Heritage NSW in late May 2022, followed by distribution of a protocol/method for RAP input and feedback in the first half of June 2022 (Annexure B.2). During this discussion, there was some disagreement between RAPs on the temporary relocation of cultural materials following their collection, with some seeking their movement nearby while others suggested the Thunggutti LALC office. Ultimately, it was determined that cultural materials would remain on Country, and generally within close proximity to their observed location; and which was endorsed by Heritage NSW.

Activities on the upper reservoir occurred between 9–13 June 2022, and adopted these discussed methods, and all cultural materials encountered were situated adjacent a nearby tree (Annexure B.1). In the case of the lower reservoir, the storage method was amended following discussions with the RAPs – reflecting all seven of the key parties involved in the on-Country activities for the Project – on the morning of the proposed collection (13 July 2022). These discussions that had been pre-empted by off-line consultation between the proponent and Thunggutti LALC (and potentially other RAPs) indicated that: i) there was general support for retention of cultural materials on Country; ii) there was some concern that erosion and natural movement on the steep slopes around the access track may result in the loss or impact of any moved cultural materials nearby; and iii) there was potential for further anthropogenic impact of areas near the track through maintenance and other Project activities. As a result of these discussions, the consensus was that the recovered cultural materials would be collected in a locked storage container, which would be situated near the northern end of the access tracks (in the vicinity of Georges Junction). The storage container was itself chained to a tree, and situated in a discrete location generally inaccessible to the general public. Subsequently, this process was adopted with representatives of Thunggutti LALC, QMS Aboriginal Experience Pty Ltd, Iwatta Aboriginal Corporation, Three Ducks Dreaming, and Bruce Cohen (Annexure B.2).

To date, the storage container and content have remained unchanged since July 2022.

2.5 Additional information of consultation since December 2022

Following the last documented consultation event recorded in the EIS ACHA on 23 December 2022, the following additional consultation activities occurred (Annexure B.3):

- a project update email was provided by EMM to all project RAPs on 24 January 2023
- a project update email was provided by EMM to all project RAPs on 1 May 2023
- archaeological test excavations of the EAR between 22–29 May 2023 (see Section 5).

Due to a discontinuance in Aboriginal consultation since May 2023 and this report, the formal consultation process was re-started (Section 2.5).

2.6 Consultation undertaken since submission of the EIS (May 2023–present)

2.6.1 Aboriginal stakeholder consultation

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. A complete consultation log is provided in Annexure B.4 with Table 2.1 providing a summary of the processes undertaken.

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 (Annexure B.5). 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 (Annexure B.6). Of these, 20 registered an interest following the notification period (Table 2.1), 7 of which had been previously involved (Table 2.2).

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.

Table 2.1 Summary of Aboriginal consultation undertaken for the Project

Consultation stage	Description	Date initiated	Date completed	Notes
1	Government Agency Pre-Notification	11 March 2024	19 March 2024	Additional details provided in Annexure B.7.
	Advertisement in *Macleay Argus* and *Armidale Express*	22 March 2024	5 April 2024	A tear sheet is provided in Annexure B.7.
	Notification and registration of potential Aboriginal stakeholders	22 March 2024	5 April 2024	Additional details are provided in Annexure B.7.
	Advising Heritage NSW and Thunggutti LALC/Armidale LALC of RAPs	18 April 2024		Additional details are provided in Annexure B.7.
2/3	Presentation of information about the proposed Project; and gathering information about cultural significance	15 April 2024	13 May 2024	Additional details are provided in Annexure B.8.
	Field survey	20 May 2024	21 June 2024	Additional details are provided in Section 6.
	Test excavations	14 June 2024	21 June 2024	Additional details are provided in Section 6.
4	Review of draft ACHA addendum report	TBC	TBC	Additional details are provided in Annexure B.9.

Table 2.2 List of registered Aboriginal parties for the Project

Organisation	Contact	Location	Previously a RAP
Thungguti Local Aboriginal Lands Council	Gina Bolt	Bellbrook	Yes
Three Ducks Dreaming	Lenny Wright	Flinders	Yes
Dunghutti Elders Council	Amie Jacky	Kempsey	Yes
Murrabidgee Mullangari	Ryan Johnson	Sydney	Yes
Bruce Cohen	Bruce Cohen	Armidale	Yes
QMS	Richard Campbell	Kempsey	Yes
Iwatta Aboriginal Corporation	Steven Ahoy	Armidale	Yes
Gomery Cultural Consultants	David Horton	Muswellbrook	No
Jeremy Duncan	Jeremy Duncan	Inverell	No
Nukara Cultural Services	Olivia Connors	-	No
-	Ethan Trewlynn	Dubbo	No
-	Natalie Mercy	Keperra	No
AT Gomileroi Cultural Consultancy	Aaron Talbott	Gunnedah	Yes
-	Christarher Quinlan-Dunn	Bellbrook	No
Gomeroi Traditional Owners	Steve Talbott	Gunnedah	Yes
-	Thomas Dahlstrom	Sydney	No
Nganyawana Cultural Consultants	Les Ahoy	Armidale	No
Girragirra Murun	Diana Astin	Mudgee	No
Wingarra Wilway	Ray Moon	Gulgong	No
Ninnum	Kevin Campbell	-	No
Dhangu Barri	Cory Powell	-	No
-	Elwwyn and David Toby	Bellbrook	No
-	Tim Hill	Bellbrook or Kempsey	No
Learning the Macleay	Jo Kelly	Kempsey	No
-	Lila Quinlan	Bellbrook	No
-	Kenneth Majors	Bellbrook	No
Armidale Local Aboriginal Lands Council	Mavis Ahoy	Armidale	Yes
Jagundami Corporation Limited	Steven and Cynthia Briggs	-	No

2.6.2 First Nations Advisory

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 early 2024. This has included broader benefit-sharing opportunities, general project interactions, and liaison with the Aboriginal community in relation to the ACHA process and addendum report. This included numerous face-to-face and in person opportunities held throughout the year at Kempsey, Bellbrook and Armidale.

In relation to the addendum report, Annexure B.10 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.

2.6.3 Aboriginal stakeholder feedback

Aboriginal consultation has been extensive between March and July 2024, and included over 80 interactions, and some 15 days of on-Country activity. When including previous phases (Sections 2.2–2.5), these values total over 250 interactions with the local Aboriginal community and over 300 days on-Country.

The EIS ACHA outlines previous discussions and comments from the RAPs. In relation to recent activities on the Project, the following summarises the main discussions that have occurred:

- Who speaks for Country – overwhelmingly, there is significant disagreement in the local Aboriginal community about who speaks for Country, and who has the right to be involved in the Project. Historically, the Project has focussed on the local Bellbrook (Thunggutti) community, with some representation of Anaiwan traditional owners due to contemporary connections at Georges Junction. As part of the addendum report, efforts have been made to include representation of Dhungutti traditional owners and further Anaiwan representation, and this has resulted in backlash from some of the original Aboriginal participants. This has included efforts to physically impede the on-Country activities and complaints to the consent authorities about the composition of field teams. Ultimately, a range of Thunggutti, Dhungutti and Anaiwan representatives have been involved throughout the Project.

- Fieldwork participation – similar to the issue above, there has been ongoing complaint from some Aboriginal parties on their level of involvement in the field program. The field program for the addendum report was fairly limited and did not provide opportunity for wide involvement of the RAPs. Further, following physical interactions on site, the field program was modified and reduce to limit on-Country activities due to WHS concerns. This further limited the involvement during this phase of works.

- Impacts to cultural and intangible values – there has been ongoing concerns about impacts to cultural values, although these remain poorly defined in discussions with Aboriginal participants. There are general references to the Project being within a ceremonial cultural landscape, typically reflecting men's initiation activities. However, none of the specific places articulated to date appear to be within or near the Project, including the Carrai water-holes, Serpentine, Mount Anderson and Sugarloaf Mountain (Mount Anderson, *Barrarr balayi*). A previously identified artefact scatter (#21-5-0142) near Georges Junction documented in the EIS ACHA has now more recently now been articulated by Iwatta Aboriginal Corporation representatives as a gender-specific (male) site of a large size than previously documented. (EMM has sought additional information on this, and visited the site with an Iwatta Aboriginal Corporation representative to discuss further). Cultural values for the Project continue to be explored and are further discussed in Section 3.

The outcomes of these discussions have been considered in the development and content of the addendum report. While not necessarily individually mentioned throughout the report, they have nonetheless been considered throughout its formulation.

A copy of the addendum report has been provided to the RAPs (Table 2.2). This updated ACHA has been sent to RAPs for their review and comment. If any comments are received within the 28 day review period, an updated ACHA will be submitted to Heritage NSW.

2.6.4 Government consultation

The following activities have included consultation with Heritage NSW:

- receipt of advice in relation to the EIS ACHA on 1 March 2023 (Annexure A)
- sought information on Aboriginal individuals and/or organisations within the region on 11 March 2024 (Annexure B.7)
- provided a list of registered Aboriginal parties for the Project on 18 April 2024
- notification of the commencement of on-site activities on 7 May 2024
- briefing to Heritage NSW and the Department of Planning, Housing and Infrastructure (DPHI) on the on-Country issues encountered during the initial field program and discussed potential issues with answering clarifications in Table 1.1 on 30 May 2024
- provision on information on proposed test excavation program and consultation associated with these activities following on-Country issues on 5-7 June 2024
- was advised and provided clarifications on complaints about field participation by Iwatta Aboriginal Corporation on 19 June 2024.

3 Cultural values information

3.1 Key findings

- Additional information is provided on the cultural values mapping study undertaken as part of the EIS ACHA, and key findings relevant to the Project area. Due to local Aboriginal community unrest, the report cannot be finalised and therefore cannot be released under Indigenous Cultural and Intellectual Property requirements.

- Further Aboriginal consultation on cultural values issues is being attempted but remains unavailable at the time of the addendum report. Further exploration of visual impact, surface water and aquatic ecology studies for the EIS have been undertaken against the cultural places and stories to provide an indication of the potential scientific impacts to these values. With the exception of Georges Creek Camp (OMPS-CS4), they demonstrate that there would be very low or negligible impacts to these places. In the case of OMPS-CS4, visual impacts would be moderate, and mitigation measures to address this have now been included in Section 9.

- Clarification of the Lower Creek/Long Flat Station Aboriginal site (OMPS-CS5) and Long Flat Station historical site has been provided. They relate to two different locations, with the former outside the Project area as stated in the EIS ACHA.

3.2 Overview of EIS ACHA findings in relation to ethnography and cultural values

The following provides a summary of key activities and/or findings of the ethnographic and cultural values investigations completed as part of the original EIS ACHA up to the completion of the EIS ACHA and submission of the EIS:

- Traditionally, the country in which the Project area is located was occupied by people known collectively as the Thunggutti, who all spoke a related language and shared many cultural attributes, and their descendants today are still based in the Macleay Valley. At the time of European settlement, the Project area would have been part of one or more estates associated with clans as landowning groups within the Thunggutti, although there is no information available on their clan identity.

- The main mythologies documented for the Project area were dominated by supreme beings, such as Baiame, Daramulan and Muni Burrebean, with totemic ancestors being of lesser importance in the records. Numerous creation stories and spiritual sites are documented within the region, with the Carrai water-holes, a gender-restricted (male) site, ~3 km south of the Project area, being frequently cited as of high cultural significance; and reference to a catfish increase site – a natural feature used in ceremonies to improve a resource – located in the Macleay River just south of Georges Junction.

- A review of historical records for the region shows an extensive interaction with Europeans over the last 200 years, including numerous incidences of frontier violence, participation of the Thunggutti community with the cedar getters and pastoral stations encompassing the Project area, and the establishment of reserves and camps throughout the region. No specific post-Contact sites or places are identified within the Project area, although activities at both Georges Junction and Kunderang Station were both in close proximity and would likely have used the Macleay River corridor as a travel route.

- Cultural mapping was undertaken by a highly experienced anthropologist with the participation of key knowledge-holders. Some 12 specific locations were identified in the general region as having traditional, historical and/or contemporary values to the local Aboriginal community. None of these were documented within the Project area. These were focussed around Bellbrook – a focus of contemporary Thunggutti people – and included knowledge and relationships with historical frontier violence, descendants working on pastoral stations, and/or more recent recreational activities, such as fishing. Only a historical and contemporary camp at the confluence of Georges Creek and the Macleay River, and Kunderang Station were documented as being in close proximity to the Project area. Cultural flows were explored and indicated the maintenance of river and creek flows in the Macleay Valley to be crucial to the Thunggutti people. They stated that the river must continue to flow for the benefit of the physical environment, as well as for both their spiritual and physical health.

Additional information was provided by the RAPs, and included:

- Arthur Bain (TLALC, pers comm 9 Dec 2021) advised that the ranges (Carrai) to the west of Bellbrook were traditionally referred to as the Mirri Buka ranges. The literal translation is dead or stinky dog. There are a number of stories about how this came about, including reference to massacres, and a ridge line that looks like a dead dog. *Mirri* is Thunggutti for dog and *buka* means either dead or stinky.

- Bruce Cohen has advised that he has knowledge of ancestors that used to work on the Kunderang Station.

- Steve Ahoy has mentioned the use of George's Creek Junction as a camping location both in the post-Contact and contemporary period. Steve was also aware of a pre-Contact axe quarry site located east of Georges Junction (#21-5-0142), and which has formed a focus of the archaeological program of the ACHA.

3.3 Cultural values mapping

The cultural values mapping report used in the development of the EIS ACHA was confidential and was not provided as part of the EIS submission. At the time of submission, the report had not been finalised with several participants yet to provide approval of the specific text and any necessary redactions. A high-level summary of the findings was included in the EIS ACHA, but excluded any oral history or culturally sensitive information that was exclusively presented in the cultural values mapping report. This information includes the general description of key cultural places and their broad locations in Figure 5.3 of the EIS ACHA.

Unfortunately, finalisation of the report has proved unfeasible since the EIS submission. This is the result of several issues, including: i) one of the key participants passing away and therefore unable to validate their components of the report; ii) the Aboriginal facilitator of the Aboriginal engagement of the report left the region and was unwilling to assist further; and iii) recent engagement indicates that there would be little support for the findings of the report, since the previous participants were selected by an Aboriginal person not supported by the broader Aboriginal community.

Given these issues, the cultural values mapping cannot be provided, since it would breach agreed Indigenous Cultural and Intellectual Property agreements made by EMM. As such, for assessment purposes, the summary information provided in Section 5.4 of the EIS ACHA will need to be used. This provides both brief descriptions of the values and their locations. We highlight that none of the 12 identified cultural places or values are within the Project area, with only three in the general vicinity - Kunderang Station (OMPS-CS3), George's Creek Camp (OMPS-CS4), and Lower Creek/Long Flat Station (OMPS-CS5).

Formal visual assessment of the project area was undertaken concurrently with the ACHA as part of the EIS (EMM 2023b). While not considered in detail during the ACHA due to timing, the visual assessment can now be considered in relation to the three sites identified above. All of these were highlighted as having some potential for indirect impacts from the Project in the form of visual impacts that may affect aesthetic values. However, it must be highlighted that:

- Kunderang Station (OMPS-CS3 [#21-5-0214]) was subject to formal visual impact assessment as part of the EIS (EMM 2023b) and concluded that *East Kunderang Homestead…had no predicted visual impacts* (based on viewpoint 1).

- George's Creek Camp (OMPS-CS4 [#21-5-0215]) was subject to formal visual impact assessment as part of the EIS (EMM 2023b) and concluded that impacts would be *moderate* (based on viewpoint 3).

- Lower Creek/Long Flat Station (OMPS-CS5 [#21-5-0216]) was subject to formal visual impact assessment as part of the EIS (EMM 2023b) and concluded that impacts would be *low* (based on viewpoints 8 and 9 that encompass this site).

Based on this data, it is considered that neither OMPS-CS3 nor OMPS-CS5 would be adversely affected by the Project using these data. However, OMPS-CS4, a post-Contact camp that has been identified in part with aesthetic significance; and as such would be impacted by the Project (Plate 3.1). Suitable mitigation measures have now been developed in Section 9 to address these impacts.

5.3.3 Viewpoint 3 - Georges Junction camp site

Distance from development footprint	575 m (access road) 825 m (tower)
Duration of view	Short - road Long - camp site
Viewing experience	High
Scale of change	Low
Magnitude of change	**Moderate**
Viewer sensitivity	Moderate
Scenic quality	Moderate
Visual sensitivity	**Moderate**
Visual impact rating	**Moderate**

View type and context:
This view is from the camp site looking south along the river. Georges Creek is visible in the foreground with the Macleay River beyond.

This view is representative of views for motorists using Kempsey Road and people along the Bicentennial national Trail.

Potential visual impact:
The project infrastructure will be located along an existing transmission line, which dictates its location in the landscape. Potentially five sets of towers will be visible along the lower slopes opposite the viewer (refer to photomontage on following page).

Viewpoint 3 - Georges Junction camp site photomontage

Photomontage at the same scale as the viewpoint analysis.

Enlargement of the photomontage to illustrate visible project elements.

Plate 3.1 The predicted visual impacts at Georges Junction, within which OMPS-CS4 is situated, based on EMM (2023b).

3.4 Additional consultation on cultural values

We note that Heritage NSW suggests that additional consultation in relation to potential impacts to cultural places and values be undertaken as part of the EIS ACHA. Unfortunately, as outlined in Section 2 and in meetings with Heritage NSW in recent months, there is significant disagreement within the Aboriginal community about who can provide these inputs. Further, it is probable at this point that whatever information is obtained would be critiqued by other Aboriginal participants due to these disputes.

The proponent, working with GIRA, continues to discuss cultural values with the local Aboriginal community, and propose to revisit a formal cultural values study as the Project progresses. However, at this stage, it is considered such works would require significant time to gain widescale agreement on any participants of such activities; and then time to undertake the study and negotiate the release of any developed data. Such timeframes are incompatible for the Project.

At this stage to address this issue, we propose:

- to rely on the visual impact assessment data in the EIS for the three cultural places in close proximity to the Project area, and implement suitable mitigation measures based on these findings (Section 3.1)
- to undertake informal discussions with several senior men currently being consulted by GIRA to gain an initial understanding whether concerns beyond the formal visual impact assessment require consideration. These discussions are proposed for August 2024, and will be advised to DPHI should any further issues/concerns or inputs be discerned.

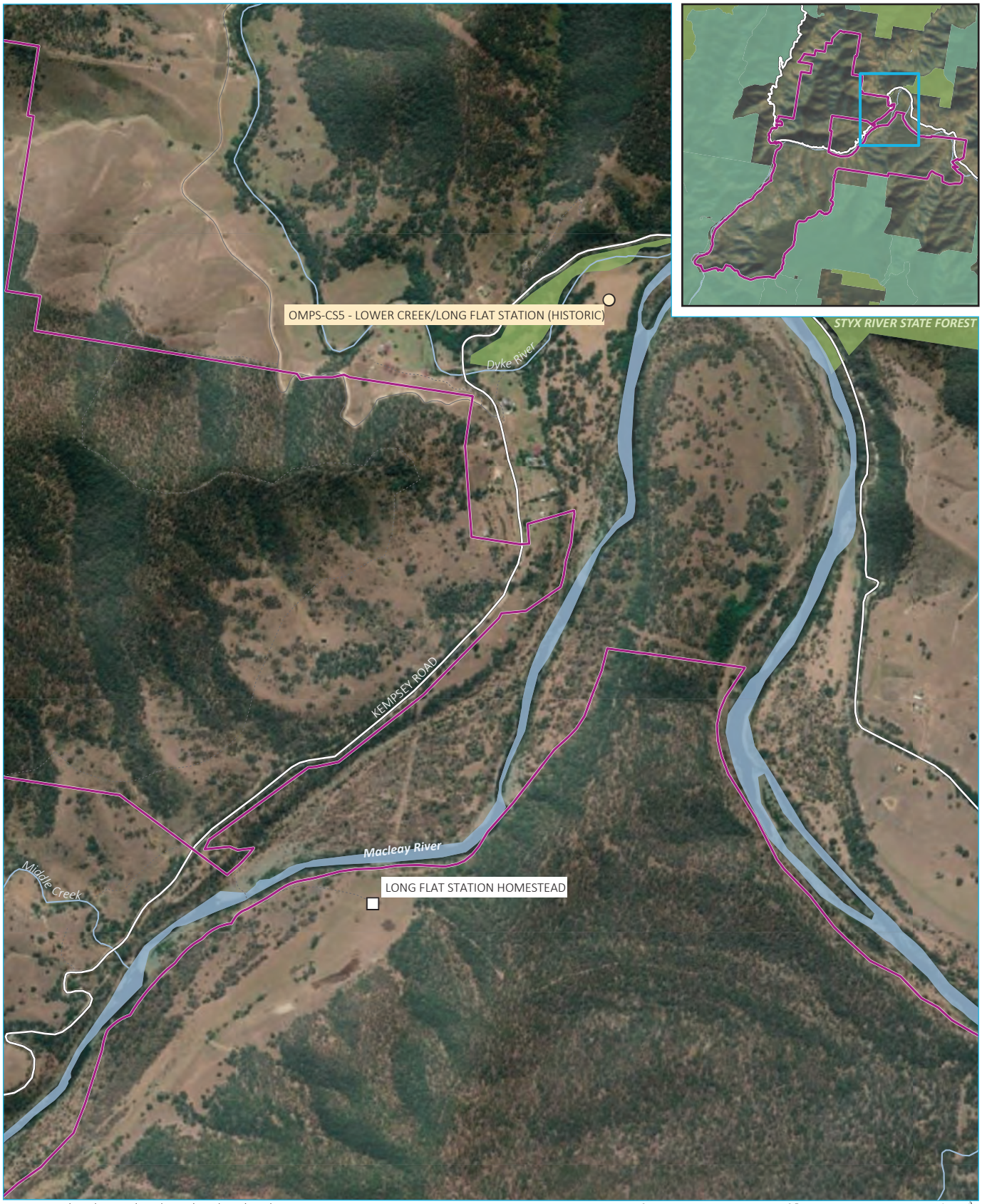
3.5 Ratification of Lower Creek/Long Flat Station

Heritage NSW indicates a conflict in relation to an Aboriginal site, Lower Creek/Long Flat Station (OMPS-CS5), and a historical site of a similar name. In the EIS ACHA, the site is only considered to be indirectly impacted, while in the Statement of Heritage Impact (SoHI) (EMM 2023c), it is proposed for direct impact.

The reason for the disparity is that the reports are referring to two different locations, albeit with very similar names. In the case of OMPS-CS5, this relates to a series of alluvial flats and terrace either side of Lower Creek situated immediately north of the Project area (Figure 3.1). This site has been documented as a post-Contact camp with other ceremonial activities known to have occurred. Being on Lower Creek, the site is identified as such; however, a supplementary name of Long Flat Station has been applied to reflect the probable connections of Aboriginal people working on this station in the post-Contact period; and to provide an improved spatial identifier since Lower Creek is a common name found across NSW. The station itself is presented in Figure 5.2 of the EIS ACHA and is several hundred hectares in size, primarily extending north and west of the Project area.

In terms of the Long Flat Station referred to in the SoHI, this focusses on a former homestead of the station, and which is situated within the Project area (Figure 3.1). This site is within, or near the construction envelope and may be adversely affected. However, it is unrelated to the findings of the EIS ACHA. To date, no specific Aboriginal cultural values have been assigned to the homestead site or immediate environs.

Based on this, the initial EIS ACHA findings and potential impacts in relation to OMPS-CS5 remain valid.



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

0 0.5 1 km

GDA 1994 MGA Zone 56

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KEY

- Project area
- Long Flat Station homestead
- OMPS-CS5

Existing environment

- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

OMPS-CS5 and Long Flat Station homestead

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 3.1

EMM creating opportunities

3.6 Cultural flows

Aboriginal consultation during the EIS ACHA did not raise any site-specific concerns around changing water-levels of the Macleay River as a result of the Project. There was a range of *general* concerns around the potential for the river to be entirely drained and impact contemporary camping and hunting activities, and conversely the potential for catastrophic flooding should the reservoirs fail. As a result, a mitigation measure to explore and manage any fluctuations to the river system as part of the Project operation where it may intersect with cultural heritage was proposed. This recommendation was made in part to ease and allow more fully exploration of these concerns with the local Aboriginal community, rather than to address specific identified impacts.

As outlined in Section 3.4, additional consultation is not feasible at this time to explore this issue further. However, a surface water assessment (EMM 2023d) and an aquatic ecology impact assessment (Aquatic Ecology Services 2023) were undertaken as part of the EIS and similarly updated following preparation of the EIS to address stakeholder feedback and assess design changes (EMM 2024a), and which provide insights into potential changes of the Macleay River.

In relation to the water flow, EMM (2024a) concludes that changes to the Macleay River would be relatively negligible. Specifically, water initially taken from the Macleay River would be <1% of annual flow in wet years and <7% in drier years. Under the proposed extraction rules for the Project, these values would be managed to between 1–4% of the annual streamflow of the river, with an initial infill of several months. This is <1% for operational requirements into the future. Perhaps of more relevance is the impacts of the water use to the streamflow, which is potentially more visible. In these instances, a maximum potential reduction of 16% (during low flow) is predicted, and which would only last a matter of hours, and <3% if undertaken during peak flow rates. Notably, in very low flows, the project would not extract water under the 'cease to pump' rules. It is understood that extraction of water during low river flow conditions is extremely restrictive and would only be <1% for operational (not initial filling) purposes. Visually, the report indicates that these water intakes would result in (EMM 2024: 98):

> A maximum reduction in [river] depth of 0.05 m, which represents a 5% change in depth from a streamflow rate of 683.4 ML/day (0.95 m depth) to a streamflow rate of 597 ML/day (0.90 m depth).
>
> No material impacts on streamflow depth are anticipated when extracting 2.8 ML/day for construction purposes

When reviewing the aquatic ecology, the report does indicate the potential for some impacts to various fauna as a result of water infilling and discharges (e.g. thermal pollution). However, the report provides a number of mitigation measures for implementation, and if adopted, it concludes (Aquatic Ecology Services, 2023:92):

> It is not expected that the Project will result in significant broad-scale impacts to key fish habitat or aquatic biodiversity within the Macleay River and associated waterways...

As an addendum to the aquatic ecology report, further assessment of potential impacts on the life cycle of fish was conducted to consider potential changes to flow in the Macleay River which similarly concluded (EMM 2024b: 27):

> 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 cease to pump rules in place to minimise the effects of flow and maintain adequate environmental flows.

Based on these data, it is considered that visual changes of ~5 cm to river height would be potentially observable over short durations (hours to months), and the aquatic ecology would be relatively unaffected. By extension, it is expected that the use of the river for activities such as fishing would be relatively unaffected by the Project. While we propose to retain mitigation measures to continue to explore and facilitate traditional practises associated with the Macleay River and tributaries wherever feasible, it is considered that the risks of potential harm to these values based on above would be extremely low.

3.7 Travel route between Georges Creek camp and Kunderang Station

As outlined in Plate 5.6 of the EIS ACHA, there are records of Aboriginal people walking along the Macleay River between Georges Junction and Kunderang East Pastoral Station. The route represents a significant part of the cultural landscape biographies of the Aboriginal women connected to Kunderang (Harrison 2004). This route has most recently been formalised as part of the National Trail, a trekking route that follows the east coast of Australia (National Trail 2021); and which runs along the river's edge within the Project area between Rafferty's Crossing and George's Creek Junction.

As outlined in Section 3.4, additional consultation has not been feasible to resolve this issue. It is however highlighted that a significant part of the walking route was situated on the western side of Macleay River, and which would be unaffected by the Project. In the case of the route within the Project area, this has already been formalised as part of the National Trail. While the trail is expected to be impacted by the Project, a walking track along the river is expected to be maintained into the future.

Given there are no defined Aboriginal paths or trackways documented along this part of the river, it is considered that the cultural value is the connection – and the need to maintain the connection – between the two locations. This will be achieved through the Project, which is proposing to maintain the National Trail, albeit with some modifications where needed during construction and/or operational periods. As such, it is considered that there would be no impacts to this value.

4 Additional desktop information

4.1 Key findings

- Additional desktop information in relation to AHIMS data and landform mapping has been provided. 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 3 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 6 stone arrangements, 27 culturally modified trees (including 3 recent additions outlined in Section 5), 2 rockshelters and 1 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.

4.2 Additional requested desktop information

4.2.1 Updated AHIMS search

An updated Aboriginal Heritage Information Management System (AHIMS) search has been undertaken for the Project area (Figure 4.1, Annexure C). Table 4.1 provides a summary of the results by site type and includes previous data presented in the EIS ACHA. The key differences relate to a number of the sites added to the AHIMS database as an outcome of the EIS ACHA and subsequent test excavations in May 2023 (Section 5.3).

Specifically, 51 additional sites have been added to the AHIMS database since the previous search, 48 of which reflect sites encountered within the Project area (Table 4.2). Three additional sites unrelated to the Project have also been added, and which may reflect slight differences in the size of searches undertaken. These include #21-5-0155, #21-5-0156 and #21-6-0469. Both #51-5-0155 and #51-5-0156 are situated in the Oxley Rivers National Park some >9 km west of the Project, and both appear to relate to ongoing maintenance of the park with one referenced as being on a fire trail (Annexure C.2). The site card for #21-6-0469 is not available, but is labelled as Thunggutti Drive, and presented spatially as being within the township of Bellbrook situated on this road. As such, the site is not within the Project area.

With these exceptions, the searches remain unchanged from those conducted as part of the EIS ACHA. Further, the additional sites do not substantively change the broad percentages of the various site types used in the EIS ACHA. The only notably difference was the increase in culturally modified trees from ~5% up to 19%, with numerous examples encountered through the Project area. It must however be noted that many of the new listing have been assigned a tentative status and this may be an over-representation of this site (see Section 5.3).

Overall, 38 previously documented sites are within the Project area, of which 22 are in the construction envelope (Table 4.2). These are all sites documented as part of the EIS ACHA and/or additional excavations undertaken in May 2023 (Section 5.3).

Table 4.1 Summary of AHIMS site within the search area

Site type	2021–2022 search				2024 search				Variation between searches	
	Number		% of Total		Number		% of Total		Number	
	Category	Sub-category	Category	Sub-category	Category	Sub-category	Category	Sub-category	Category	Sub-category
Aboriginal Ceremony and Dreaming site	19		16.96		21		12.88		+2	
– Aboriginal ceremony and dreaming		2		1.79		2		1.23		-
– Aboriginal ceremony and dreaming site with burial		1		0.89		1		0.61		-
– Aboriginal ceremony and dreaming site with Bora/ceremonial ring		2		1.79		2		1.23		-
– Aboriginal ceremony and dreaming site with Bora/ceremonial ring and resource and gathering site		1		0.89		1		0.61		-
– Aboriginal ceremony and dreaming site with natural mythological and/or ritual significance		13		11.61		15		9.20		+2
Aboriginal resource and gathering site	1		0.89		1		0.61		-	
Art site (pigment or engraved)	2		1.79		2		1.23		-	
– Unspecified art site		1		0.89		1		0.61		-
– Engraving site		1		0.89		1		0.61		-
Artefact site	44		39.29		56		34.36		+12	
– Isolated artefact		13		11.61		15		9.20		+2
– Low-density artefact scatter (<10)		9		8.04		16		9.82		+7
– Undefined artefactual site		22		19.64		23		14.11		+1
– High density artefact scatter (60+)						2		1.23		+2

Site type	2021–2022 search				2024 search				Variation between searches	
	Number	% of Total	Number	% of Total	Number		% of Total		Number	
	Category	Sub-category	Category	Sub-category	Category	Sub-category	Category	Sub-category	Category	Sub-category
Bora/Ceremonial ring (stone or earth)	9		8.04		9		5.52		-	
Burial site	7		6.25		7		4.29		-	
Conflict and/or massacre site	6		5.36		7		4.29		+1	
Culturally modified tree	6		5.36		31		19.02		+25	
– Carved or scarred (unspecified)		4		3.57		4		2.45		-
– Scarred trees		2		1.79		27		16.56		+25
Grinding groove					1		0.61		+1	
Habitation structure	6		5.36		8		4.91		+2	
Natural resource site	2		1.79		4		2.45		+2	
– Stone quarry		1		0.89		3		1.84		+2
– Ochre quarry		1		0.89		1		0.61		-
Stone arrangement	3		2.68		9		5.52		+6	
Not an Aboriginal site	1		0.89		1		0.61		-	
Restricted site	6		5.36		6		3.68		-	
Total	**112**	**-**	**100**	**-**	**163**	**-**	**100**	**-**	**51**	**-**

Table 4.2 Aboriginal objects and sites within Project area and/or recorded by the EIS ACHA

AHIMS #	Site name	Easting	Northing	Site type
21-5-0011*	Kunderang Station;Oven Mountain;	[redacted]	[redacted]	Stone arrangement
21-5-0142*	George's junction Site	[redacted]	[redacted]	Undefined artefactual site
21-5-0143*	George's junction scarred tree	[redacted]	[redacted]	Aboriginal resource and gathering
21-5-0158*	OMPS-R1	[redacted]	[redacted]	Habitation structure
21-5-0159*	OMPS-R2	[redacted]	[redacted]	Habitation structure
21-5-0171	OMPS-ST17	[redacted]	[redacted]	Scarred tree
21-5-0172€	OMPS-ST19	[redacted]	[redacted]	Scarred tree
21-5-0173€	OMPS-ST20	[redacted]	[redacted]	Scarred tree
21-5-0174	OMPS-ST18	[redacted]	[redacted]	Scarred tree
21-5-0175€	OMPS-ST21	[redacted]	[redacted]	Scarred tree
21-5-0176€	OMPS-ST22	[redacted]	[redacted]	Scarred tree
21-5-0177€	OMPS-ST23	[redacted]	[redacted]	Scarred tree
21-5-0178€	OMPS-BS1	[redacted]	[redacted]	Low-density artefact scatter (1-10)
21-5-0179	OMPS-ST14	[redacted]	[redacted]	Scarred tree
21-5-0180*	OMPS-SA2	[redacted]	[redacted]	Stone arrangement
21-5-0181€	OMPS-SA4	[redacted]	[redacted]	Stone arrangement
21-5-0182€	OMPS-SA5	[redacted]	[redacted]	Stone arrangement
21-5-0183€	OMPS-SA6	[redacted]	[redacted]	Stone arrangement
21-5-0184€	OMPS-ST01	[redacted]	[redacted]	Scarred tree
21-5-0185*	OMPS-ST02	[redacted]	[redacted]	Scarred tree
21-5-0186	OMPS-ST03	[redacted]	[redacted]	Scarred tree
21-5-0187€	OMPS-ST04	[redacted]	[redacted]	Scarred tree
21-5-0188*	OMPS-ST05	[redacted]	[redacted]	Scarred tree
21-5-0189*	OMPS-ST06	[redacted]	[redacted]	Scarred tree
21-5-0190*	OMPS-ST07	[redacted]	[redacted]	Scarred tree
21-5-0191*	OMPS-ST08	[redacted]	[redacted]	Scarred tree
21-5-0192€	OMPS-ST09	[redacted]	[redacted]	Scarred tree
21-5-0193€	OMPS-ST10	[redacted]	[redacted]	Scarred tree
21-5-0194	OMPS-ST11	[redacted]	[redacted]	Scarred tree and low-density artefact scatter (1-10)
21-5-0195*	OMPS-ST12	[redacted]	[redacted]	Scarred tree

AHIMS #	Site name	Easting	Northing	Site type
21-5-0196	OMPS-ST13	[redacted]	[redacted]	Scarred tree
21-5-0197	OMPS-ST15	[redacted]	[redacted]	Scarred tree
21-5-0198	OMPS-ST16	[redacted]	[redacted]	Scarred tree
21-5-0199€	OMPS-GG1	[redacted]	[redacted]	Grinding groove
21-5-0200	OMPS-AS36	[redacted]	[redacted]	High-density artefact scatter (60+)
21-5-0201€	OMPS-AS33	[redacted]	[redacted]	Low-density artefact scatter (1-10)
21-5-0202*	OMPS-AS26	[redacted]	[redacted]	High-density artefact scatter (60+)
21-5-0203	OMPS-AS01	[redacted]	[redacted]	Low-density artefact scatter (1-10)
21-5-0204*	OMPS-Q1	[redacted]	[redacted]	Stone quarry
21-5-0205€	OMPS-Q2	[redacted]	[redacted]	Stone quarry
21-5-0206€	OMPS-SA3	[redacted]	[redacted]	Stone arrangement
21-5-0207€	OMPS-SA1	[redacted]	[redacted]	Stone arrangement
21-5-0208*	OMPS-ST24	[redacted]	[redacted]	Scarred tree
21-5-0214	OMPS-CS3	[redacted]	[redacted]	Conflict and/or massacre site
21-5-0215	OMPS-CS4	[redacted]	[redacted]	Aboriginal ceremony and dreaming site with natural mythological and/or ritual significance
21-5-0216	OMPS-CS5	[redacted]	[redacted]	Aboriginal ceremony and dreaming site with natural mythological and/or ritual significance
21-5-0217*	OMPS IF-1	[redacted]	[redacted]	Isolated artefact
21-5-0218€	OMPS OS-1	[redacted]	[redacted]	Low-density artefact scatter (1-10)
21-5-0219€	OMPS OS-2	[redacted]	[redacted]	Low-density artefact scatter (1-10)
21-5-0220€	OMPS OS-4	[redacted]	[redacted]	Low-density artefact scatter (1-10)
21-5-0221€	OMPS OS-3	[redacted]	[redacted]	Low-density artefact scatter (1-10)

Notes: All coordinates are presented in GDA 2020 Area 56.

a. * denotes within the current Project area.

b. € denotes within the construction envelope.

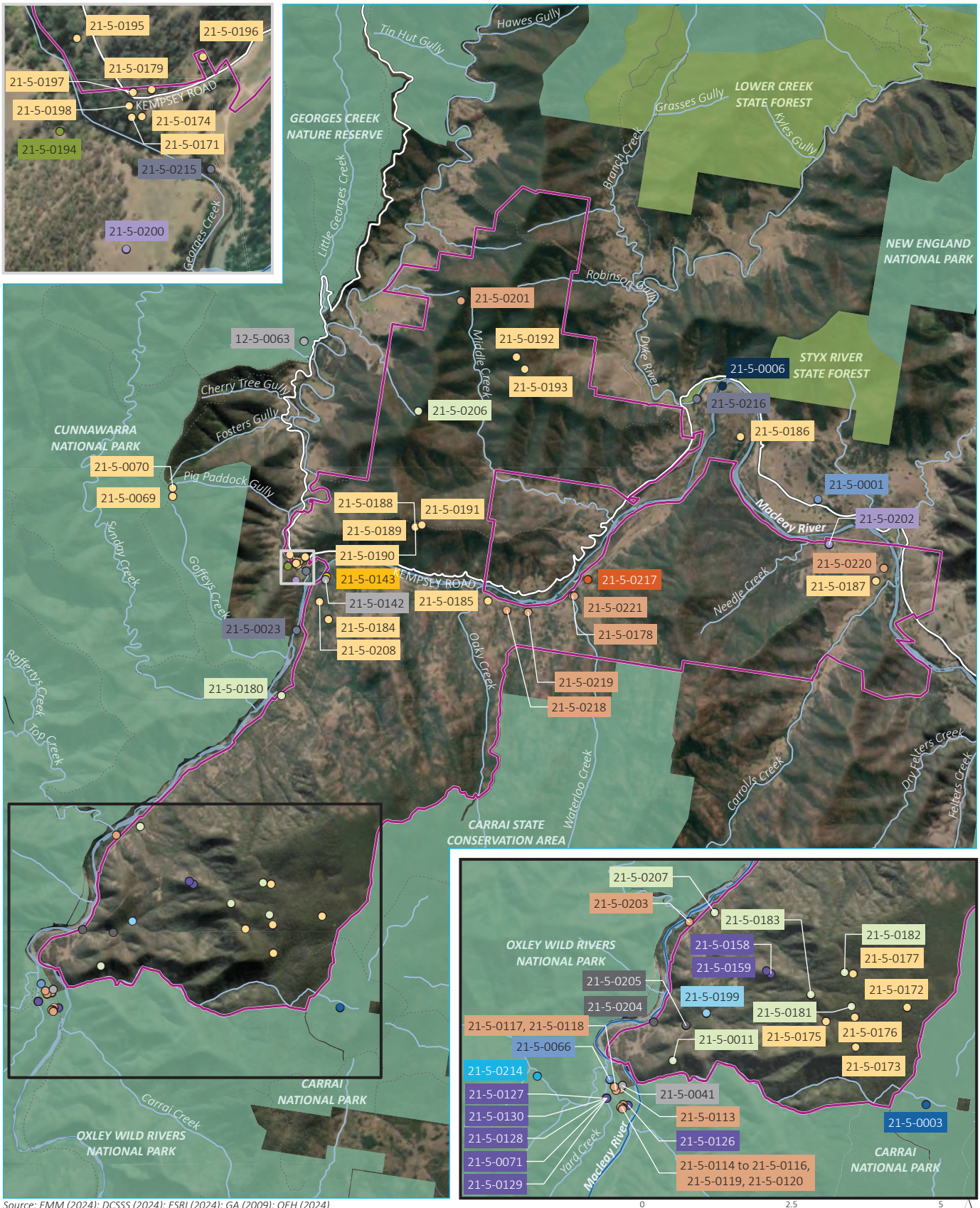
4.2.2 Landform mapping

The Heritage NSW *Code of Practise for the Archaeological Investigations of Aboriginal Objects in NSW* guidelines does not require visual representation of landforms within a Project area. Regardless, Figure 4.2 presents the major landform units present across the Project area as requested in Table 1.1. Table 4.3 presents the previously recorded Aboriginal sites, which are dominated by the findings of the EIS ACHA (i.e. an updated version of Table 7.2 in 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.

Table 4.3 Major landforms and previously documented cultural materials within the Project area

Landform	Landform area within Project area (ha)	Landform area within construction envelope (ha)	Landform area within Disturbance footprint (ha)	Number of previously documents sites	Site density by landform area (1 site/*x* ha).
Creekline	472.42	55.75	24.05	3	157.47
Floodplain	617.72	141.25	34.11	12	51.48
Open depression	764.09	51.39	32.15	5	152.82
Ridge	584.30	120.48	68.50	10	58.43
Slope	2,602.79	229.14	122.40	2	1,301.40
Spur	1,329.88	164.48	86.29	6	221.65
Average	*1,061.87*	*127.08*	*61.25*	*6*	*1,943.25*
Total	**6,371.20**	**762.50**	**367.50**	**38**	**-**

Notes: Number of previously documented sites only include those presented in Table 4.2 within the Project area and/or construction envelope.



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

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KEY

- Project area

AHIMS (by site type)

- Aboriginal ceremony and dreaming site with Bora/ceremonial ring
- Aboriginal ceremony and dreaming site with natural mythological and/or ritual significance
- Bora/Ceremonial ring (stone or earth)
- Burial site
- Grinding groove
- Habitation structure
- High-density artefact scatter (60+)
- Isolated artefact
- Low-density artefact scatter (1-10)
- Resource and gathering site with modified tree
- Scarred tree
- Scarred tree and low-density artefact scatter (1-10)
- Stone arrangement
- Stone quarry
- Undefined artefactual site

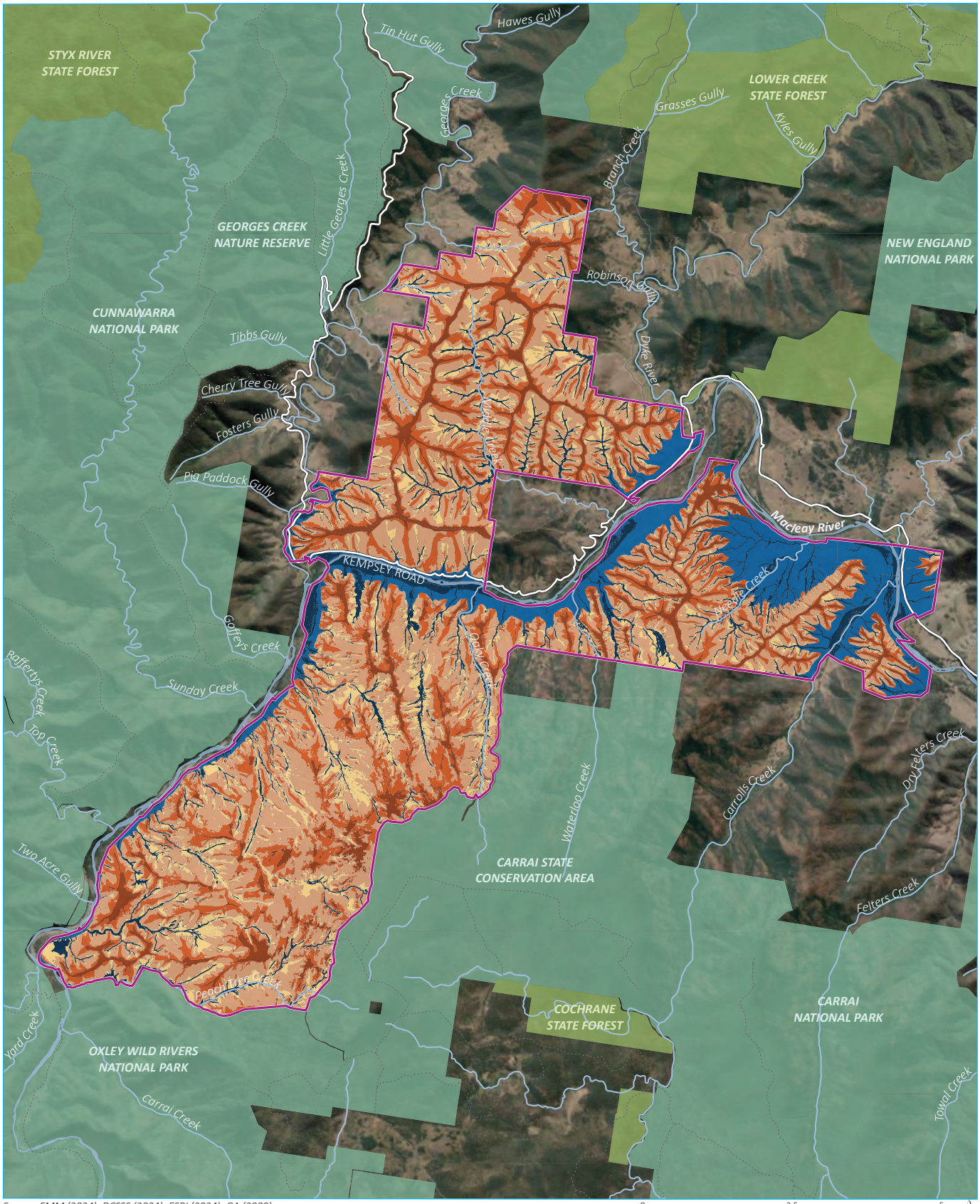
Existing environment

- Major road
- Minor road
- Vehicular track
- Macleay River
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

Previously documented Aboriginal sites within and near the Project area

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 4.1

EMM creating opportunities



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

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GDA 1994 MGA Zone 56

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KEY

Project area

Project landform
- Ridge
- Spur
- Slope
- Open depression
- Floodplain
- Creekline

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

Landform types within the project area

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 4.2

EMM creating opportunities

4.3 Additional information and consideration of tentatively classified sites

4.3.1 Background

The EIS ACHA identified a number of identified Aboriginal sites and places as having a 'tentative' classification. These sites were identified during the field investigations, but either had mixed views by the field team and/or lacked characteristics to validate them as of cultural/anthropogenic origin. Additional invasive works in some of these site types to undertake such validation is also not permitted under Heritage NSW guidelines listed in the Project's SEARs.

In the case of the EIS ACHA, two main site types were identified as 'tentative', several stone arrangements, and culturally modified or scarred trees. A lesser number of potential rock shelters, a quarry and a grinding groove site were also given a tentative status due to an absence of characteristics.

In the case of stone arrangements, a further review was undertaken of the these types of site and develop criteria to discern their cultural origin (Section 4.3.2). These criteria were then applied to the findings of the EIS ACHA and determine whether they pass thresholds indicating that they are of anthropogenic origin. The rockshelters, grinding groove and quarry also undertake a similar approach below.

For culturally modified trees, for those within the Project area, additional field investigations were undertaken by an arboriculturist and RAPs to further investigate these sites, and similarly make a determination.

4.3.2 Stone arrangements

Regionally, stone arrangement sites are largely characterised as 'groups of low stone cairns or heaps of stone' (McBryde 1974: 29). Other types of stone arrangements located in NSW are identified through their morphologies, including 'circles', 'lines', 'pathways', and 'standing stones' (Hamacher et al. 2012). McCarthy (1940) posited that stone arrangements may have ceremonial importance relating to the particular landscape in which it is located, with most stone arrangements to date being identified in areas of high elevations (Hamacher et al. 2012), including preference for good outlooks (McBryde 1974).

Regionally, there are several studies on stone arrangements that can be reviewed to provide an indication of their location, shape, and appearance. Notably, these include the foundational *Aboriginal Prehistory of New England* by Isabel McBryde, as well as several publications that were undertaken by McBryde and Creamer around the same time of this work. More recently Hamacher et al. (2012) have also focussed on this site type and their connection to astronomical activities.

McBryde (1963) undertook a recording of the Serpentine River stone arrangement, which is widely considered to be one of the most significant of these site types in the region. The site consists of two discrete arrangements on exposed rock surfaces above the Serpentine/Styx river. The stones consist of granite straight sided blocks (as a result of weathering rather than modification), and consist of numerous discrete features (Plate 4.1). Of note are several ~1 m high standing stones supported by smaller stones, but numerous linear (~33 cm high) and circular features (~1.3 m diameter) were also documented. Parallel lines of ~33 cm sizes stones (and numbering 12) were documented, along with star-shaped formations, and an oval (~2 m diameter). Overall some 23 discrete stone features were documented in a ~100 x 70 m area.

In her 1974 book, McBryde undertook a more detailed review of stone arrangements across New England. This included descriptions of stone arrangements at Blaxland's Flat (near Nymboida), Bull Paddock (near Orana River), Copmanhurst, Black Mountain, and various others across the Tableland. There are several consistencies across the sites, with all having multiple stone features, typically >10, and in the case of Bull Paddock, some 39 discrete stone cairns; all having abundant stone materials in the immediate vicinity to use for stone arrangement production; most on a ridge or high elevation; and often found in the vicinity of Bora rings or decorated rockshelters indicative of nearby ceremonial activities. Stone arrangements were predominantly large stone cairns frequently of comparable size and >2 m in diameter and between 40 and 80 cm high, but also included circular and linear features.

Further afield, McBryde (1973) published details of a stone arrangement at Brewarinna. Here, in association with a quartzite quarry, a series of mounds were encountered ~90 m away. These were composed of oval or circular quartzite mounds each 1.4–2.1 m in diameter and ~20 cm in height. Some 16 mounds were documented, with 15 found in two discrete locales, and the remaining mound associated with the quarry. A culturally modified tree was also encountered within this site complex.

In 1975, Creamer and Shepherd documented oral histories and some description of the Serpentine, Petroi and Dungowan stone arrangements. The first two being well known and extremely important within the local Aboriginal community. In the case of those at Serpentine River/Bullock Creek, oral history captured during the study that the site was established 'on open ground so that the proceedings may be observed by the supreme being overhead' (Creamer and Shepherd, 1975:4). They further indicated that the stones are in various formations reflecting ceremonial activities undertaken around them, but had unfortunately been vandalised as mentioned by McBryde (1963). At Petroi, the site was similarly in an isolated location and required a rugged climb up to a plateau. Due to the sensitivity of this site, there is limited information on its composition or appearance that can be discerned. The Dungowan stone arrangement found near the township of Dungowan reflected a circular arrangement with pathways both north and south, within the saddle of a ridgeline. Dimensions of this site are listed as ~11 x 7 metres, with the diameter of the ring being 4 m in size.

Further east of the Project area, Brayshaw (1978) undertook recording of a stone arrangement at Rolland Plains, south-west of Kempsey. This site consisted of 16 circular features beginning on a ridge and extending down a slope towards Wilson River. They varied in size, with an average of 2.41 m in diameter and 51 cm in height, and extended across an area perhaps 40 x 40 m in area.

A study by Davies (1993:40) identified stone arrangements in the Walcha-Nundle state forests as typically 'consist of stone heaps, or cairns of varying size (up to 50 cm high and 10 cm diameter). There are also sites where individual stones are arranged into lines and semi-circles'. The report adds that:

> The most widely known Stone Arrangement in the management areas is near the Serpentine River…
>
> …these sites can occur anywhere where there are rock outcrops and the surrounding terrain is relatively flat…there is a tendency for these site types to occur on fairly remote vantage points.

Hamacher et al.'s (2012) investigations are slightly biased, since they focussed specifically on linear stone arrangements to answer their research questions. The study reviewed some 643 stone arrangements listed in the AHIMS database. Of these, only 24 met their criteria to be a linear stone arrangement with at least five stones. Notably 21% of these contained multiple rows of stones, with a further 4% revealing other features.

Plate 4.1 **Examples of stone arrangements at Serpentine River (McBryde 1963)**

Plate 4.2 **One component of a stone arrangement at Petroi (Creamer and Shepherd 1975)**

Plate 4.3 The Dungowan stone arrangement (Creamer and Shepherd 1975)

i Selection criteria

When considering the information outlined above, a number of consistent patterns are evident for stone arrangements that are known to be of anthropogenic origin. In almost all cases, the stone arrangements appear to relate to ceremonial activities, often gender-specific (male) initiation; and this requirement strongly influences their location and composition. Specifically as follows:

1. The majority of stone arrangements are on high plateau or exposed ridge locations that are remote and hard to reach. Their location forms both part of the ceremonies they are used for, and to avoid interaction with utilitarian life – access to such sites being extremely restrictive within the Aboriginal community.

2. Several examples indicate that they are exposed and have extensive views of the surrounding region. This is an extension of the ceremonial activities performed and their relationships with the sky and/or being visible to Dreaming beings.

3. While not universal, a large number of examples are found to be located on exposed geological bedrock and in proximity to a range of useable raw materials.

4. Stone arrangements will typically be composed of a number of closely spaced discrete elements in the form of circles, ovals, lines, or other shapes. They are rarely found in isolation, such as a single cairn of stones, and often >10 features have been documented in this region.

5. Stone arrangements are predominantly circular or oval in shape, and will typically be of considerable size (>1.5 m diameter, with examples of >4 m). Linear stones are also common, but rarely in isolation.

6. Stone arrangements are often found in association with other forms of cultural materials, such as culturally modified trees.

7. Many of these sites within the region are known to the Aboriginal community and will have been documented by them in the past, or will have stories and relationships to ceremonial activities known.

It is also worth highlighting with specific reference to the Bellbrook region that Victor Shepherd, an initiated man, undertook extensive works with the anthropologist Harry Creamer in the 1970s. He provided extensive information of traditional and historical activities extending back into the pre- and early post-Contact period across the region; and including the description of the natural increase site documented at the Georges Junction and Macleay River intersection outlined in the EIS ACHA. His information also included discussions of stone arrangements at Petroi and Serpentine River. Notably, he makes no reference in any discussions to Oven Mountain or such sites at this locale (Creamer 1981).

ii Consideration of OMPS-SA1-6 inclusive

Six tentatively classified stone arrangements were noted in the EIS ACHA. Table 4.4 presents these sites against the criteria in the preceding section. Where at least three criteria are met, the site is classified as of anthropogenic origin. When applying these criteria, only OMPS-SA1 can be considered valid, and it must be noted that this site is located on the National Trail where linear stones for marking the route may be expected. While several of the remaining sites meet a small number of the criteria, they do not meet thresholds considered to reflect an anthropogenic origin.

It is also highlighted that OMPS-SA6 was proposed as a burial location based on the stone arrangement being of anthropogenic origin. Given the site fails to meet most of the regional criteria, it is considered to reflect natural geological process, and further suggest the potential for it to mark a grave improbable. When reviewing McBryde's (1974) regional study on burials in the broader region, these are frequently found in rockshelters, and can either reflect a bark burial (an individual laid on a piece of bark) or cremation. She does reference inhumations, and where stone is adopted as a medium for these interments, the individual is commonly bound sitting upright with his knees close to their chest. While not described in detail, it would be expected to cover a sitting individual, a stone arrangement would need to be at least 80 cm– 1 m in height to ensure covering of the remains. As shown in Plate 4.4 for OMPS-SA6, the height of the feature is ~50 cm at its highest point.

Plate 4.4 The height of OMPS-SA6 based on the EIS ACHA investigations.

Table 4.4 Consideraton of stone arrangements against regional criteria

Site	AHIMS #	Description from EIS ACHA	Criteria							Conclusion
			1	2	3	4	5	6	7	
OMPS-SA1	21-5-0207	…identified on an outcrop of granodiorite identified by RAP participants, with an artefact scatter in proximity. The site is located on a level to gently inclined spurcrest adjacent to an access track, and the area within which cultural materials were identified is approximately 50 m (l) x 40 m (w). The stone arrangement comprises up to seven lines of small (generally <10 cm) rocks placed in wavy lines on outcropping granodorite. The antiquity of this site is questionable, as the rocks within the stone arrangement are very small and not secured. Some of these lines are intact, though have been disturbed and retain no discernible form. In addition, several artefacts were identified on the access track adjacent to the stone arrangement. Artefacts identified included a number of hornfels flakes and a blade, and a retouched silcrete flake.				✓	✓	✓		Valid – meets three criteria, although must be noted it is found in close proximity to the National Trail
OMPS-SA2	21-5-0180	…identified on an outcrop of granodiorite identified by RAP participants. The site is located on a level to gently inclined terrace abutting the Macleay River (~210 m west) and on the verge of the active flood zone, and the area within which [stones] were identified is approximately 2.5 m (l) x 2 m (w). The stone arrangement comprises a number of small (generally <10 cm) rocks on the outcrop, though they form no discernible pattern or form.								Non-cultural – meets none of the criteria
OMPS-SA3	21-5-0206	…identified by RAP participants, located on a small saddle along the ridgeline in the mountains to the north of the project area. The stone arrangement is very obscured by dense vegetation and features a few large slate boulders with no discernible form or pattern, measuring 105 cm (l) x 80 cm (w) and no more than 50 cm high. The site is located inside the current disturbance footprint.								Non-cultural – meets none of the criteria
OMPS-SA4	21-5-0181	…identified on an outcrop of granodiorite identified by RAP participants. The site is located on a hillslope where the Carrai Plateau starts to drop away into the Macleay River Valley. The arrangement has no discernible shape or form, and features a few (<10) granodiorite rocks on exposed granodiorite bedrock. Identified by RAPs as potential stone arrangement due to the patterning, including one stone standing upright.	✓		✓					Non-cultural – meets only a small number of the criteria
OMPS-SA5	21-5-0182	…identified on an outcrop of granodiorite identified by RAP participants. The site is located on a small saddle along the ridgeline in the mountains to the north of the project area. The arrangement has not discernible shape or form, and features a few (<5) granodiorite rocks on exposed granodiorite bedrock. It is very overgrown with long grasses.	✓							Non-cultural – meets none of the criteria
OMPS-SA6	21-5-0183	…identified on a spurcrest, where the Carrai Plateau drops away into the Macleay River Valley. The stone arrangement consists of a loosely arranged pile of rocks/cairn (approximately 60 cm (l) x 1.3 m (w)). The elevation of the site offers good views of the Macleay River valley, particularly when facing west. Discussion with RAP participants identified this as a potential stone arrangement, burial or European cairn.		✓			✓			Non-cultural – meets only a small number of the criteria

4.3.3 Culturally modified trees

Some 24 potential culturally modified trees were encountered within the Project area as part of the EIS ACHA. In most instances, the identifications were not fully supported by all members of the field team or had unresolved questions, and were therefore identified as tentative with a recommendation for further specialised investigation to be undertaken.

As part of the addendum report, EMM sought the advice of Danny Draper, an arboriculturist with Urban Tree Management to provide inputs into the classification of these sites. This included a preliminary desktop review of the identified sites, and an on-site inspection of those within the construction envelope in attendance with an archaeologist and representatives of the Aboriginal community (including Steve Ahoy, Terrence Cohen, Gordon Jacky, and Elwyn Toby).

In the preliminary desktop review, it was considered that 11 trees were unlikely to reflect anthropogenic origin, with other more probable mechanisms, including:

- animal and/or insect damage: OMPS-ST3, OMPS-ST5, OMPS-ST6, OMPS-ST8, OMPS-ST9, OMPS-ST11, OMPS-ST20
- contemporary or extremely recent wound: OMPS-ST15, OMPS-ST16, OMPS-ST17
- mechanical impacts: OMPS-ST10.

Despite this, a number of the trees above, as well as eight suspected of being of Aboriginal creation, were targeted for site inspection. In addition, four new potential sites identified as part of recent field investigations (Section 5.2) were also inspected. Table 4.5 provides a summary of the findings of these inspections, with the full report provided in Annexure C.3.

Based on these results, 15 of the cultural modified trees are considered valid:

- based on preliminary desktop review: OMPS-ST7, OMPS-ST12, OMPS-ST13, OMPS-ST14, OMPS-ST18 and OMPS-ST24; several of these are now outside the Project area
- based on site inspection: OMPS-ST1, OMPS-ST2, OMPS-ST4, OMPS-ST19, OMPS-ST22, OMPS24-ST1, OMPS24-ST2, OMPS24-ST3, OMPS-ST4.

The remaining 13 sites (when including the additional findings from Section 5.2) are considered to have formed through natural processes and are considered non-cultural.

Table 4.5 Consideration of culturally modified trees inspected within the Project area.

Site name	AHIMS #	Common name (genus, species)	Age range of tree (approximate years)	Age range of wound/s (approximate years)	Likely original of wound/s	Conclusion
OMPS-ST1	21-5-0184	Forest red gum (*Eucalyptus tereticornis)*	200 - <250	120–<150	Aboriginal cultural origin	Valid
OMPS-ST2	21-5-0185	Forest red gum (*Eucalyptus tereticornis)*	250 - <300	100–<150	Aboriginal cultural origin	Valid
OMPS-ST4	21-5-0187	Forest red gum (*Eucalyptus tereticornis)*	300 - <350	150–<200	Aboriginal cultural origin	Valid

Site name	AHIMS #	Common name (genus, species)	Age range of tree (approximate years)	Age range of wound/s (approximate years)	Likely original of wound/s	Conclusion
OMPS-ST9	21-5-0192	Spotted gum (*Corymbia maculate [Hook.])*	75 - <100	20–<40	Mechanical wound from abrasion impact	Non-cultural
OMPS-ST10	21-5-0193	Forest red gum (*Eucalyptus tereticornis)*	20- <40	100–<150	Mechanical wound from abrasion impact and secondary damage by fire	Non-cultural
OMPS-ST19	21-5-0172	Tallowood (*Eucalyptus microcorys*)	150- <200	W1: 100–<150 W2: 20–<40	W1: Aboriginal cultural origin W2: insect damage and secondary damage by fire	Valid
OMPS-ST20	21-5-0173	White mahogany (*Eucalyptus acmenoides*)	125 - <150	W1: 20–<40 W2: 20–<40 W3: 20–<40	W1-W3: insect damage and secondary damage by fire	Non-cultural
OMPS-ST21	21-5-0175	Grey gum (*Eucalyptus biturbinata)*	200 - <250	24–<50	Mechanical wound from abrasion impact	Non-cultural
OMPS-ST22	21-5-0176	White mahogany (*Eucalyptus acmenoides*)	300 - <375	150–<200	Aboriginal cultural origin	Valid
OMPS-ST23	21-5-0177	White mahogany (*Eucalyptus acmenoides*)	300 - <350	50–<75	Insect damage	Non-cultural
OMPS24-ST1		Forest red gum (*Eucalyptus tereticornis)*	325 - <375	150–<200	Aboriginal cultural origin	Valid
OMPS24-ST2	-	White mahogany (*Eucalyptus acmenoides*)	250 - <275	125–<150	Aboriginal cultural origin	Valid
OMPS24-ST3	-	White mahogany (*Eucalyptus acmenoides*)	350 - <400	100–<125	Aboriginal cultural origin	Valid
OMPS24-ST4	-	White mahogany (*Eucalyptus acmenoides*)	325 - <375	150–<200	Aboriginal cultural origin	Valid

4.3.4 Other site types

There are four further sites that were assigned a tentative status in the EIS ACHA, including OMPS-R1, OMPS-R2, OMPS-GG1, and OMPS-Q1. In the case of OMPS-Q1 and OMPS-R2, these are outside the construction envelope and would be unaffected by the Project. They have been listed on the AHIMS database as #21-5-0204 and#21-5-0159, respectively, and therefore do no warrant further consideration.

In relation to OMPS-R1, this is potential rockshelter situated outside, but extremely close to the construction envelope. While direct impacts are not expected, the site is downslope of a portion of the road between the two reservoirs and may be subject to indirect impacts. Previously documented rockshelters within the region are sparse. The regional record based on the AHIMS data (Section 4.2) reveals no other examples of such sites. Godwin (1990) identified two sites at Kunderang Brook creek, with only one rockshelter, K2, revealing evidence of limited past use. This site was located on a steep hill, 150 m from Kunderang Brook. The site was some 6 m wide x 4 m deep and ~1–1.5 m in height. There are few other sites recorded in this region, although McBryde's (1974) regional study documents a substantial number of these sites across north-east NSW. While a detailed summary cannot be provided here, the vast majority of the sites appear to be of considerable size, albeit not infrequently with low roofs, and often with art and/or cultural deposits. They usually occur on steep relief overlooking or within relatively close proximity to water courses. Examples include rockshelters at Blaxland Flat's, which were found on a ridge near Skinner's Swamp Creek. These sites both included art motifs, and were ~4 m long x 2 m deep x 1.8 m high, and ~5 m long x 4 m deep x 3 m high. At Sandy Creek, she noted a rockshelter overlooking Sandy Creek, with art motifs and some 15 m long x 3 m deep x 3 m high. At Chambigne, near Grafton, a large number of rockshelters were encountered. Again, these primarily included art motifs and/or deposits, and often >6 m long, albeit several having low roofs of <1.2 m. Near Orara River, in the vicinity of Middle Creek, a small shelter with art, some ~14 m long x 2 m deep x 1.5 m high, was documented.

When considering OMPS-RS1, it fails to correlate with many of the similarities with those documented by Godwin (1990) and McBryde (1974). Specifically, while the roof is of suitable height, the site is extremely narrow that contrasts with most other sites suggesting that they are several metres long. It also lacks any evidence of art or cultural deposits, which are common in other examples. While not definitive, with large variation in spatial locations elsewhere, the site is some distance from any water course. Based on this, it is considered improbable that OMPS-R1 reflects a rockshelter used by people in the past, and has been de-classified.

OMPS-GG1 reflects a single groove on a granodiorite boulder located with the proposed lower reservoir. While such sites may be expected given the presence of axe production sites and axes within the cultural assemblage, it is considered improbable that this feature represents anthropogenic activity. Again, here, there is no evidence of such sites in the regional record (Section 4.2). When reviewing regional studies, such as McBryde (1974) such sites are exclusively constrained to sandstone geological substrates and are rarely found in isolation with groups or clusters of grooves typically encountered. Neither condition is met by OMPS-GG1.

5 Field investigations

5.1 Key findings

- Following commitments in the EIS ACHA, amendments to the Project, and in response to received from Heritage NSW during EIS exhibition, additional on-site activities have been undertaken. These included the following:
    - further archaeological survey of additional investigation areas, which are proposed to form part of the revised construction envelope, located at the proposed upper reservoir and access road that proposes to link the upper and lower reservoir sites
    - completion of the original excavation program along the proposed EAR, which further investigated the alluvial terraces and spurcrests of the Macleay River; this was undertaken in response to commitments made as part of the EIS ACHA, as this locale was identified as having the potential to contain deeper alluvial soils
    - additional test excavation to further understand any buried cultural deposits within the construction envelope focussing on the proposed upper reservoir site which had not previously been subject to subsurface excavation.
- Additional field survey for the addendum report totalled some 14 km primarily focussed on the amendments to the Project on the Carrai Plateau. When combining the results of the field activities undertaken for both the EIS ACHA and this addendum report, survey for the project has resulted in ~121 km of pedestrian survey transects, resulting in coverage of ~129 ha of the construction envelope. In relation to the additional survey, some nine discrete sites were identified, including five surface artefact scatters and/or isolated finds, four culturally modified trees, and one stone arrangement. None of the artefact sites identified met artefact thresholds identified in the EIS ACHA, and are incorporated into OMPS-BS1 (#25-5-0178) in Section 6.3.
- In terms of the EAR excavations, a further sixty-one 0.25 m^2 test pits (15.25 m^2) were undertaken in May 2023, and focussed on the eastern portion of the Project area along the alluvial flats of the Macleay River. While the EIS ACHA considered this area to have potential for deep alluvial soils based on desktop research, this investigation identified that while there is some potential for deep soils in this locale, artefactual material was only recovered in 7 of the 61 test pits. When considering the results against thresholds identified in the EIS ACHA, three significant cultural deposits comparable with previous findings were identified, all in the vicinity between Georges Junction and Lower Creek, and these sites have been identified as areas of foci in Section 6.3.
- A further twenty-eight 0.25 m^2 test pits and one 1 m^2 test pit across the ridges, spurs and slopes of the Carrai Plateau where undertaken. Of the 140 artefacts recovered during this component of the archaeological program, 136 (~97%) were recovered from a single test pit (UR8). As such, when considering the results against thresholds identified in the EIS ACHA, UR8 is considered to be the only significant cultural deposits encountered, and have been identified as a cultural deposit in Section 6.3.
- When combining the test excavation activities undertaken for both the EIS ACHA and this addendum report, some 209 test pits have been undertaken, totalling 52.25 m^2. This has included regular transects across the lower reservoir footprint, along the entire proposed EAR on the banks of the Macleay River, and the Carrai Plateau.

5.2 Archaeological survey

5.2.1 Overview of EIS ACHAR survey activities undertaken for the EIS

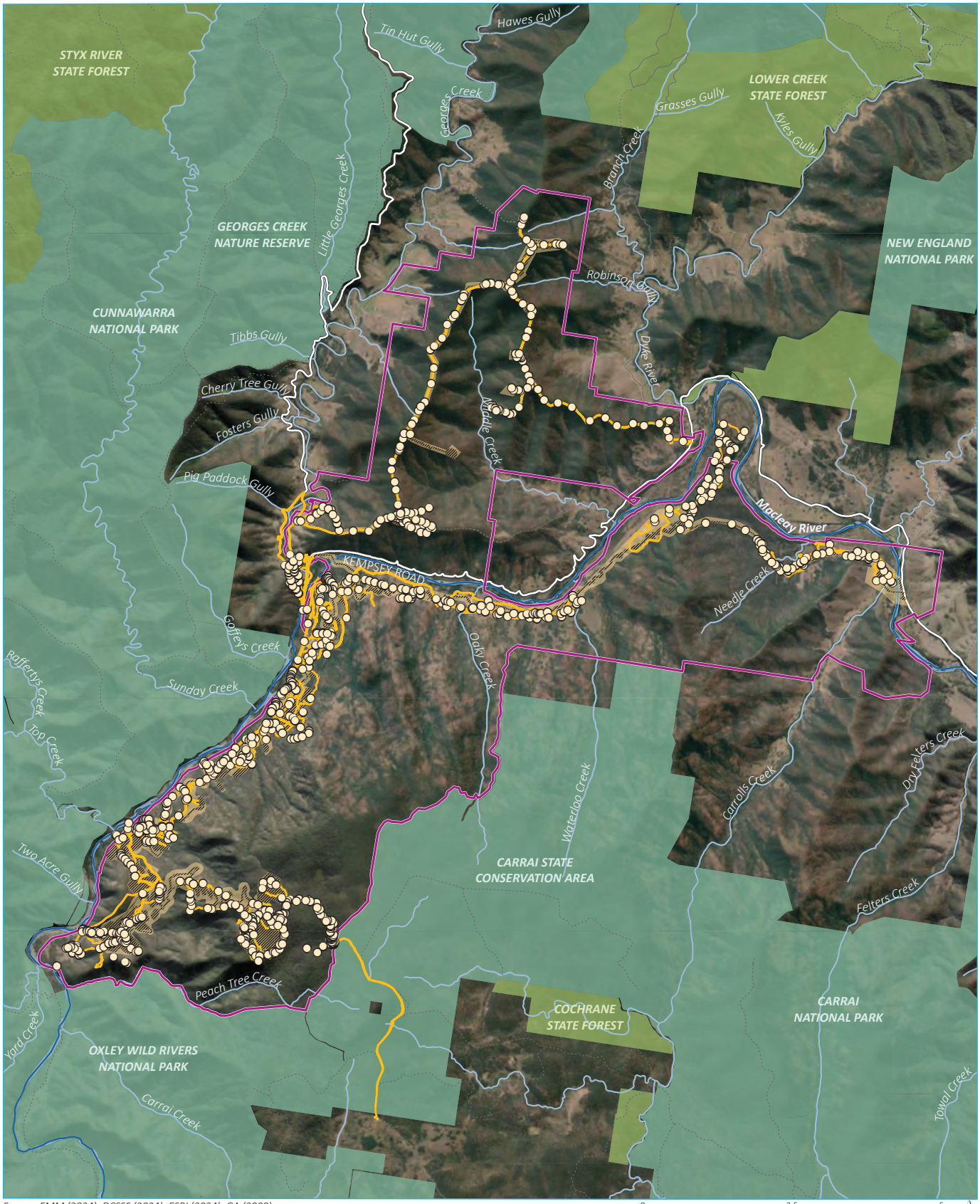
The following provides a summary of key activities and/or findings of the field survey completed as part of the original EIS ACHA up to the completion of the EIS ACHA and submission of the EIS:

- On-site validation consisted of field surveys and test excavations undertaken by EMM archaeologists and representatives of seven of the registered Aboriginal parties. The field survey encompassed a 5-week period in May and June 2022, while the test excavations consisted of a four-week program between August and September 2022, and then a smaller six day program in May 2023. The field activities completed ultimately totalled over 250 person days of investigation on-site.

- The field survey encompassed some 107 kilometres (or some 801 hectares) of linear **pedestrian transects** across the construction envelope and included 1,004 individual points of observation and documentation. All parts of the surveyed area (which broadly correlates with a proposed construction envelope) were investigated, with the exception of a small portion of the proposed EAR within the flood zone, which was not accessible due to high waters in the Macleay River at the time of the field program.

- Across the construction envelope, exposure was ~60% (reflecting the high proportion of access tracks traversed), visibility was ~16% and effective coverage ~13%. Visibility and coverage were relatively poor (~13%) due to dense vegetation. Despite this, some 108 Aboriginal objects, sites and/or places were documented, and one previously documented site relocated. These included: 42 artefact scatters; 32 isolated stone artefacts, including one possible post-contact artefact; 24 potential culturally modified trees, including one associated with an artefact scatter and one associated with a potential gender-restricted (women) site; six stone arrangements, including one associated with a nearby artefact scatter; two potential quarry sites, including one associated with an artefact scatter; two potential rockshelter sites; and, one potential grinding groove site identified by Aboriginal participants.

- Spatially, these sites were primarily found on hillslopes (n=29, 27%), which likely is more reflective of the abundance of this landform within the surveyed area rather than any distinctive site pattering. Notably, hillslopes reflect 75% of the area effectively surveyed during the fieldwork. Comparatively, while terrace landforms represent <1% of the area effectively surveyed, 15% (n=16) of sites were identified on this landform type. Similarly, spurcrests represent <1% of the area effectively surveyed, with 15% (n=16) of sites were identified on this landform. This is most evident in the site density calculations which demonstrated that that 1 site per 2–5 ha may be expected in terraces, spurcrests and spur slopes compared with 1 site per 8–12 ha in hillcrests or slopes.



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

0 2.5 5 km

GDA 1994 MGA Zone 56

N

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KEY

- Project area
- Disturbance footprint
- Amended construction envelope

EIS ACHAR field survey

- Survey documentation point
- Survey track

Existing environment

- Major road
- Minor road
- Vehicular track
- Macleay River
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

Summary of EIS ACHAR field survey and findings

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 5.1

EMM creating opportunities

5.2.2 Approach and methods

i Background and aims

Due to the changes to the disturbance footprint, some additional survey was required to investigate additional areas proposed for inclusion in the Project. In addition, subsequent comments from Heritage NSW (Table 1.1) sought further investigation of two locations which had been inaccessible: the first being the escarpment abutting either side of the proposed access road which links the lower and upper reservoir sites, and the second being a small portion of the construction footprint east of Waterloo Creek which was flooded at the time of original survey.

The latter of these, the area east of Waterloo Creek, was not achieved due to unrest among the Aboriginal participants relating to works undertaken at the lower reservoir site and surrounds (Section 2). However, it is highlighted that a significant amount of time was spent at this locale during the test excavations undertaken in May 2023 (Section 5.3), and no surface sites were identified; and majority of test pits excavated in this area were sterile aside from a small number (discussed in Section 5.3.2ii).

The escarpment abutting the proposed access road leading from the lower to upper reservoir sites, was investigated further as part of this survey. Due to the near vertical rockface that comprises the escarpment, access to the escarpment directly was still deemed to be a safety issue without appropriate training; and as such was only inspected from various vantage points and often at distance. The additional survey did confirm however, the construction area largely follows a slightly less inclined spur that bends down from the proposed upper reservoir to the proposed lower reservoir, and therefore does not directly impact the identified escarpments.

Building on the work of the EIS ACHA, and with respect to the aims and conditions outlined above, 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 Steve Ahoy (Iwatta Aboriginal Corporation) during the course of this assessment (Section 2), specifically in regards to the size and cultural significance of the site.

ii Methods

The additional survey was undertaken between 12–14 June 2024. These works were undertaken by EMM archaeologists (Taylar Reid and Mikhaila Chaplin), with the participation of four RAPs, primarily locally based Thunggutti traditional owners (Table 5.1). A site inspection of #21-5-0142 was also coordinated by Nicolas Reilly with the participation of two RAPs, specifically two Anaiwan traditional owners who have cited cultural connections to this specific site.

The methods for undertaking archaeological field investigations for the addendum report aligned with previous investigations undertaken by the EIS ACHAR (EMM 2023), and in accordance with Section 2.2 of the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010). This included the participation of archaeologists and registered Aboriginal individuals and/or organisations undertaking pedestrian inspection of the amended construction area. Survey included revisitation of previously documented sites and places identified in the desktop review.

For the majority of the project, archaeological surveys consisted of a pedestrian inspection of the additional investigation areas between ~100 and 200 m in width. As the additional survey areas are located on the peripheries of the original construction envelope, parts of the construction envelope were resurveyed as part of this fieldwork. A team of six personnel (generally two archaeologists and four Aboriginal participants) spread between 10–20 m apart in a line and walked along the amended construction area either in a single direction or completed adjoining transects to ensure complete coverage. Due to thick understory coverage across the proposed upper reservoir site and difficult terrain, distance between participants could not always be maintained.

The archaeological survey and data collection methods followed Section 2.2 of the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010). Site recording was completed in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010).

Table 5.1 Aboriginal stakeholder representatives involved in the fieldwork

Organisation or individual	Personnel
Dunghutti Elders Council	John Kelly Kevin Smith
Alinta	Juston Sullivan Gordon 'JJ' Jackey
Iwatta Aboriginal Corporation	Steve Ahoy
Bruce Cohen	Terrance Cohen

5.2.3 Results

The archaeological field survey undertaken for this addendum report included the completion of field survey for a further ~14 km of survey units (SU) across the additional investigation areas on the peripheries of the construction footprint (Table 5.2; Plate 5.1–Plate 5.10; Figure 5.2 & Figure 5.3). Some 287 discrete observations were made during the field survey associated with the addendum ACHAR, where a participant entered notes, photographs, descriptions, etc, about the landscape, and/or identified cultural materials (Figure 5.2 and Figure 5.3; Annexure D).

Overall, the areas surveyed for this addendum report comprised additional investigation areas that sit on the peripheries of the previously investigated construction envelope, around the proposed upper reservoir and at the edges of the proposed access road that joins the lower and upper reservoir. Across the additional investigation areas, exposures on average were relatively high (68%), reflecting the high proportion of access tracks traversed and high levels of exposed bedrock in all areas surveyed. Conversely, visibility across the additional investigation areas was relatively low (13%) and effective coverage of these areas totalled 8%.

Topographically, the construction envelope and additional investigation areas in the vicinity of the upper reservoir are situated on the edge of the Carrai Plateau, a flat to gently undulating plateau that drops steeply and dramatically into the Macleay River valley to the west. The proposed upper reservoir sits on the edge of this drop, utilising the naturally steep spurs and ridges in this locale for the proposed dam. To give an indication of the terrain, particularly the areas surveyed between the lower and upper reservoir, the elevation grade between the proposed upper and lower reservoir is ≥50° (with slopes of up to 89° recorded in some sections) and walking between the two reservoir sites requires ~6 hours despite being only ~1 km apart.

Due to highly variable terrain and relatively discrete, small additional investigation areas, the survey was divided into four survey areas (SUs), each with a single transect apart from SU5, and primarily captured ridge, spur and slope landforms, and some open depressions. These transects and associated survey coverage are summarised in Table 5.2, and shown in Figure 5.2. Due to the position on the edge of the plateau and given the steep topography, while many watercourses are mapped within the upper reservoir, these reflect headwaters and ephemeral drainage lines, carrying flow only occasionally after heavy rain. The underlying geology of the locale is a granodiorite and granite, and where evident, soils appeared to be residual and comprised course quartz sands formed from the eroding bedrock. Large boulders and exposed bedrock are evident across the surveyed areas, and natural quartz was observed in many of the visible exposures. Due to the steep topography and associated high levels of erosion and soil movement downslope, archaeological potential was considered low on slopes, with some potential retained on ridgelines and spurs where erosion was less severe, and open depressions where cultural materials may settle due to colluvial movement.

The first transect, OMPS24-T1, is situated in SU1, across a spur extending south-west from the plateau, and associated steep slopes and deeply incised open depressions. The area has been historically logged, and native regrowth consisted primarily of thin native gums with a thick understory of ferns, long grasses, shrubs and vines, as well as invasive weeds. Similarly to SU3, which is also located on the edge of the plateau where it drops into the lower reservoir site, where vegetation cleared, impressive views of the river valley towards Kunderang Station were observed (Plate 5.2). The visibility was poor (~20%) across the transect, and the exposure was estimated to be moderate (60%), particularly on the slopes and largely due to rock exposures, including boulders and exposed bedrock slabs.

The second transect, OMPS24-T2, in situated in SU2, and extended across a moderate ridge and associated slopes, situated on the eastern edge of the proposed upper reservoir. This area exhibited a similar environment and landforms as SU1 but varied slightly by the increase in large granite boulders protruding from the ground surface, as well as small boulders and exposed bedrock slabs on the steep incised slopes. Visible soil exposures were largely constrained to the access tracks, and where observed were noted as fine- and coarse-grained quartz sands, reflective of residual soils. Overall, this transect had low visibility (~10%) due to leaf litter and other vegetation, but moderate to high exposures (~80%) primarily due to the proximity of the access road and rock exposures.

The third SU featured transect OMPS24-T3, and extended across a steep ridge and spur, and associated slopes and open depressions. The terrain varied between steep slopes to spurcrests, and deeply incised gullies, and traversing steep slopes was difficult with scree, boulders, and thick brush obscuring the field of vision. This SU featured the highest proportion of rock exposures, a reflection of its position on the steep slopes which lead down to the lower reservoir site. Where vegetation cleared, impressive views of the river valley showed the abutting escarpment showed near-vertical granite bedrock with occasional blocky boulders protruding above the sheer granite faces. While some small cervices were observed, these were generally too small for occupation and facing the prevailing winds, so generally deemed to be unsuitable for occupation and an undesirable place to camp. The visibility was nil for much of the SU due to leaf litter and other vegetation, and the exposure was high (80%), where the small amounts of scree and skeletal soils supported the vegetation amongst the granite boulders.

The final transects (OMPS24-T4 and OMPS24-T5) are located in SU4, which is to the north of SU1, and situated on undulating spurs and slopes. This area exhibited a similar environment and landforms as SU1, and similarly exhibited very low visibility (<10%) and moderate exposure (40%), though notably featuring many boulders and fallen logs across the SU which made the terrain difficult to traverse. Where observed, soils were consistent with other SUs. Unlike other parts of the additional investigation areas, limited previous disturbance was observed in this locale, and very little evidence of forestry activities and land clearing were observed.

In addition to the formal survey undertaken in the additional investigation areas of the upper reservoir, during the course of the culturally modified tree assessment (13-14 June 2024), #21-5-0142 was reinvestigated in light of new information provided by Iwatta Aboriginal Corporation (Section 2; Annexure B.8). The findings of this are described in Section 5.2.4.

Table 5.2 Overall field survey undertaken for the construction envelope by the EIS ACHA and addendum report activities

Unit #	Length (m)	Area (m^2)	Landform	Exposure (%)	Visibility (%)	Effective coverage	
						Area (m^2)	Percent (%)
OMPS24-T1	1,749	4,540	Ridge, spur and slopes	80	20	726	16
OMPS24-T2	1,779	11,874	Ridge, spur and slopes	70	10	831	7
OMPS24-T3	4,662	9,993	Ridge, spur and slopes	80	10	799	8
OMPS24-T4	1,440	65,855	Ridge, spur and slopes	40	10	2,634	4
OMPS24-T5	4,403			50	10		
Total	**14,033**	**92,262**				**7,785**	**8**
Average	*2,807*	*23,066*		*68*	*13*	*1,248*	*9*

Plate 5.1 The steep slopes and bedrock exposures featured within SU1

Plate 5.2 Views of the Macleay River valley and Kunderang Station (blue arrow for general location), as observed from slopes of SU1

Plate 5.3 Example of the large granite boulders on the slope leading down from the spur in SU2, facing north

Plate 5.4 Example of coarse-grained sand exposure along vehicle access track on the eastern margin on SU2, facing east

Plate 5.5 Steep slopes and exposed boulders which typify SU3, facing west

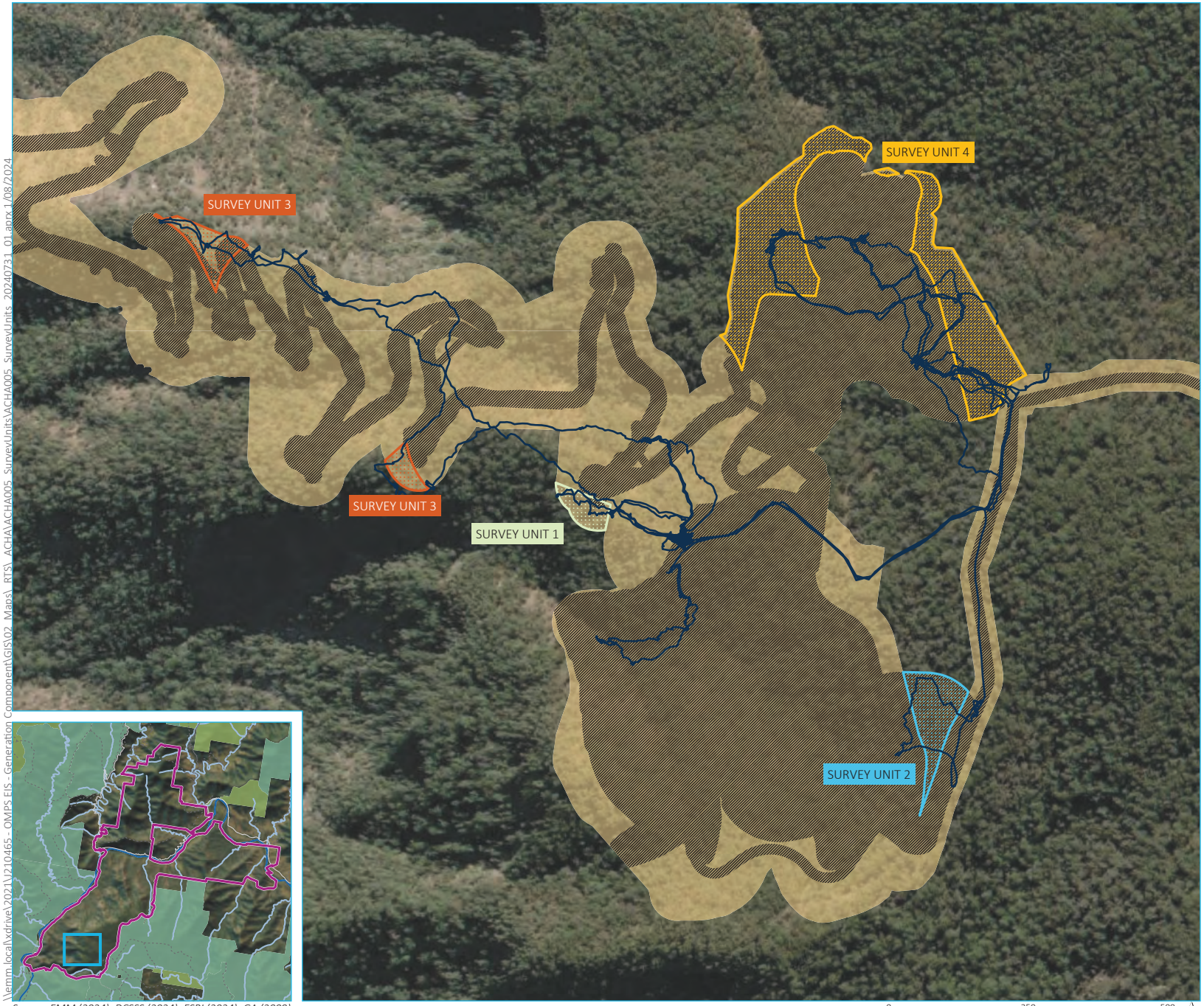
Plate 5.6 Views of the near vertical escarpment that abuts the construction envelope, as observed from SU 3, facing north-east

Plate 5.7 Example of the level crest of a ridge in SU5, on transect OMPS24-T4, view facing north-east

Plate 5.8 Example of steep slopes identified in OMPS24-T4, facing north

Plate 5.9 An example of an open depression (headwaters of a drainage line) in SU5, on transect OMPS24-T5, facing north

Plate 5.10 Example of the steep slopes and granite rock exposures of SU5, facing west



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

Field survey units, transects and documentation points in the additional investigation areas

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Figure 5.2

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5.2.4 Additional Aboriginal sites identified

The addendum report investigations identified a further nine previously undocumented Aboriginal objects and sites, and revisited several previously documented sites (Plate 5.1Plate 5.1–Plate 5.10; Table 5.3 & Table 5.4; Figure 5.3). 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 EIS ACHA.

Spatially, the results of this additional survey align well with the results documented in the EIS ACHA (EMM 2023a), with the majority of sites either encountered in proximity to the Macleay River, on ridge lines and/or where good views are present. Table 5.3 and Table 5.4, and Figure 5.3 presents a summary of these findings, which includes three low density artefact scatters (OMPS24-AS1–AS3 inclusive), an isolated object (OMPS24-IF1), and four culturally modified trees (OMPS24-ST1–ST4 inclusive). 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). All of the culturally modified trees were validated by the arboriculturist as part of specialist investigations outlined in Section 4.3. In the case of the stone arrangement, OMPS24-SA1, one of the RAPs did not believe its cultural origin, and felt a tree growing through the geological substrate may have been a cause. Nonetheless, the site meets at least three of the criterion developed in Section 4.3.2 (specifically, 1, 3, 4 and 5) that indicates an anthropogenic origin; and the site has therefore been validated.

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 (Section 2). #21-5-0142 was described in the ACHA (EMM 2023, p.F6) as:

> Previously documented site recorded by Steve Ahoy (Iwatta Aboriginal Corporation). Approximately 70 artefacts were identified on a long exposure on a ridgeline of a steeply inclined spurcrest. The majority of artefacts were identified on the crest itself, with artefacts identified across an area 220 m (l) x 100m (w). This area was significantly more level, and gently inclined in a southeast direction. Visibility was generally poor in this locale with much of the area overgrown with native and invasive vegetation; though the crest of the spur was naturally eroded, thick leaf litter obscured much of the ground surface. Artefacts identified were diverse in type and included a number of hornfels axes and axe blanks, hammerstones, retouched artefacts, potential anvil (unknown material), chert core, jasper cobble/hammerstone, flakes and cores. Steve reported that visibility has decreased since initial recording, and that artefacts were originally observed on adjoining spurcrests and down the side slopes of the spur. A scar tree was also recorded in this locale (#21-5-0143) however it could not be relocated at the time of survey. Due to the large number of axes and axe blanks identified here, many with water-rolled cortex where visible, it appears Aboriginal people were bringing cobbles from the Macleay up to the higher ground in order to manufacture these larger tool types. The site is located outside the project boundary.

No feedback was received during the EIS ACHA which conflicted the assessment or investigation of this site. During the consultation undertaken for this addendum ACHA, Iwatta Aboriginal Corporation submitted feedback which indicated a larger site curtilage than previously identified; and that the site was gender-restricted (male). This larger curtilage is approximately 800 m x 500 m and encompasses several discrete artefact site recordings documented during the EIS ACHA including OMPS-AS11, OMPS-AS12, OMPS-AS13, OMPS-IF14, OMPS-IF17, and OMPS-FA14, all of which are located to the south of the recorded location of #21-5-0142.

Observations made during this reinspection have not changed the definition of #21-5-0142 as described in the EIS ACHA, as this curtilage captures the densest expression of this site and the foci of occupation in this locale. A number of smaller, discrete sites have been identified outside this curtilage, and are captured by the overall background scatter identified across the construction envelope. However, Steve Ahoy (Iwatta Aboriginal Corporation) continued to advise that the site was larger than this expression and should be constrained to male-only personnel. Section 9.4 proposes mitigation measures to offset these perceived impacts.

Notably, during the course of the investigations undertaken for this addendum report, it was noted by Steve Ahoy (Iwatta Aboriginal Corporation) that the proposed temporary crossing of Maceay River is located across a set of rapids which may have been used for fish and eel trapping. No material evidence of such activities was observed during the on site investigations.

Table 5.3 Identified Aboriginal objects and sites (*n*) by landform context

Site type	Total						
	Creekline	Floodplain	Open depression	Ridge	Slope	Spur	Total
Artefact scatter		1		2		1	**4**
Isolated find					1		**1**
Stone arrangement					1		**1**
Culturally modified tree	1	1			2		**4**
Total	**1**	**2**		**2**	**4**	**1**	**10**

Plate 5.11 View of stone arrangement (OMPS24-SA1), view south-east

Plate 5.12 Detail of stone arrangement (OMPS24-SA1), view south

Plate 5.13 Detail of stone arrangement (OMPS24-SA1), view west

Plate 5.14 View of OMPS24-ST1 on Macleay River flat, view north

Plate 5.15 Detail of scar at base of tree, confirmed of anthropogenic origin by aborculturalist

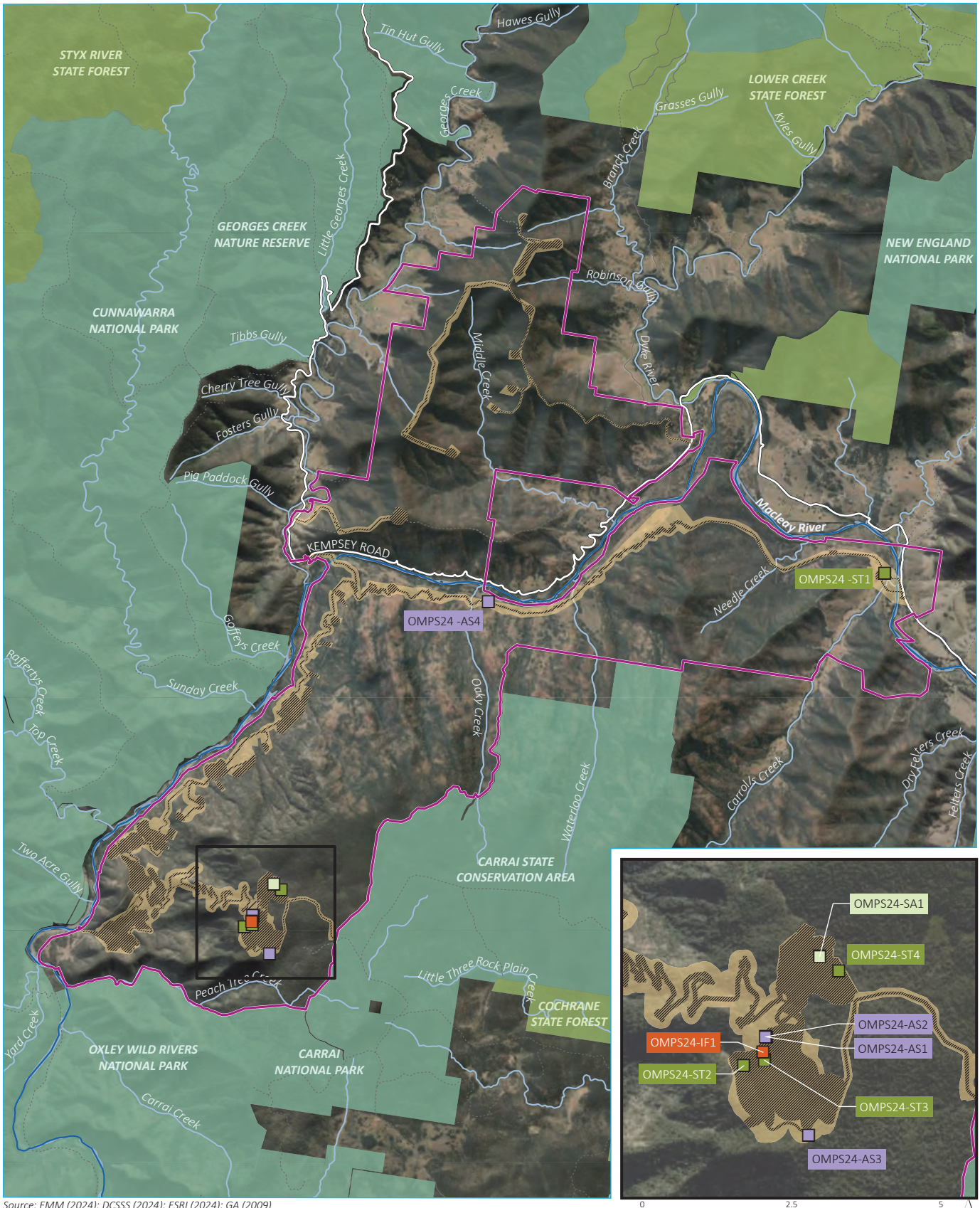
Plate 5.16 View of OMPS24-ST3 on ridge of Carrai Plateau, view north

Plate 5.17 Detail of horizonal axe marks on OMPS24-ST3

Table 5.4 Aboriginal sites identified during the field survey

Site ID	Site type	Landform	Easting	Northing	Description	Site status
OMPS24-AS1	Low density artefact scatter	Ridge	[redacted]	[redacted]	Three stone artefacts identified on a sheet wash exposure on the crest of a ridge of the Carrai Plateau, adjacent to a recently cleared access track. Artefacts comprised one reddish brown chert flake and two milky quartz flakes Visibility in this locale was around slightly higher than the overall average at 20%, but still considered poor due to leaf litter, and exposure was high, around 70%. Archaeological potential was observed here, as soil retention was considered to be higher on crests.	Valid
OMPS24-AS2	Low density artefact scatter	Ridge	[redacted]	[redacted]	Four stone artefacts identified adjacent to the access track along the proposed EAR. This site was incidentally identified during the scarred tree assessment fieldwork and is located 20 m south of OMPS-ST2, and ~210 m south of the Macleay River Notably, one artefact comprised a dark green to navy quartzite material, previously identified at OMPS-AS06 and has previously been identified by RAPs as transported from the Sydney region. While the somewhat gentler topography and proximity to the resource rich Macleay River in this locale would suggest archaeological potential, excavated undertaken in the vicinity 2023 recovered very little from this landform.	Valid
OMPS24-AS3	Low density artefact scatter	Spur	[redacted]	[redacted]	Three stone artefacts identified on an exposed access track on the Carrai Plateau. One artefact, an indurated mudstone/tuff complete flake, noted some retouch, and white patina on the cortex. The other two artefacts were quartz flakes. This site is 30 m east of OMPS-AS40. Given the disturbance in this area from the access track, any archaeological potential in this area is likely disturbed from the access track and may already be exposed.	Valid
OMPS24-IF1	Isolated Aboriginal object	Slope	[redacted]	[redacted]	A complete basalt flake found on a sloping access track on the Carrai Plateau. Due to its position on the slope, and the stoney skeletal soils observed on the access track, little further potential was observed here.	Valid
OMPS24-SA1	Stone arrangement	Slope	[redacted]	[redacted]	Linear shaped stone arrangement located on a hillcrest on flat granite bedrock on the Carrai Plateau, with two circular arrangements located directly west of the linear arrangement. While these forms were observed in the field, they are considered in poor condition and did not document well in photographs. Elwyn Toby (Dunghutti Elders Corporation) suggested its use was a water barrier to hold water. This site meets criteria 1, 3, 4, and 5 as outlined in preceding sections (Section 4.3.2), and is considered valid for the purposes of this assessment.	Valid
OMPS24-ST1	Culturally modified tree	Floodplain	[redacted]	[redacted]	A small scar (60 cm x 30 cm) with missing heartwood identified on a very old, living, forest red gum with fire damage, located on the alluvial floodplain of the Macleay River. Due to the size and shape of the scar, it is possible it reflects a small coolamon. The scar sits very low at the base of the tree. Scar assessed to be of Aboriginal cultural origin by arboriculturist (Section 4.3.3).	Valid

Site ID	Site type	Landform	Easting	Northing	Description	Site status
OMPS24-ST2	Culturally modified tree	Creekline	[redacted]	[redacted]	North facing scar (1.1 m (l) x 13 cm (w) x 11 cm (d)) with good regrowth, on mature living, white mahogany tree on northern edge of an ephemeral creekline on steep hillslope overlooking the Macleay River. The creekline here is likely a steep drop/small waterfall when water is flowing, and lookout to the Macleay River is present at confluence a few meters south-west of the tree. Scar assessed to be of Aboriginal cultural origin by arboriculturist (Section 4.3.3).	Valid
OMPS24-ST3	Culturally modified tree	Slope	[redacted]	[redacted]	A single horizontal series of small axe cuts on a dead white mahogany tree. Elwyn Toby advised that as a child he visited the area many times with his father and that the Longicorn Borer larvae were a food source called "*Dhubble*". Dead tree, south facing scar. Scar assessed to be of Aboriginal cultural origin by arboriculturist (Section 4.3.3).	Valid
OMPS24-ST4	Culturally modified tree	Slope	[redacted]	[redacted]	A large scar (1.3 m (l) x 60 cm (w) x 25 cm (d)) with missing heartwood identified on a mature but dead white mahogany tree with fire damage, located on the Carrai Plateau. with mistletoe growths Scar assessed to be of Aboriginal cultural origin by arboriculturist (Section 4.3.3).	Valid



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

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KEY

- Project area
- Disturbance footprint
- Amended construction envelope

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

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Figure 5.3

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5.3 Test excavations

5.3.1 Overview of EIS ACHAR test excavations undertaken for the EIS

The following provides a summary of key activities and/or findings of the field survey completed as part of the original EIS ACHA up to the completion of the EIS ACHA and submission of the EIS:

- Test excavations were undertaken by EMM archaeologists and representatives of seven of the registered Aboriginal parties. The test excavations consisted of a four-week program between August and September 2022, and then a smaller six-day program in May 2023.

- Test excavations consisted of 116 0.25 m^2 manually dug test pits in a series of transects, spaced 400 m with test pits spaced every 50 m along each transect, focussing on the construction envelope running along the Macleay River and Georges Creek – a distance of ~16 km. These were predominantly within the spur and slope landforms.

- During the course of the excavations, some 2,462 artefacts were recovered primarily between 10–40 cm below surface, with 2,049 of these found at a single location near the proposed lower reservoir but outside the construction envelope, and likely reflecting exploitation of a quartz outcrop. Overall, some 21 test pits were shown to contain extrapolated values of ≥24 artefacts/m^2 and considered to reflect past foci of occupation and activity. They are all found within 360 m of the Macleay River, noting that this system can flood significant distances in some areas (and as such the distance may have been less).

- The finding demonstrated exploitation of the raw materials near and within the nearby river systems (including hornfels, with silcrete, jasper, chert, and quartz) being taken to nearby elevated ground, minimally modified and then relocated elsewhere for subsequent use. With these exceptions, the assemblage reflects only an ephemeral or transient use of much of the river corridor. Foci of cultural material were generally 0.6 ha (80 x 80 m) in size, and characteristically appear to suggest use of the region over the last 5,000 or so years.

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

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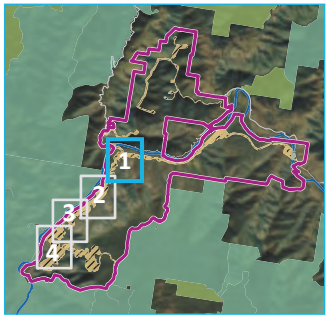

KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Number of artefacts (m^2)

- 0
- 1- 15
- 16- 24
- 25- 100

Existing environment

- Major road
- Named waterbody
- NPWS reserve
- State forest

Summary of EIS ACHA test excavations and findings

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Figure 5.4

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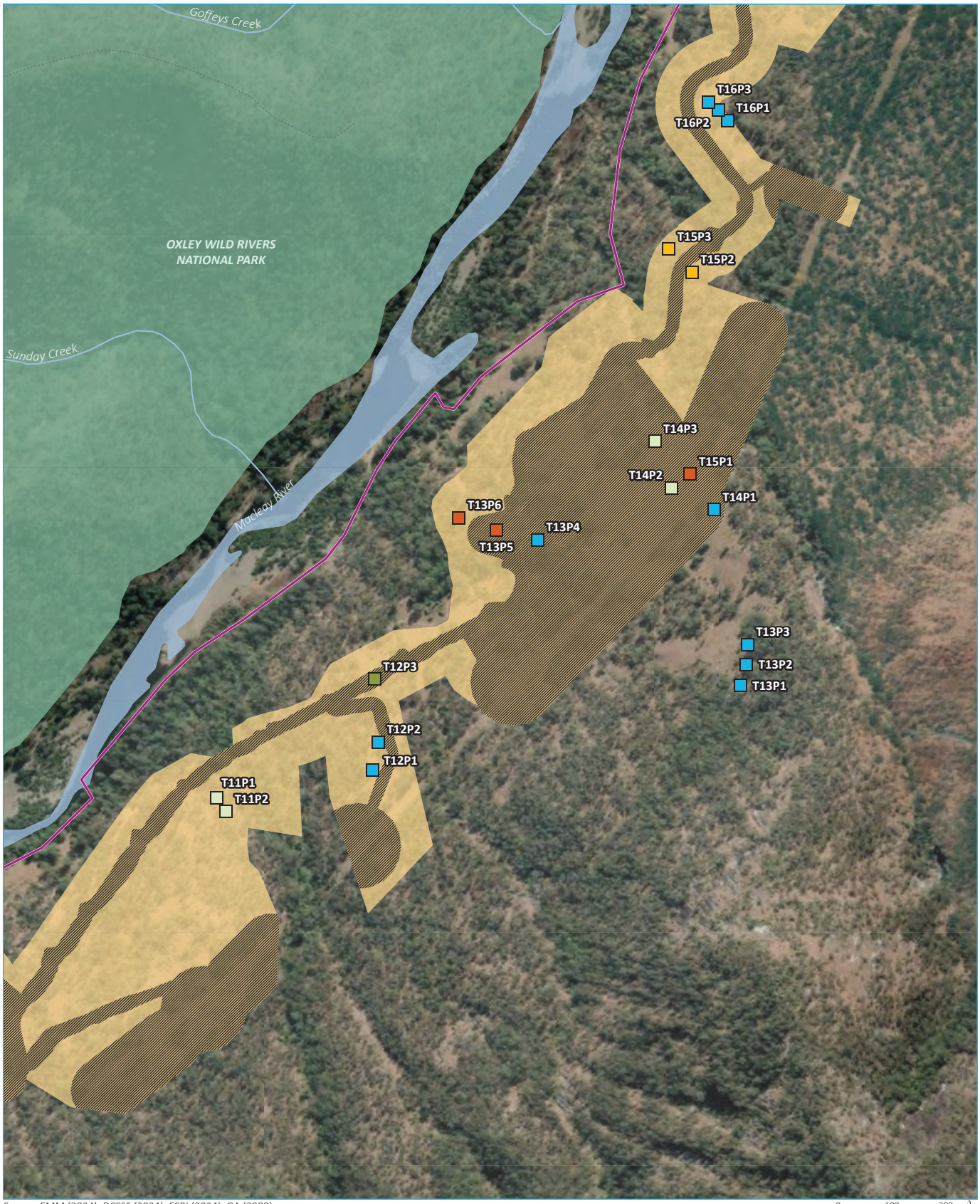

Source: EMM (2024); DCSSS (2024); ESRI (2024); GA (2009)

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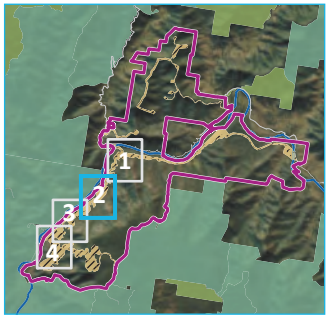

KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Number of artefacts (m^2)

- 0
- 1- 15
- 16- 24
- 25- 100
- 101- 250

Existing environment

- Vehicular track
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

Summary of EIS ACHA test excavations and findings

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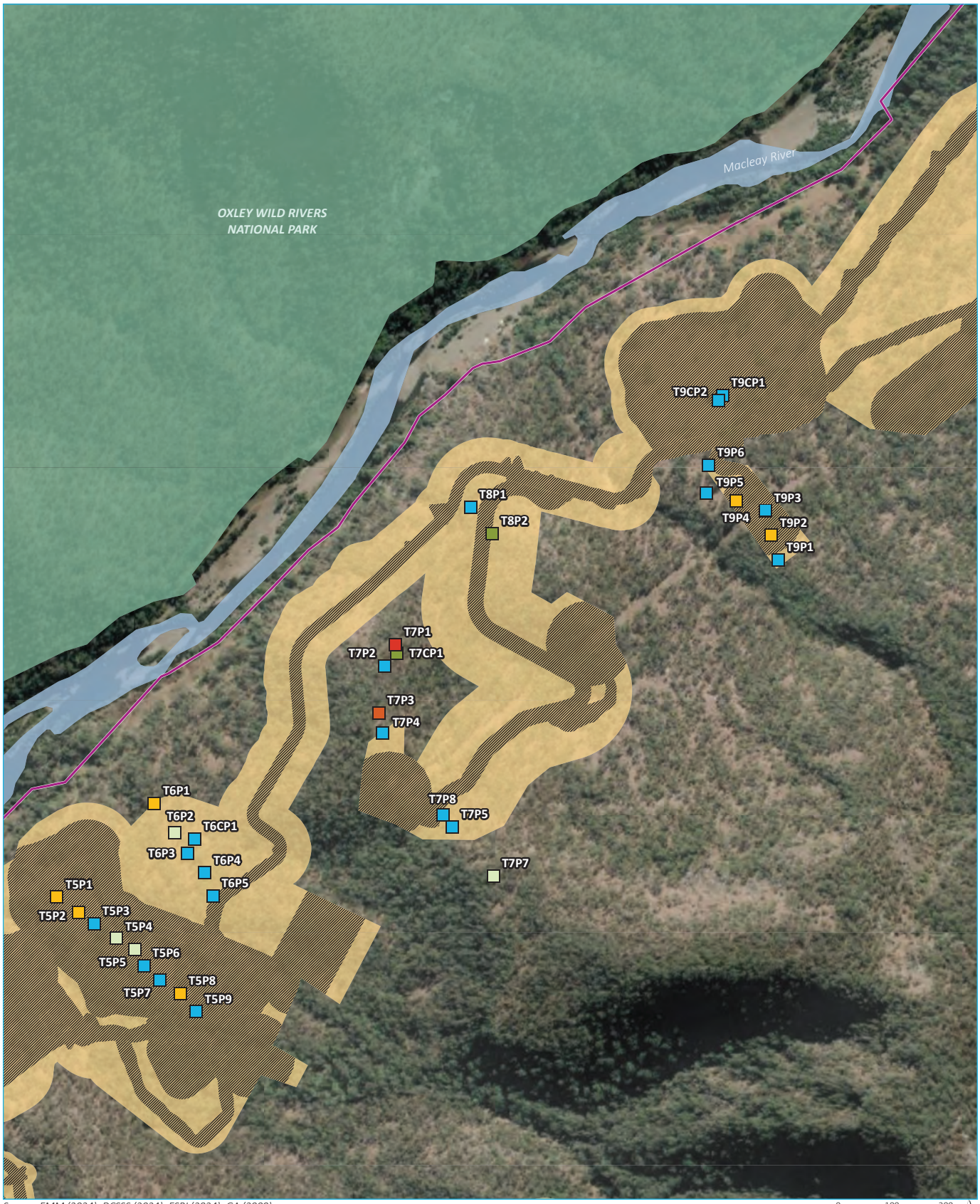
Figure 5.4

EMM creating opportunities



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

0 100 200 m
GDA 1994 MGA Zone 56
N

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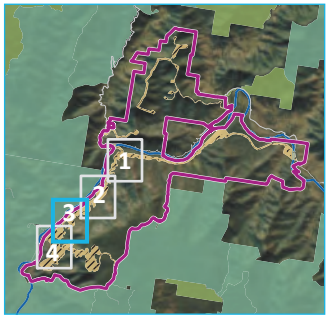

KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Number of artefacts (m^2)

- 0
- 1- 15
- 16- 24
- 25- 100
- 101- 250
- 8056

Existing environment

- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

Summary of EIS ACHA test excavations and findings

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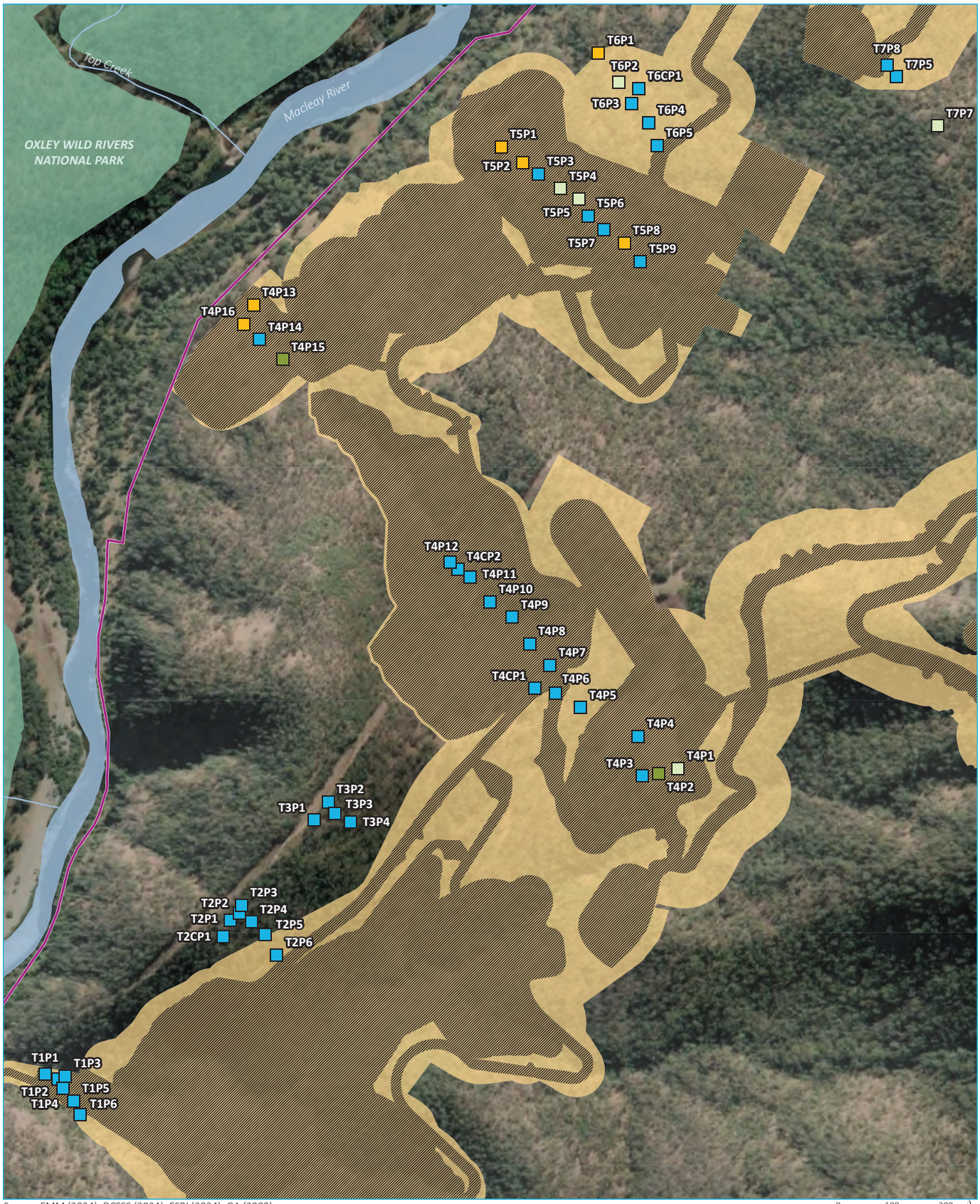
Figure 5.4

EMM creating opportunities



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

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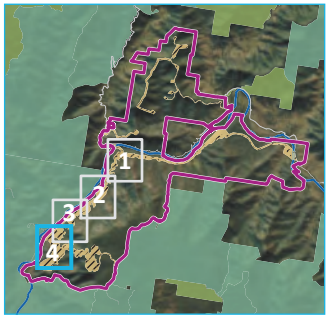

KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Number of artefacts (m^2)

- 0
- 1- 15
- 16- 24
- 25- 100

Existing environment

- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

Summary of EIS ACHA test excavations and findings

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Figure 5.4

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5.3.2 Additional excavation undertaken in proposed EAR and upper reservoir

i Approach and methods

Due to unprecedented rainfall hindering access during the ACHA, the proposed on-Country activities could not be completed within the EIS timeframes. Specifically, a portion of the original test excavation program comprising a series of transects along the EAR north of Georges Creek Junction could not be accessed due to flooding. In addition, discussions with Heritage NSW during submission of the EIS and recommendations of the EIS ACHA indicated the need for further test excavations of the construction envelope on the Carrai Plateau, was desirable. This has been reinforced in subsequent comments from Heritage NSW (Table 1.1) seeking further rationale for the previous program and additional information in the archaeological models that were developed by the EIS ACHA.

As a result of this, two additional archaeological test excavation programs have been implemented since finalisation of the EIS ACHA in late 2022. The first was a six-day program between 22–29 May 2023 undertaken by OzArk Environment and Heritage Pty Ltd (OzArk) on behalf of EMM, which was completed along the proposed EAR. These excavations largely focussed on the alluvial flats and lower terraces of the Maclay River, including near Waterloo Creek. The second was a five-day program between 17–21 June 2024 undertaken by EMM, which consisted of a systematic grid of test pits across the proposed upper reservoir footprint on the Carrai Plateau.

The aims of these works are twofold:

- to identify whether further areas of past foci were present along the EAR in areas that had not previously been subject to test excavation
- to determine the depth of the soil profiles and their potential to contain cultural materials more broadly on the Carrai Plateau.

All of the test excavations were undertaken in accordance with Heritage NSW's *Code of Practise for the Archaeological Investigations of Aboriginal Objects in NSW* guidelines, and documentation developed for the EIA ACHA and/or as part of consultation outlined in Section 2 of this report.

These works were undertaken EMM personnel and Aboriginal stakeholders identified in Table 5.5.

Table 5.5 Personnel participating in the archaeological test excavations

Organisation	Role	Name
Excavations undertaken along EAR (May 2023)		
OzArk	Excavation director Field archaeologist Field archaeologist Field archaeologist	Brendan Fisher - - -
Iwatta Aboriginal Corporation	Aboriginal stakeholder	Blear Ahoy
Representing himself as an Elder	Aboriginal stakeholder	James Dunn
Representing himself	Aboriginal stakeholder	Bruce Cohen
Thunggutti Local Aboriginal Land Council	Aboriginal stakeholder	Glen Campbell
QMS	Aboriginal stakeholder	Dominique Lardner
Gumaraa Aboriginal Experience Pty Ltd	Aboriginal stakeholder	Julia Ann Narayun

Organisation	Role	Name
Excavations undertaken on upper reservoir (June 2024)		
EMM	Excavation director Field archaeologist Field archaeologist Field archaeologist	Taylar Reid Mikhaila Chaplin Nicolas Rielly Otto Dicpetris
Dungutti Elders Council	Aboriginal stakeholder	Kevin Smith John Kelly
Alinta	Aboriginal stakeholder	Juston Sullivan Gordon Jacky

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

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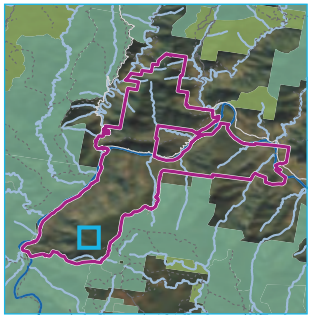


KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Test excavation program

- Excavated
- Not excavated

INSET KEY

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

Test excavation program (planned and completed)

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 5.5

EMM creating opportunities

ii Results of EAR excavations

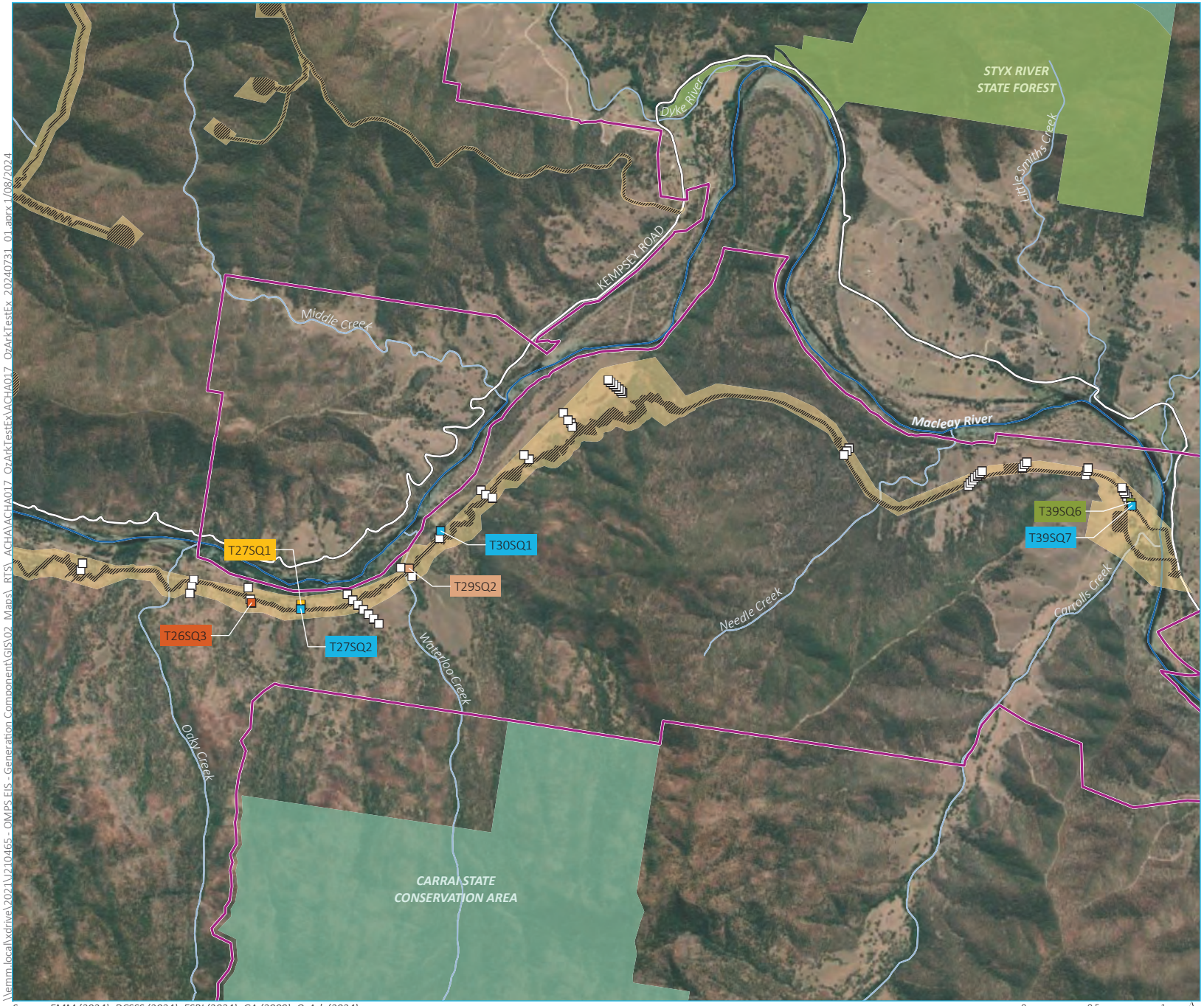
A commitment in the EIA ACHA included the completion of the test excavations proposed in the EIS ACHA. Following the finalisation of the EIS ACHA in late 2022, Ozark were engaged by EMM to complete the test excavation program. OzArk's supplementary report on these works is presented in Annexure D.1, with a summary provided below.

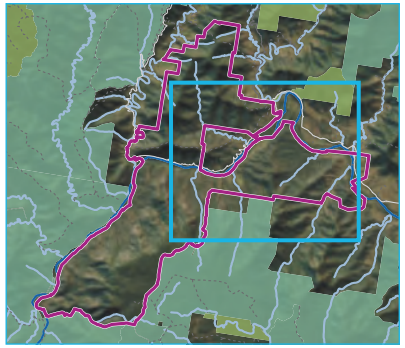
These excavations were located along the EAR, running along the alluvial terraces and spurcrests near the Macleay River. In contrast to previous excavations outlined in Section 5.3.1, OzArk's investigations were predominantly on alluvial plains and terraces, as a result of the broader geomorphology of the Project area in this locale. The Project area being more steep and rugged to the south than the north.

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 (Figure 5.6). Most of the artefacts were recovered from depths of 10–30 cm below the current ground surface, while many of the test pits exceeded 50 cm in depth. One test pit demonstrated the presence of 14 artefacts with the other test pits (n=6) recording lower densities.

The recovered cultural assemblage was dominated by unmodified complete flakes and included basalt and mudstone raw materials. In contrast to earlier phases quartz was not prevalent in the assemblage. They concluded that this change in raw materials from other parts of the Project area may reflect different chronological periods of use of the Macleay River.

OzArk documented these findings into five discrete additional Aboriginal sites: OMPS-OS1 (#21-5-0218), OMPS-OS2 (#21-5-0219), OMPS-OS3 (#21-5-0221), OMPS-OS4 (#21-5-0220), and OMPS IF-1 (#21-5-0217). These sites were only present in sub-surface contexts and were outside of the extents of the sites identified by EMM (2023a). However, while only OMPS-OS1 containing 14 artefacts was considered to meet thresholds outlined in EMM (2023a) to reflect areas of past foci, several of the other sites would also meet them. Specifically, EMM (2023a) concluded that >24/m^2 were required to reflect past activity and not part of a broader background of stone artefacts encountered across the Project area and beyond. OMPS-OS1 containing 14 artefacts in a 0.25 m^2, would extrapolate to 56/m^2 and meet this threshold. However, while OzArk did not highlight OMPS-OS2 or OMPS-OS3 as reflecting similar foci, the recovery of six and seven artefacts, respectively, would also meet these thresholds when extrapolated from a 0.25 m^2 to 1 m^2 test pit. As such, for the purposes of the addendum report, both of these sites are also considered areas of past foci or cultural deposits in subsequent sections. Both OMPS-OS4 and OMPS-IF1 have been integrated into the broader background scatter, OMPS-BS1 (#21-5-0178).





KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Number of artefacts (Ozark 2024)

- 0
- 1
- 2
- 6
- 7
- 14

Existing environment

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

Test excavation results (OzArk 2024)

Oven Mountain Pumped Hydro
Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 5.6

EMM
creating opportunities

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

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iii Results of upper reservoir excavations

Following comments on the EIS ACHA, another excavation program was undertaken in June 2024, focussing on the steep, rugged terrain of the proposed upper reservoir. This section provides a summary of the excavations and subsequent analysis (Plate 5.18–Plate 5.27, Figure 5.7 & Figure 5.8), with further detail provided in Annexure D. This includes a detailed lithic analysis and catalogue (Annexure D.2 & Annexure D.3). A summary of the post excavation analysis from the excavations is provided below.

Overall, 28 0.25 m^2 test pits and one 1 m^2 test pit (UR8a-d) were excavated across the ridges, spurs and slopes of the Carrai Plateau where it abuts the steep, dramatic drop into the Macleay River. Of these, four test pits (UR7, UR8a-d, UR9, UR10) were relocated from their original grid position on extremely steep slopes to the top of a spurcrest where OMPS24-AS1 was identified – a surface artefact site which exhibited some subsurface potential. A further 14 test pits were discounted due to being situated in extremely steep terrain, which exhibited generally low soil retention due to slope erosion. Test pits averaged 33 cm, slightly shallower than the test pits excavated within the Macleay River valley (averaging 40 cm), and generally ceased at bedrock. The deepest excavated test pit (UR35) was excavated to 80 cm, before encountering granite bedrock. Spatially, these test pits were predominantly on ridgelines (n=16, 50%), with some exploration of slopes (n=9, 28%), spur (n=6, 19%) and near drainage lines (n=1, 3%).

Only five (17%) of the 29 test pits excavated contained artefacts (Figure 5.7 & Figure 5.8), with a total of 140 Aboriginal objects recovered (Annexure D.2 & Annexure D.3). When extrapolating each 0.25 m^2 test pit to 1 m^2, which is more commonly how artefact densities are discussed in the archaeological literature, an extrapolated average density of 4.8/m^2. However, similar to the results of the ACHA investigations, of the 140 artefacts recovered, 136 (97% of the total excavated assemblage) were recovered from a single test pit (UR8a-d). The remaining four artefacts were recovered as isolated artefacts from four discrete test pits (UR16, UR18, UR32, and UR34). When removing these values, this reduces the average to 0.1/m^2. This is significantly lower than the average recovered in the Macleay River valley (3.9/m^2), and likely reflective of the rugged terrain on the steep slopes of this locale, and the relatively harsh and unfavourable conditions prevalent on the Plateau.

As detailed in preceding sections above, >24 artefacts/m^2 is considered to reflect past foci of activity in contrast to the broader background scatter which is present across the construction envelope. Only a single test pit (UR8a-d) reflects values that meet this threshold and is named OMPS-FA16 in subsequent sections. The EIS ACHA noted a relationship between distance to water to these areas of foci, with sites averaging ~360 m from the river's edge. However, given the position of the proposed upper reservoir at the headwaters of many ephemeral drainage lines, and its location a considerable distance from permanent water sources, very little useful comparison can be made in relation water for this phase of excavation. Similarly, due to the majority of artefacts bring recovered from a single excavation, it is unclear to determine any spatial patterning.

Compositionally, the assemblage is dominated by milky quartz (n=98, 71%), with lesser amount of crystal quartz (n=18, 13%), indurated mudstone/tuff (n=9, 7%), volcanic (likely basalt; n=9, 7%) chalcedony (n=3, 2%), and chert (n=1, <1%). Compositionally, the assemblage of quartz (including crystal quartz, chalcedony and chert) was dominated by complete and broken flakes. Broken flakes (proximal, medial, distal and longitudinal splits) account for almost half of the assemblage (n=56, 48%). Complete flakes were also a high proportion (44.1%), with only two cores present. Only a fraction of the quartz assemblage was associated with retouched flakes or tools (n=6, 5%). Given that much of the material consists of broken and complete flakes, it is unlikely that a source of raw material (quartz) is nearby. This is in part due to the overall good quality of the quartz recovered, with fewer low-quality material (e.g. brittle or flawed) observed, suggesting quality material has been transported into the site for use. The overall low frequency of processing tool types suggests that occupation was short term, single events with limited food processing and tool manufacture.

Similar to the earlier phases of excavation, analysis of the cultural assemblage recovered during this phase suggests that it dates to the late Holocene (i.e. <5,000 years ago). Cultural material was recovered primarily between 0–40 cm, with only a single artefact recovered beyond this, at a depth of 60–70 cm below surface in test pit UR35. The artefact assemblage shows a general trend of smaller, lighter materials lower in the stratigraphic profile, suggesting downward movement of artefacts through the soil profile. Specifically in the case of test pit UR35, the soil profile suggested a residual soil of degrading bedrock, which supports the assertion that the artefact at depth recovered in this test pit is not reflective of an earlier phase of occupation of the site.

Plate 5.18 UR8 facing north

Plate 5.19 UR8 northern section of test pit

Plate 5.20 UR16 facing north

Plate 5.21 UR16 – northern section of test pit

Plate 5.22 UR18 facing north

Plate 5.23 UR18 – northern section of test pit

Plate 5.24 UR32 facing north

Plate 5.25 UR32 – northern section of test pit

Plate 5.26 UR34 facing north

Plate 5.27 UR34 – northern section of test pit

Table 5.6 Summary of proposed and excavated test pits

Test pit UR#	Landform	Easting	Northing	Depth of test pit (cm below surface)	Excavated? Y/N	Number of artefacts (n)	Extrapolated artefact count (per m^2)
1	Spur	[redacted]	[redacted]	40	Y	0	0
2	Slope	[redacted]	[redacted]	5	Y	0	0
3	Spur	-	-	-	N	-	-
4	Slope	-	-	-	N	-	-
5	Slope	[redacted]	[redacted]	20	Y	0	0
6	Creekline				N	-	-
7	Spur	[redacted]	[redacted]	40	Y (relocated)	0	0
8	Ridge	[redacted]	[redacted]	35	Y (relocated)	136	136
9	Ridge	[redacted]	[redacted]	15	Y (relocated)	0	0
10	Ridge	-	-	-	N	-	-
11	Spur	-	-	-	N	-	-
12	Spur	-	-	-	N	-	-
13	Spur	-	-	-	N	-	-
14	Slope	[redacted]	[redacted]	5	Y	0	0
15	Slope	-	-	-	N	-	-
16	Ridge	[redacted]	[redacted]	25	Y	1	4
17	Spur	[redacted]	[redacted]	33	Y	0	0
18	Ridge	[redacted]	[redacted]	40	Y	1	4
19	Ridge	[redacted]	[redacted]	10	Y	0	0
20	Creekline	[redacted]	[redacted]	40	Y	0	0
21	Slope	[redacted]	[redacted]	35	Y	0	0
22	Ridge	[redacted]	[redacted]	20	Y	0	0
23	Ridge	[redacted]	[redacted]	20	Y	0	0
24	Ridge	[redacted]	[redacted]	10	Y	0	0
25	Ridge	[redacted]	[redacted]	12	Y	0	0
26	Spur	-	-	-	N	-	-
27	Spur	-	-	-	N	-	-
28	Ridge	[redacted]	[redacted]	50	Y	0	0
29	Spur	-	-	-	N	-	-
30	Slope	-	-	-	N	-	-
31	Slope	[redacted]	[redacted]	15	Y	0	0

Test pit UR#	Landform	Easting	Northing	Depth of test pit (cm below surface)	Excavated? Y/N	Number of artefacts (n)	Extrapolated artefact count (per m^2)
32	Ridge	[redacted]	[redacted]	50	Y	1	4
33	Spur	[redacted]	[redacted]	70	Y	0	0
34	Slope	[redacted]	[redacted]	70	Y	1	4
35	Slope	[redacted]	[redacted]	80	Y	0	0
36	Spur	-	-	-	N	-	-
37	Spur	[redacted]	[redacted]	15	Y	0	0
38	Slope	[redacted]	[redacted]	43	Y	0	0
39	Ridge	[redacted]	[redacted]	5	Y	0	0
40	Ridge	[redacted]	[redacted]	60	Y	0	0
41	Slope	[redacted]	[redacted]	30	Y	0	0
42	Spur	[redacted]	[redacted]	80	Y	0	0
43	Slope	-	-	-	N	-	-
Average	-	-	-	*33.55*	-	*4.83*	*5.24*
Total	**-**	**-**	**-**	**-**	**-**	**140**	**152**

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

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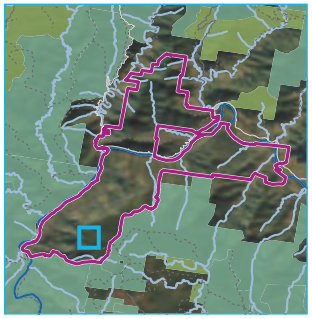

KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Number of artefacts

- 0
- 1
- 136

INSET KEY

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

Test excavation results

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 5.7

EMM creating opportunities

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

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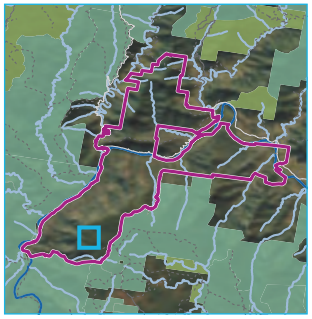


KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Number of artefacts (m^2)

- 0
- 4
- 136

INSET KEY

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

Test excavation results (per m^2)

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 5.8

EMM creating opportunities

6 Refining the archaeological resource

6.1 Key findings

- This addendum report refines and updates the previous findings from the EIS ACHAR following additional investigations.
- The EIS ACHAR identified some 44 discrete identified sites and places, fifteen cultural deposits of substantive buried stone artefacts, and a discontinuous and complex distribution of surface and shallowly buried stone artefacts distributed across the Project area.
- When incorporating additional desktop information (notably re-consideration of tentatively identified sites), field survey and test excavation results, a revised cultural assemblage within the Project area can be developed. This now 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. Notable changes include the following:
    - the identification of previously undocumented culturally modified trees (OMPS24-ST1 -ST4 inclusive), and a stone arrangement (OMPS24-SA1)
    - the identification of four further areas of high density buried stone artefacts, or areas of foci (OMPS-OS1 situated on transect 26, OMPS-OS2 situated on transect 27, OMPS-OS3 situated on transect 29, and OMPS-FA16 situated on test pit UR8)
    - the de-classification of several previously documented Aboriginal sites that through further desktop analysis and/or specialist investigations have indicate that they are unlikely to be of anthropogenic and/or cultural origin
    - some modification to Aboriginal site values due to changes and refinements of the Project area and construction envelope since the EIS ACHA.
- While not within the Project area, as per the EIS ACHA, a number of cultural and archaeological sites are within the general environment of the Project, including OMPS-CS4, #21-5-0023, OMPS-AS1, and OMPS-AS36.

6.2 Summary of EIS ACHAR findings undertaken for the EIS

The EIS ACHAR undertook ratification of the cultural materials encountered across the construction envelope within existing desktop information, field survey and a test excavation program. This concluded that the following cultural assemblage was present within the construction area:

- Four cultural, historical and/or social history sites, including: Kunderang Station (OMPS-CS3), a large pastoral station to the west of the Project area with a history of frontier conflict and associated with the pastoral history interlinked with work lives of local Aboriginal families; George's Creek Camp (OMPS-CS4) and Lower Creek/Long Flat Station (OMPS-CS5), both post contact camp sites and the reported locations of initiation ceremonies; and, AHIMS# 21-5-0023, a catfish increase site believed to be situated on a large rock in a portion of rapids within the Macleay River.

- Forty archaeological sites including: 24 culturally modified trees (OMPS-ST1 – 24), six stone arrangements (OMPS-SA1 – 6), five artefact scatters with ≥24 artefacts identified (AHIMS #21-5-0142, OMPS-AS1, 26, 33 and 36) two quarry sites (OMPS-Q1 and 2), two rockshelters (OMPS-R1 and 2), and one grinding groove site (OMPS-GG1). Many of these sites were assigned a tentative classification given a lack of archaeological characteristics; and all are recommended for further specialist investigation.

- A stone artefact background scatter across the entire construction envelope and extending beyond its limits within which artefact densities of ~16/m^2 may be expected (OMPS-BS1), and which includes identified isolated Aboriginal objects (OMPS-IF1 – 32 inclusive) and low-density artefact scatters (OMPS-AS2–25, 27–32, 34–35, and 37–42 inclusive). These sites are typically of low significance and reflect the long-term, transient use of the entire landscape by Aboriginal people in the past.

- Fifteen areas of past foci and activity (OMPS-FA1 – 15 inclusive) characterised by high densities of primarily sub-surface artefacts ranging from ~24->236/m^2 ($\bar{x}$ = 81/m^2) with at least one test pit (T7P1, now OMPS-FA7) having values of >8,000/m^2 and which reflect extensive and/or repeated visitation and occupation by people over the last 5 ka. Several of the field observations are also encompassed within these site's curtilage, where stone artefacts were identified on the surface near these locations during the test excavation program. These foci are generally small and averaging ~0.6 ha (80 x 80 m) in size, although several of them overlap to form larger areas.

6.3 Updated archaeological resource

The addendum report has undertaken a number of activities to refine previously identified cultural materials, and presents the findings of additional on-Country activities as a result of spatial gaps in, and/or amendments to, the Project.

In relation to sites and places of cultural values (Section 3), and as detailed in Section 2, limited additional consultation has been achieved as part of the addendum report. However, additional scientific information has been applied to those sites that are documented in close proximity to the Project area, and now reveal that many would be unlikely to be affected by the Project and can be omitted from the report. These include the Kunderang East homestead, Lower Creek/Long Flat station site, and a number of other places further afield near Bellbrook and beyond. On review, only one site, Georges Creek camp (OMPS-CS4 [#21-5-0215]), is in close proximity and may be subject to indirect impacts affecting its aesthetic significance and requires further consideration. Cultural flows are also unlikely to be impacted by the Project, with studies indicating visually changes of <5 cm would be visible during periods of intake/discharge, and with suitable mitigation measures the aquatic ecology would be unaffected. However, since there is an increase site associated with catfish (#21-5-0023) present in the Macleay River near the Project, this site is also considered further below, despite being outside the Project area.

Using desktop information from the broader region, a number of the previously documented Aboriginal sites have been considered further in the addendum report (Section 4). When applying criteria that appear consistent across certain site types, a number of tentative classified sites have been discounted as unlikely to be of Aboriginal cultural origin. While such sites are documented within the region, they are consistently found in certain spatial locations and having certain characteristics, which many of them did not meet. Of the six stone arrangements, two rockshelters, and one grinding groove previously documented, five stone arrangements, one of the rockshelters and the grinding groove have been de-classified. In addition, additional on-Country specialist investigations were undertaken of potential culturally modified trees by an arboriculturist. This resulted in ~50% of the previously identified sites being identified as of Aboriginal cultural origin, with the remainder explained by natural, insect and modern mechanical damage. Of note is that many of the cultural modifications have been dated to the last 40–50 years, and suggest strong ongoing connection to Country remains with the local Aboriginal community. Indeed, there is extensive anthropological investigation with initiated men as late as the 1970s (e.g. Creamer 1981).

Additional field investigations were undertaken of gaps in the previous investigations (Section 5). This has included the field survey of amendments proposed since the EIS ACHA and/or areas that could not be reached during the EIS ACHA. These have been primarily focussed on the upper reservoir and immediate environs, since the visible and publicly accessible areas in the lower reservoir initially resulted in divisions within the local Aboriginal community (Section 2) that the proponent did not want to intensify through field work. Importantly, the field survey investigated steep relief north and west of the upper reservoir where Heritage NSW raised some concerns about previous coverage. These investigations identified an additional stone arrangement and four further culturally modified trees – both validated by information and activities in Sections 4 and 6 of the addendum report. A number of stone artefact sites were also observed, but due to their low densities have been encompassed within the broader background scatter documented across the Project area.

Two further archaeological test excavations were undertaken to inform the addendum report. These include the extension of test excavations along the EAR, initiated, but not completed in the EIS ACHA, and as a systematic grid across the proposed upper reservoir. The results of these test excavations are consistent with the EIS ACHA, and demonstrate shallow residual soil profiles that have formed on the under-lying volcanic geological substrates. Generally, there is limited cultural materials within these soil profiles, although localised areas of past activity, or foci, were found. Some 15 of these locations – areas of high densities of stone artefacts ~0.6 ha in size – were encountered in the previous phase of works. One of these has been discounted on further review as part of the addendum report (OMPS-FA12), with limited cultural material ultimately documented. Here, a further three foci were encountered along the EAR on similar elevated landform environments over-looking the Macleay River; and a further one centred on test pit UR8 (OMPS-FA16) on the upper reservoir. This latter site does not conform with regional models that focus on, or near water courses, and as such has significant research opportunity to further explore past activities on the heights of the Carrai Plateau.

Finally, the Project area has been refined since the submission of the EIS ACHA (Figure 1.3–Figure 1.4). In so doing, some sites that were previously within the Project area and/or construction envelope are now omitted, while others may be subject to differing levels of impact. Notably, this has resulted in the removal of two surface stone artefact scatters previously identified in the EIS ACHA, OMPS-AS1 situated on the banks of the Macleay River near the lower reservoir, and OMPS-AS36 found south of George's Creek Junction on the western bank of Macleay River.

Overall, when ratifying the information gathered from the above activities, and continuing to apply stone artefact criteria and requirements in the EIS ACHA (~>24/m^2 being indicative of intense activity), the following Aboriginal sites and places are present (Figure 6.1):

- within the Project area, *but outside* the construction envelope:
    - one rockshelter (OMPS-R2 [#21-5-0159]) situated north of the road and transmission line between the two reservoirs
    - one stone arrangement (Kunderang Station; Oven Mountain [#21-5-0011]) situated on a ridge south of the lower reservoir
    - five culturally modified trees (George's junction scarred tree [#21-5-0143], OMPS-ST2 [#21-5-0185, OMPS-ST7 [#21-5-0190], OMPS-ST12 [#21-5-0195], and OMPS-ST24 [#21-5-0208]), predominantly located on the banks and terraces around Georges Creek Junction
    - two high density surface artefact scatters (George's junction site [#21-5-0142] and OMPS-AS26 [#21-5-0202]) located overlooking Georges Creek Junction and at the eastern end of the EAR. #21-5-0142 has been identified as highly significant by the Aboriginal community and the Project has been designed around it, however recent discussions suggest the proposed crossing of the Macleay River to hits north may result in indirect impacts

- one quarry site (OMPS-Q1 [#21-5-0204]) located north-west of the lower reservoir on the banks of the Macleay River

- one area of past foci and activity characterised by high densities of sub-surface artefacts (>24/m^2) (OMPS-FA7). This site contained some of the highest densities of stone artefacts across the Project, and reflects extensive and/or repeated visitation and occupation by people over the last 5 ka.

• within the construction envelope:

- two stone arrangements (OMPS-SA1 [#21-5-0207], OMPS24-SA1 [TBD]) located within surface works near the lower reservoir and at the very edge of proposed surface works north of the upper reservoir

- eight culturally modified trees (OMPS-ST1 [#21-5-0184], OMPS-ST4 [#21-5-0187], OMPS-ST19 [#21-5-0172], OMPS-ST22 [#21-5-0176], OMPS24-ST1 [TBD], OMPS24-ST2 [TBD], OMPS24-ST3 [TBD], OMPS24-ST4 [TBD]) located variously on the periphery of the upper reservoir and associated surface works and/or along the EAR. At least four of these are on the edges of proposed activities, and may be avoided during detailed design

- one low density surface artefact scatter (OMPS-AS33 [#21-5-0201]) located in the transmission easement in the north-western portion of the Project area

- one quarry site (OMPS-Q2 [#21-5-0205]) consisting of a small number of struck boulders within a high energy creekline located within the proposed lower reservoir

- Eighteen areas of past foci and activity characterised by high densities of sub-surface artefacts (>24/m^2), each some 0.6 ha in size (~80 x 80 m), and which reflect extensive and/or repeated visitation and occupation by people over the last 5 ka. They include:

    - OMPS-FA1 (TBD) centred on test pit T4P2 and situated in the proposed Mat portal

    - OMPS-FA2 (TBD) centred on test pit T4P13 and T4P16 and situated in the proposed surface works north of the lower reservoir

    - OMPS-FA3 (TBD) centred on test pit T5P8 and situated in the proposed surface works north of the lower reservoir

    - OMPS-FA4 (TBD) centred on test pit T5P1 and T5P2 and associated in the vicinity of OMPS-SA1 (#21-5-0207); and situated in the proposed surface works north of the lower reservoir

    - OMPS-FA5 (TBD) centred on test pit T6P1 and situated on the edge of the construction envelope near the proposed surface works north of the lower reservoir

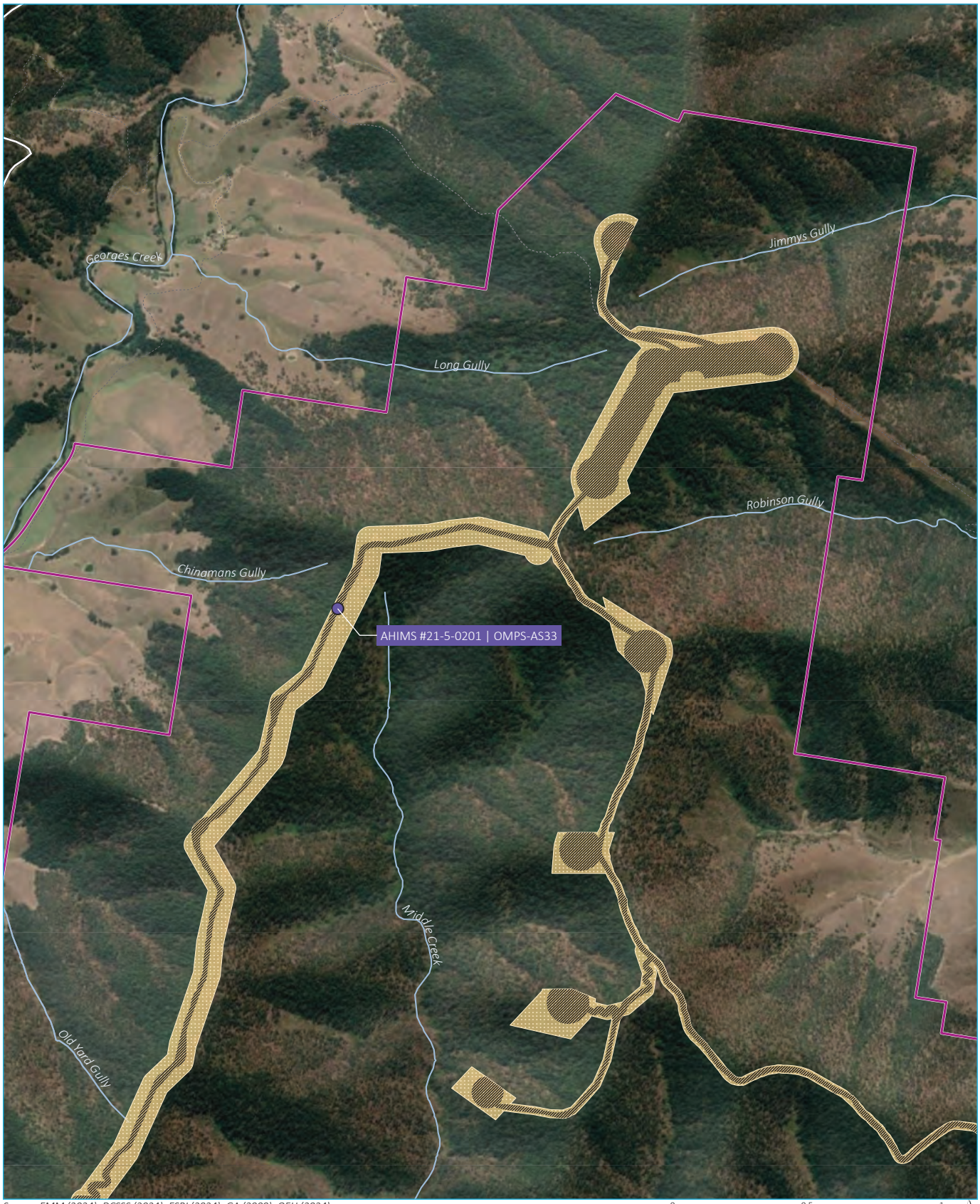
    - OMPS-FA6 (TBD) centred on test pit T7P3 and situated substantially outside the construction envelope (~92%) on the permanent road leading to the lower reservoir

    - OMPS-FA8 (TBD) centred on test pit T9P2 and situated in the proposed surface works north of the lower reservoir

    - OMPS-FA9 (TBD) centred on test pit T9P4 and situated in the proposed permanent road leading to the lower reservoir

- OMPS-FA10 (TBD) centred on test pit T12P3 and situated partially within the proposed permanent road leading to the lower reservoir
- OMPS-FA11 (TBD) centred on test pit T13P5 and TP13P6 and situated in the proposed surface works north of the lower reservoir
- OMPS-FA13 (TBD) centred on test pit T15P2 and T15P3 and situated partially within the proposed permanent road leading to the lower reservoir
- OMPS-FA14 (TBD) centred on test pit T19P3, T19P4 and T19P5 and situated partially within the proposed permanent road leading to the lower reservoir
- OMPS-FA15 (TBD) centred on test pit T22P1 and situated in within proposed surface works at the western end of the EAR
- OMPS-FA16 (TBD) centred on test pit Test pit UR8 and situated in the proposed upper reservoir
- OMPS-OS1 (#21-5-0218) centred on test pit T30TU3and situated partially within the EAR
- OMPS-OS2 (#21-5-0219) centred on test pit T27TU1 and TP27TUP2 and situated partially within the EAR
- OMPS-OS3 (#21-5-0221) centred on test pit T29TU2 and situated partially within the EAR.

- A stone artefact background scatter (OMPS-BS1 [#25-5-0178]) that is predicted to occur intermittently across the Project area and extending beyond its limits within which disparate low to moderate artefact densities of 1–23/m^2 may be expected intermixed with culturally sterile zones. Such cultural materials are typically of low significance, and reflect the long-term, transient use of the entire landscape by Aboriginal people in the past. This includes 79 of the previously recorded isolated and low-density stone artefact sites currently documented across the construction area, including:
  - isolated Aboriginal objects – OMPS-IF1 (#21-5-0217), OMPS-IF2– IF35 inclusive, and OMPS24-IF1
  - low density stone artefact scatters – OMPS-AS1– AS25 inclusive, OMPS-AS27– AS32 inclusive, OMPS-AS34– AS42 inclusive, OMPS24-AS1– AS4 inclusive, and OMPS-OS4 (#21-5-0220).



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

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GDA 1994 MGA Zone 56

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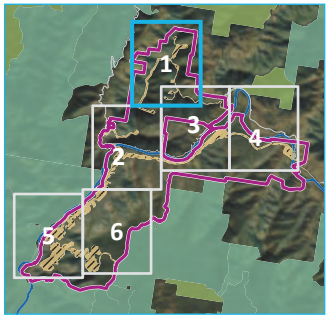


KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Archaeological resource

- Artefact scatter
- Background scatter

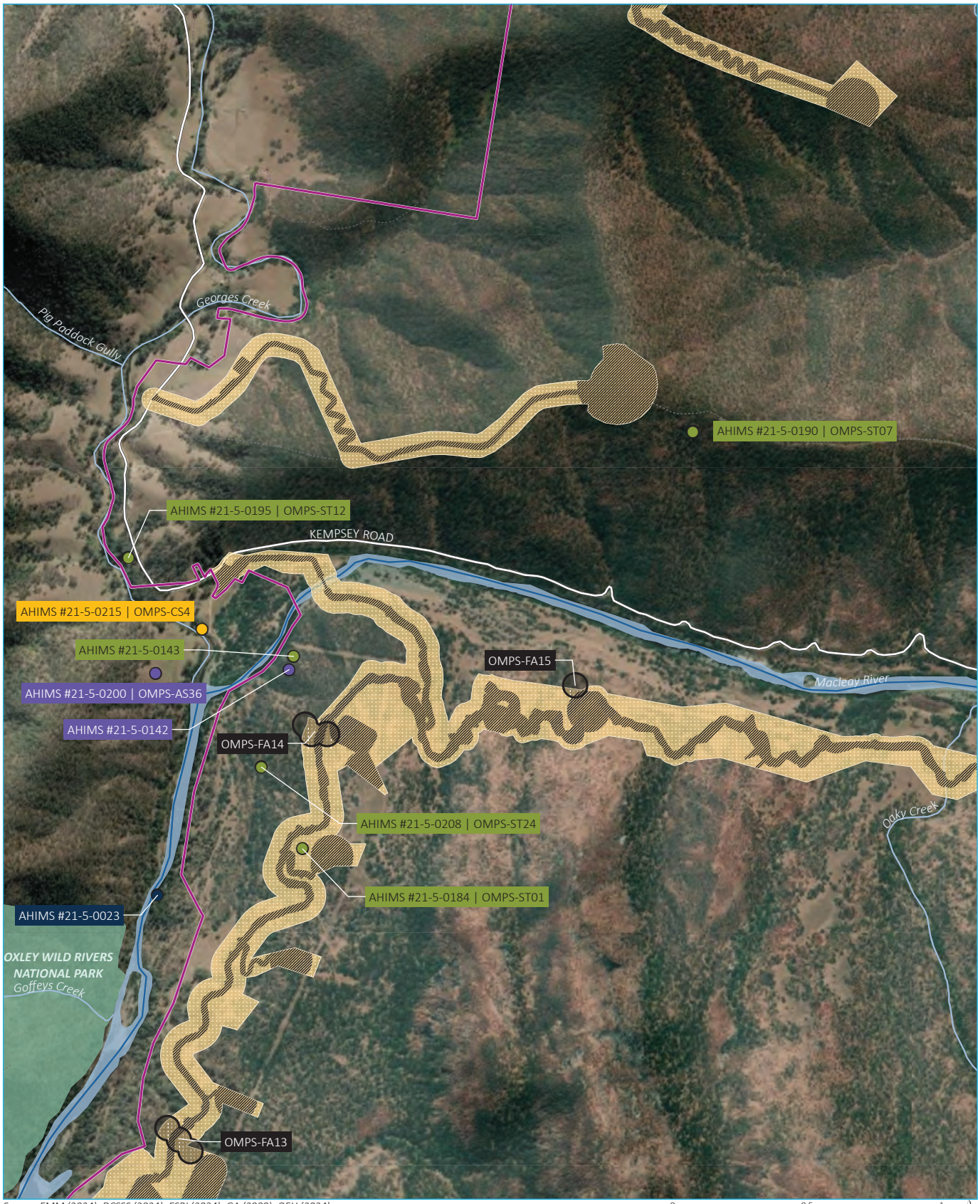
Existing environment

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

The updated archaeological resource

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities



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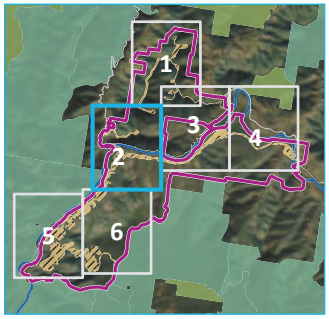

KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Archaeological resource

- Aboriginal ceremony and dreaming
- Artefact scatter
- Culturally modified tree
- Post-contact camp
- Background scatter
- Cultural deposit

Existing environment

- Major road
- Vehicular track
- Macleay River
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

The updated archaeological resource

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities

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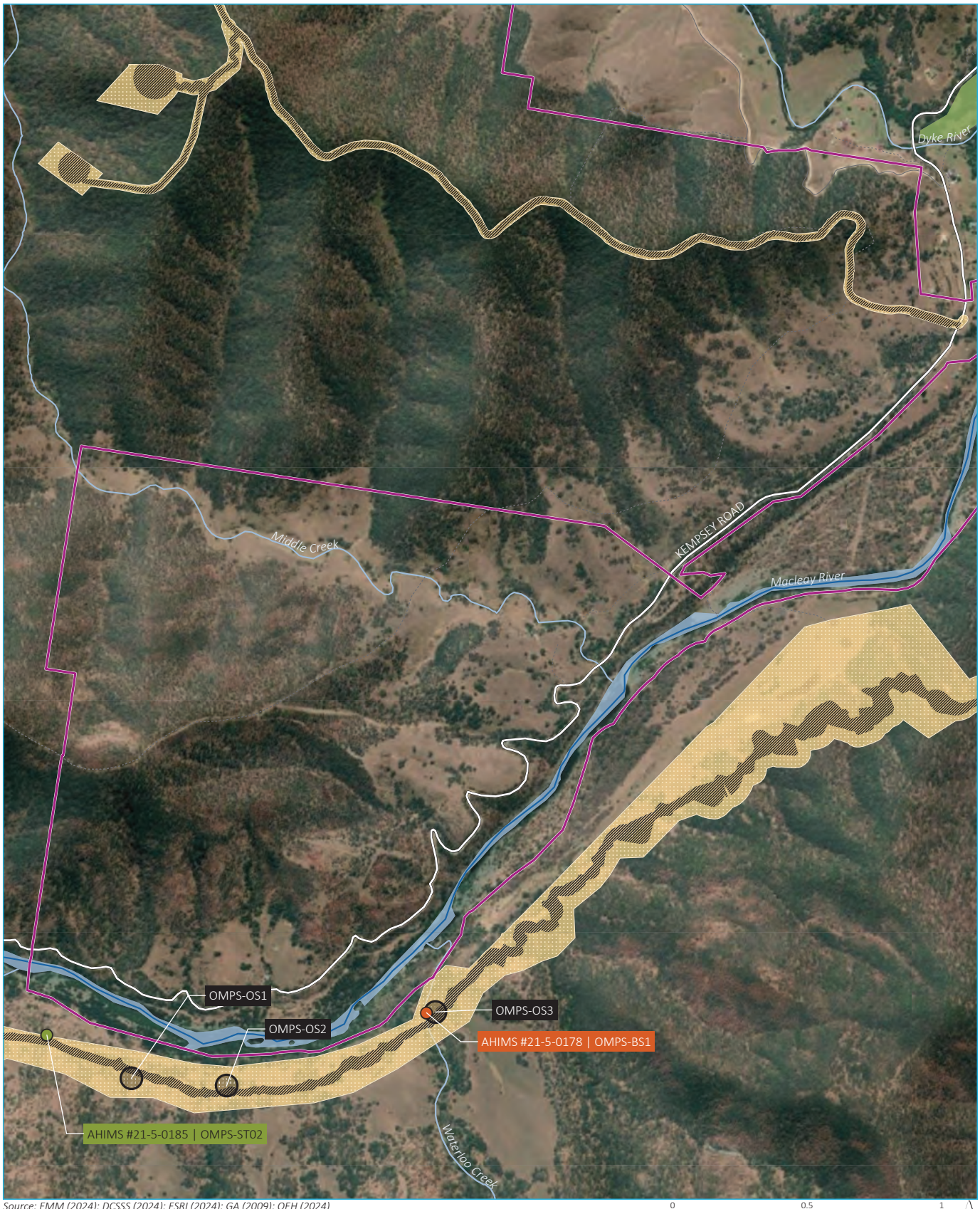

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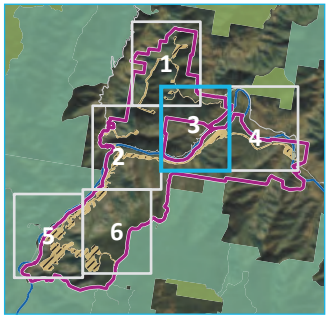
GDA 1994 MGA Zone 56

N



KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Archaeological resource

- Background scatter
- Culturally modified tree
- Background scatter
- Cultural deposit

Existing environment

- Major road
- Minor road
- Vehicular track
- Macleay River
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

The updated archaeological resource

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities

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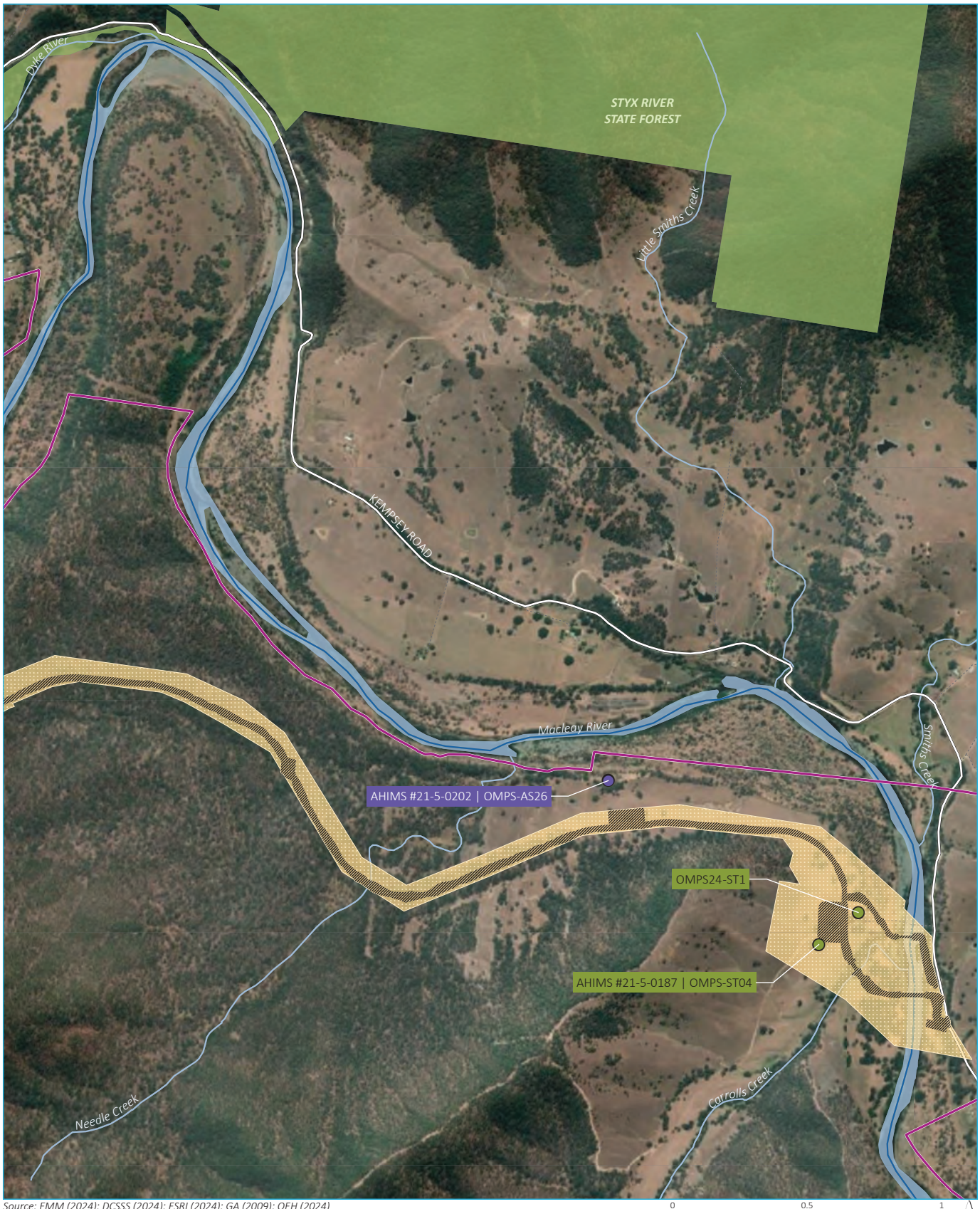

Source: EMM (2024); DCSSS (2024); ESRI (2024); GA (2009); OEH (2024)

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GDA 1994 MGA Zone 56

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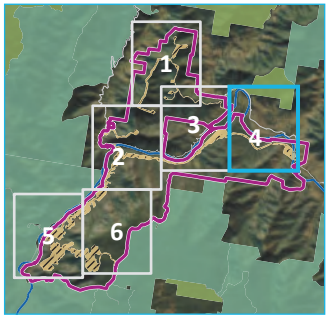


KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Archaeological resource

- Artefact scatter
- Culturally modified tree
- Background scatter

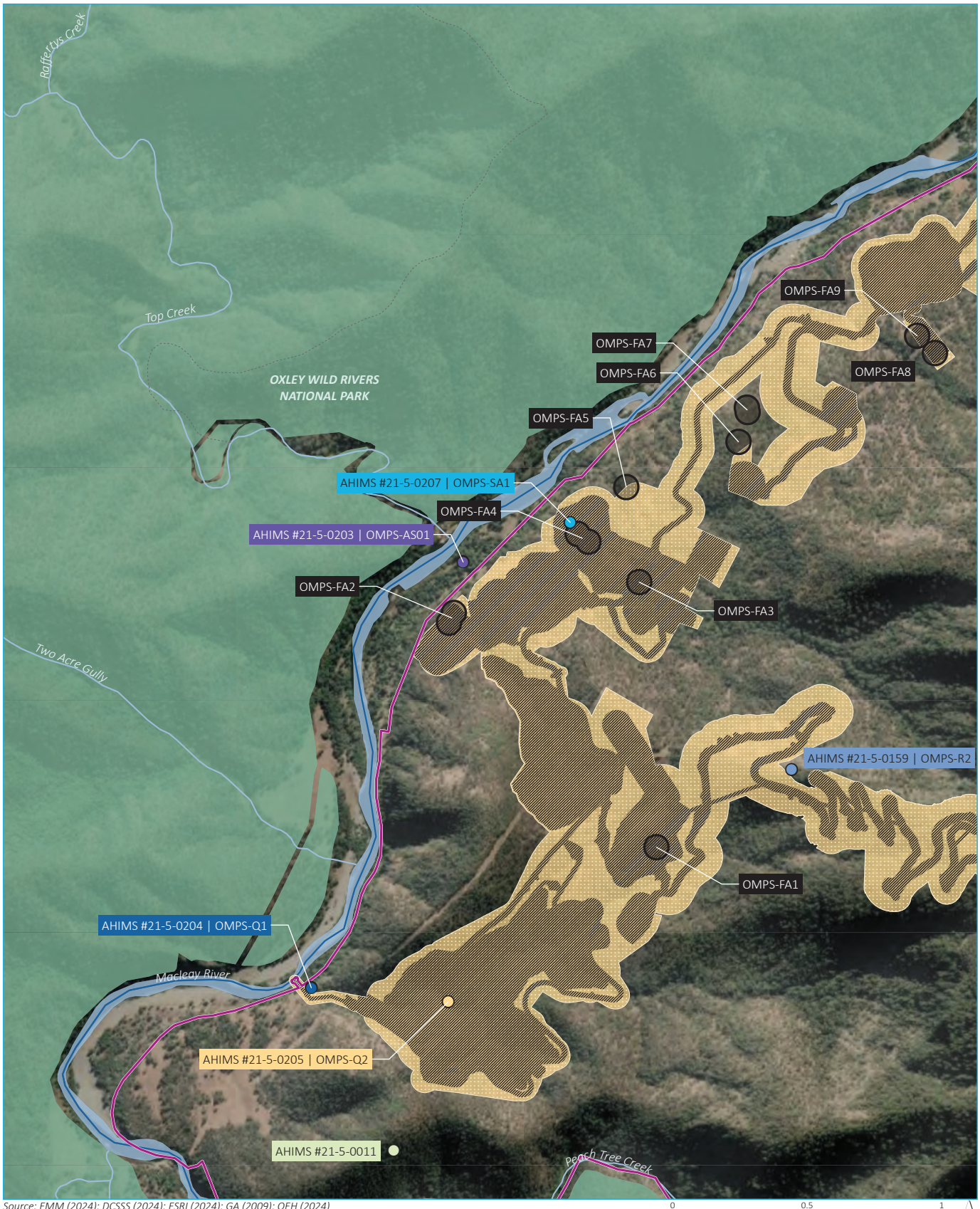
Existing environment

- Major road
- Vehicular track
- Macleay River
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

The updated archaeological resource

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities



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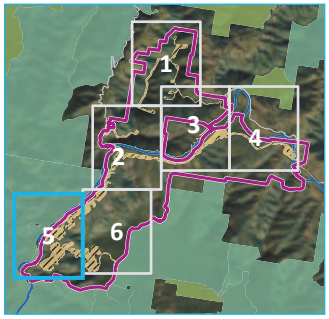

KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Archaeological resource

- Artefact scatter
- Quarry
- Quarry, artefact scatter
- Rockshelter
- Stone arrangement
- Stone arrangement, artefact scatter
- Background scatter
- Cultural deposit

Existing environment

- Vehicular track
- Macleay River
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

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The updated archaeological resource

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities

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

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GDA 1994 MGA Zone 56

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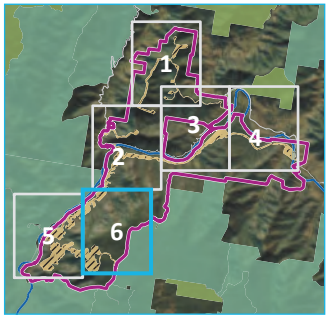

KEY

- Project area
- Disturbance footprint
- Amended construction envelope

Archaeological resource

- Culturally modified tree
- Stone arrangement
- Background scatter
- Cultural deposit

Existing environment

- Vehicular track
- Macleay River
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

The updated archaeological resource

Oven Mountain Pumped Hydro Energy Storage Project
ACHA addendum
OMPS Pty Ltd
Figure 6.1

EMM creating opportunities

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7 Significance assessment

7.1 General

A summary of significance assessment process is provided in the EIS ACHA, and the subsequent section continues to adopt this approach.

7.2 Statement of significance

With regard to previously identified sites, the significance assessment developed for the EIS ACHAR remains applicable for majority of the sites (Table 7.1). In relation to the new site identifications and refinements to existing sites outlined in Section 6, these similarly align with the EIS ACHA's overarching statement of significance for several of the main site types. Specifically (EMM 2023a: 133-134):

> The results align well with the regional archaeological and ethnographic record demonstrating both a deep-time, post-Contact and contemporary focus on the Macleay River corridor and notably its confluence with Georges Creek. Activities include post-Contact camps, ritual and mythological sites, and a broader record of stone artefactual material and culturally modified trees across the Project area. The integration of strong Aboriginal engagement and participation has further identified a range of less common and/or intangible sites providing a more comprehensive picture of the significance of the Project area in the past.
>
> …the areas of past foci and/or repeated occupation have demonstrated exploitation of the river corridor extending over the last 5,000 years. While limited excavations have occurred as part of the ACHA, it is considered that further investigation of these high-density zones (e.g. #21-5-0142, OMPS-AS26; OMPS-FA1-15 inclusive), and more detailed analysis of the assemblages recovered, has high potential to yield more information on the past economic and social behaviour of people in this region. This is especially the case for OMPS-FA7, which recovered some of the highest densities of cultural materials ever documented in the broader region, and which could significantly advance our understanding in the primary exploitation of a raw material resource.

The additional findings in relation to areas of past foci align with these statements, with OMPS-OS1-OS3 inclusive comparable with previous findings. Neither meet the artefact thresholds encountered at OMPS-FA7. Of note was the discovery at OMPS-FA16. While the artefact densities and soil profile are comparable with other cultural deposits, its location near the top of Oven Mountain is uncommon and counter to archaeological models suggesting activity focussed on the Macleay River. As such, this site is considered to have high research potential and some rarity in exploring past activities that may focus on the ceremonial cultural landscape of the region rather than the utilitarian use probable from many of the other cultural deposits.

In relation to the culturally modified trees, the validation of several of these sites does not alter the significance previously provided in the EIS ACHA. However, several of these sites appear to have been created in the 20th century – and potentially the late 20th century – and provides an important demonstration of ongoing connection to traditional practises in the region. Where encountered, these sites are now also considered to have a local historical significance to account for their role in demonstrating this ongoing connection to Country.

Two stone arrangements have also now been validated. However, the value of this site type is typically in the stories and connections that are assigned to them by the local Aboriginal community. In these instances, no such stories are apparent, indeed they are not mentioned in comprehensive anthropological work of the immediate region by Creamer and Shepard (1975) and Creamer (1981). While there is some research potential in their construction and broader environmental characteristics, as proposed in the EIS ACHA, their values remain primarily in their cultural and social importance to the contemporary Aboriginal community.

Overall, when considering the entire cultural assemblage, some 8 sites are identified as of high significance, 33 of moderate significance and 1 of low significance. When considering only the construction envelope these values can be modified to 2 high, 28 moderate, 1 of low significance. This compares closely with the EIS ACHA that identified 15 of high value, 44 of moderate value and 1 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.

Table 7.1 provides an updated summary for significance values for each Aboriginal object and/or site identified.

Table 7.1 Significance of Aboriginal objects and/or sites identified within the Project area

Site	AHIMS #	Site type	Brief description	Site status	EIS ACHA classification	Significance				
						Scientific	Aesthetic	Historical	Social	Overall
Within Project area, but outside construction envelope										
George's junction Site	21-5-0142	Artefact scatter	A stone axe production site situated overlooking the confluence of Georges Creek and the Macleay River. Previously identified by an Aboriginal participant and consisting of ~70 artefacts. A culturally modified tree was also recorded in this locale (AHIMS #21-5-0143) however it could not be relocated at the time of survey.	Valid	High	Moderate	Low	-	High	High
George's junction scarred tree	21-5-0143	Culturally modified tree	See above	Valid	High	-	-	-	High	High
Kunderang Station;Oven Mountain;	21-5-0011	Stone arrangement	South of proposed lower reservoir immediately east of Kunderang homestead	Valid	-	Moderate	Low	-	High	High
OMPS-AS26	21-5-0202	Artefact scatter	An extensive stone artefact scatter (>100 artefacts) identified on relatively flat to gently sloped terrace abutting the Macleay River. This site has the potential for deeply buried cultural materials.	Valid	High	High	-	-	High	High
OMPS-Q1	21-5-0204	Quarry, artefact scatter	A hornfels quarry site identified on outcropping rock within a deeply incised creekline, near where it meets the Macleay River. A number of artefacts were recorded in the vicinity.	Valid	Moderate	Moderate	-	-	Moderate	Moderate
OMPS-R2	21-5-0159	Rockshelter	Outcropping of large granodiorite boulders, providing a very small (65 cm (l) x 100 cm (w)) cave entrance, which extended back no more than a few metres. No overhang was present.	Valid	High	Low	Low	-	High	High
OMPS-ST2	21-5-0185	Culturally modified tree	A culturally modified river red gum (*Eucalyptus tereticornis*) identified on an alluvial terrace, ~230 m south of the Macleay River.	Valid	Moderate	Low	-	-	Moderate	Moderate

Site	AHIMS #	Site type	Brief description	Site status	EIS ACHA classification	Significance				
						Scientific	Aesthetic	Historical	Social	Overall
OMPS-ST7	21-5-0190	Culturally modified tree	A culturally modified Maiden's gum (*Eucalyptus maidenii*) identified on a ridgeline at the top of a very tall mountain range.	Valid	Moderate	Low	-	-	Moderate	Moderate
OMPS-ST12	21-5-0195	Culturally modified tree	A culturally modified river red gum (*Eucalyptus tereticornis*) identified on the alluvial flats ~60 m south-west of Georges Creek.	Valid	Moderate	Low	-	-	Moderate	Moderate
OMPS-ST24	21-5-0208	Culturally modified tree	A potential gender-restricted (woman) culturally modified fig tree located by creekline on steep slope with granodiorite outcropping.	Valid	Moderate	Low	-	-	Moderate	Moderate
OMPS-FA 7		Cultural deposit	An area of past foci containing substantive artefacts (>8,000 /m^2) and reflecting primary extraction of a raw material resource by Aboriginal people over the last 5 ka.	Valid	High	High	-	-	High	High
Within construction envelope										
OMPS24-SA1		Stone arrangement	Three linear arrangements on a ridge crest overlooking Macleay River. Aboriginal participants suggest potentially utilitarian purposes (water collection)	Valid	-	Moderate	Low	-	Moderate	Moderate
OMPS24-ST1		Culturally modified tree	A culturally modified river red gum (*Eucalyptus tereticornis*) situated at eastern end of EAR on the banks of Macleay River	Valid	-	Low	-	-	Moderate	Moderate
OMPS24-ST2		Culturally modified tree	A culturally modified white mahogany (*Eucalyptus acmenoides*) situated on the slopes of the Carrai Plateau	Valid	-	Low	-	-	Moderate	Moderate
OMPS24-ST3		Culturally modified tree	A culturally modified white mahogany (*Eucalyptus acmenoides*) situated on the slopes of the Carrai Plateau	Valid	-	Low	-	-	Moderate	Moderate
OMPS24-ST4		Culturally modified tree	A culturally modified white mahogany (*Eucalyptus acmenoides*) situated on the slopes of the Carrai Plateau	Valid	-	Low	-	-	Moderate	Moderate
OMPS-AS33		Artefact scatter	A low-density artefact scatter (~25 artefacts) identified on a portion of a disused access track that runs along the ridgeline of the mountains.	Valid	Moderate	Low	-	-	Moderate	Moderate

Site	AHIMS #	Site type	Brief description	Site status	EIS ACHA classification	Significance				
						Scientific	Aesthetic	Historical	Social	Overall
OMPS-Q2		Quarry	A quarry site consisting of two large hornfels boulders within the creekline that show evidence of being struck. No artefacts were recorded in the vicinity.	Valid	Moderate	Low	-	-	Moderate	Moderate
OMPS-SA1		Stone arrangement	A stone arrangement identified on an outcrop of granodiorite, with an artefact scatter in proximity. The site is located on a level to gently inclined spurcrest adjacent to an access track, The stone arrangement comprises up to seven lines of small (generally <10 cm) rocks placed in wavy lines on outcropping granodiorite.	Valid	High	Moderate	Low	-	High	High
OMPS-ST1		Culturally modified tree	A culturally modified river red gum (*Eucalyptus tereticornis*) on a spurcrest >500 m east of the Macleay River.	Valid	Moderate	Low	-	-	Moderate	Moderate
OMPS-ST4	21-5-0201	Culturally modified tree	A culturally modified river red gum (*Eucalyptus tereticornis*) identified on an alluvial terrace, ~345 m west of the Macleay River.	Valid	Moderate	Low	-	-	Moderate	Moderate
OMPS-ST19	21-5-0178	Culturally modified tree	A culturally modified tallowood (*Eucalyptus microcorys.*) on the relatively flat to gently undulating plateau of the Carrai Plateau.	Valid	Moderate	Low	-	-	Moderate	Moderate
OMPS-ST22	21-5-0205	Culturally modified tree	A culturally modified white mahogany (*Eucalyptus acmenoides*) identified on the steep slope where the Carrai Plateau starts to drop away into the Macleay River Valley	Valid	Moderate	Low	-	-	Moderate	Moderate
OMPS-FA1-6 and 8, 9, 10, 11, 13, 14, and15, OMPS-OS1, OMPS-OS2, and OMPS-OS3	21-5-0218, 21-5-0219, 21-5-0221	Cultural deposit	Seventeen areas of past foci and activity characterised by high densities of primarily sub-surface artefacts ranging from 24–>230/m^2, and which reflect long term and/or repeat visitation and occupation by people over at least the last 5 ka.	Valid	Moderate	Moderate	-	-	Moderate	Moderate
OMPS-FA16		Cultural deposit	An area of past foci containing high densities of sub-surface stone artefacts, and located high on the Carrai Plateau.	Valid	-	High	Moderate	-	High	High

Site	AHIMS #	Site type	Brief description	Site status	EIS ACHA classification	Significance				
						Scientific	Aesthetic	Historical	Social	Overall
OMPS-BS1	21-5-0178; See note 5	Low density artefact scatter	A stone artefact background scatter that is predicted to occur intermittently across the project area and extending beyond its limits within which disparate low to moderate artefact densities of 1–23/m^2 may be expected intermixed with culturally sterile zones; and reflecting long-term, transient use of the region for several thousand years	Valid	Low	Low	-	-	Low	Low

Notes:
1. Values are only assigned where the site fulfils that specific criterion.
2. In the case of the cultural criterion, it is ranked in relation to whether the site is important to one individual (low), a mixed view from the Aboriginal participants (moderate) or broad-scale support from all stakeholders (high).
3. Cultural sites rankings are based on Aboriginal consultation and Section 3 of the addendum report. While all sites identified were of value to the Aboriginal participants, some were clearly of more significance than others. Greater significance was also given to those that had broader regional analogues.
4. The overall significance is comparable with the highest ranking achieved in any of the four main criteria.
5. 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).

8 Potential and cumulative impacts

8.1 Key findings

- The Project would consist of the establishment of new infrastructure including off-river upper and lower water storage dams and reservoirs, transmission connection works and ancillary activities; tunnels, pumping stations, spillways, substation, access roads and tracks, quarries and temporary accommodation. These activities would impact cultural materials found generally on or near the current land surface, wherever they intersect the Project.

- Of the 12 discrete Aboriginal sites within the construction envelope, 7 are within the disturbance footprint and would be adversely affected. This includes two stone arrangements, five culturally modified trees, and an artefact scatter. Of these, two are considered of high significance, OMPS-SA1 (#21-5-0207) and OMPS-FA16 (#AHIMS TBC). Of the 18 cultural deposits identified, 15 are within the disturbance footprint, with 2 partially in the construction envelope. The majority of these would only be partially affected by the Project, with ~46% of the deposits within the disturbance footprint. Importantly, the highly significant OMPS-FA7 would be unaffected. The background scatter (OMPS-BS1 [#21-5-0178]) that extends intermittently across the Project area would also be adversely affected.

- Four Aboriginal sites located just outside the Project area are also considered. Of these, two may be subject to indirect impacts from view-lines, and/or water level fluctuations - George's Creek Camp (OMPS-CS4 [#21-5-0215]) and/or George's Creek (#21-5-0023), respectively. In both cases, it is considered that the impacts would be negligible and result in no loss of value.

- The potential impacts would result in some cumulative impacts to the regional cultural assemblage, notably in the loss of OMPS-FA16, which appears a rare cultural deposit on the top of the Carrai Plateau. As such, cumulative impacts are proposed to be offset through suitable mitigation and recovery of key sites and places where they are adversely impacted.

8.2 Avoidance and minimisation of impacts through design refinements

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), mitigation measures in Section 9 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.

8.3 Project impacts

As outlined in Section 1.2, the Project involves the establishment of new off-river upper and lower water storage dams and reservoirs, transmission connection works, and ancillary activities. In addition to these main components is tunnels, pumping stations, spillways, substation, access roads and tracks, quarries and temporary accommodation required to establish the Project. To determine how these impacts intersect with the environment, the EIS ACHA considered both the construction envelope and the disturbance footprint. This approach is adopted again here, and with amendments, the Project would result in a disturbance footprint of around 367 ha, and a construction envelope of around 768 ha.

The disturbance footprint is a smaller area of potential impact based on currently available designs, while the construction envelope provides a slightly larger area to allow some flexibility in the Project designs as they continue to evolve. Similarly to the EIS ACHA, here the Project remains committed to avoid or minimise impacts any Aboriginal sites or objects within the construction envelope that are identified as of moderate or high significance (Section 8.2) where such re-design occurs. These considerations would be formalised in the ACHMP and prior to any form of construction ground disturbance.

Generally, two types of potential impact are considered in relation to cultural materials, direct and indirect. Direct impacts relate to the project removing, truncating and/or disturbing the ground surface. It is considered probable that the construction activities would require the removal of vegetation within the disturbance footprint and result in impacts >1 m of the upper soil profile. The foundations of the dams holding the reservoirs would be required to extend to bedrock, and thereby remove the upper soil profile, while the tunnels connecting them would similarly require extensive earthworks for their establishment. The ancillary activities would require less disturbance, but even the installation of roads and temporary accommodation would typically undertake the removal of topsoil and compaction prior to establishment, especially given the rugged terrain they pass through, and therefore impacts to the upper soil profile of at least 50 cm would be expected. All of these activities would require removal of trees and other surface debris (e.g. loose stones, etc) prior to establishment. Based on this, it is considered that any activities in the disturbance footprint would result in complete harm/impact to any identified Aboriginal objects or sites within it. Indirect impacts are the result of both construction and operational activities that may result in environmental changes that would affect cultural material within, or near the project. General examples of indirect impact may include the changing view-lines to a site where visibility to/from it is part of its values, or an increase in dust being blown into a rock shelter and negatively affecting art motifs should they be present.

In contrast to the EIS ACHA, it is considered that the establishment of the reservoir would no longer enable cultural materials within them to be inundated, and thereby represent a type of conservation (submergence in situ). Further understanding of the creation of the reservoirs following the EIS suggests that ground disturbance across the footprint is probable to enable their establishment. As such, the reservoir locations are now also considered an impact in relation to Aboriginal heritage.

8.4 Aboriginal heritage impacts

8.4.1 Overview of the EIS ACHA potential impacts

The EIS ACHA found (EMM 2023a: 145):

> Specifically, of the 44 identified sites identified within or near to the Project area, 12 would be subject to direct impacts that would result in partial (OMPS-BS1) or complete loss of value (OMPS-ST2, OMPS-ST9, OMPS-ST10, OMPS-ST19, OMPS-ST21, OMPS-ST22, OMPS-SA1, OMPS-SA3, OMPS-SA6, OMPS-AS33, and OMPS-Q1) (Table 10.1;Figure 10.1). Several of these only have a tentative classification at this stage, and many are on the edge of the disturbance footprint where minor design changes may result in their conservation. Three sites (OMPS-SA4, OMPS-Q2, and OMPS-GG1) would be inundated and subject to indirect impacts, although based on details…albeit being inaccessible in the future. Four of the cultural places (OMPS-CS3, OMPS-CS4, OMPS-CS5 and #24-5-0023) are also considered to have potential indirect impacts from changes to view-lines and/or hydrological regimes, and which are proposed for further exploration and management…. While the Landscape visual impact assessment for the EIS does not indicate any visual impacts to the Kunderang homestead (OMPS-CS3), the cultural mapping did not resolve whether it was the homestead itself or other parts of the station as being of value; and hence it has been proposed here as a potential indirect impact with recommendations for further exploration as the Project progresses. Importantly, 25 of the sites of high and moderate significance are currently outside of the disturbance footprint and would remain unaffected by the development activities
>
> In relation to the significant buried cultural deposits, of the 11.28 ha encompassed within the 15 discrete foci zones, some 5.74 ha (~51%) would be directly affected primarily by the construction camp and surrounding activities… These encompass OMPS-FA1, OMPS-FA3, OMPS-FA4, andOMPS-FA12 in their entirety, and parts of OMPS-FA2, OMPS-FA8, OMPS-FA9, OMPS-FA10, and OMPS-FA11-15 inclusive. The remaining 49% of these deposits – and importantly the entirety of OMPS-FA7, which contains the highest densities of artefacts - would be unaffected by the Project.
>
> …the entire construction envelope is considered to encompass a low-density stone artefact background scatter of ~16 artefacts/m^2. Stone artefacts were either found as isolated objects and/or low-density artefact scatters as part of the field survey and/or as part of the test excavations….It would be expected that this background scatter would be encountered across much of the approx. 330 ha disturbance footprint and approx. 780 ha construction envelope.

8.4.2 Updated potential impacts

The EIS ACHA (EMM 2023a: 145) concluded that:

> All cultural material identified within the construction envelope was either identified on the current land surface (e.g. rockshelters, stone arrangements, culturally modified trees) and/or buried within the upper ~0.5 m of the soil profile...several of the project activities would result in direct impacts to these sites and deposits were situated within the disturbance footprint

Despite changes in the construction envelope, further consideration of the cultural materials observed, and additional field investigations, this conclusion remains valid. All cultural materials encountered are present on or near the current ground surface.

Of the 12 discrete Aboriginal sites documented within construction envelope, 7 are within the disturbance footprint and would be subject to impact. These are primarily found within the lower and upper reservoir footprints where avoidance by the Project is constrained. They include the stone arrangement and culturally modified trees found as part of additional works (Section 5.2), and the only highly significant site documented, OMPS-SA1 (#21-5-0207). A second stone arrangement, OMPS24-SA1 is also within the disturbance footprint, but at its very periphery of the upper reservoir surface activities and OMPS is exploring whether minor changes can be implemented to excise this portion of the Project and enable the site's retention. If achievable, this would be integrated into the ACHMP proposed in Section 9. The four remaining 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.

In the case of the 18 cultural deposits within the construction envelope, most extend into the disturbance footprint and would be at least partially impacted. Table 8.1 outlines the spatial area of each of these deposits into the disturbance footprint. In summary, the cultural deposits encompass some 14.37 ha, of which 3.22 ha (~22%) are outside any Project activities. A further 4.58 ha (~32%) are only present within the construction envelope, and include OMPS-FA5 and OMPS-FA6, which would be substantively avoided by the Project. The remaining 6.58 ha (~46%) are within the disturbance footprint and would be directly impacted. Three cultural deposits are entirely within the disturbance footprint, including OMPS-FA1, OMPS-FA3, and OMPS-FA4, all associated with major surface activities around the lower reservoir. The remaining cultural deposits range between ~14 up to ~82% depending on their location.

Similar to the EIS ACHA, disparate and discontinuous low densities of stone artefacts – a background scatter (OMPS-BS1 [#21-5-0178]) – is considered to extend across the construction envelope and would be adversely impacted by the Project.

In relation to cultural materials outside the Project area, four have been identified in Sections 3 and 4 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. In the case of George's Creek (#21-5-0023), Section 3.2 suggests that any changes to water flow and aquatic ecology, both important to this site, would be negligible, and as such this site too is considered to be unaffected by the Project. The George's Creek Camp has been identified as having moderate visual impacts by the Project in EMM (2023b) (Section 3.3), and as such is identified as being indirectly affected by the Project. However, these impacts are considered to have limited consequence, since the location is already subject to numerous modern developments, including houses/structures, the Armidale-Kempsey Road, and a semi-permanent road maintenance compound, many of which are more intrusive than the visual elements presented in Plate 3.1.

8.5 Intergenerational loss/cumulative impacts

The EIS ACHAR considered that cumulative impact from the Project would be limited, since a significant number of sites were of only tentative statues, and the Project had undertaken extensive avoidance of a range of key places to ensure their conservation. It also considered that the submergence of some sites may form a type of conversation, although this approach is no longer considered valid.

The cumulative impact section of the EIS ACHAR undertook further discussion on the consideration of cultural materials *ex situ* and their continued value in use, education and interpretation; and other positive benefits, including extensive on-Country investigation by the Aboriginal participants and an improved understanding of the past use of the region. In contrast to Heritage NSW's comments (Table 1.1), this was not to ignore or assuage the impacts of the Project, but to provide a broader context of the cultural heritage management process implemented.

When considering the updated archaeological resource (Section 6) and the updated Project (Section 1.2), cumulative impacts are considered to remain relatively minor. Key high significant sites including OMPS-FA7 and the George's junction site (#21-5-0142) remain outside the construction envelope. Although it must be acknowledged that the latter has been subject to changing boundaries in recent Aboriginal consultation. Similarly, as part of additional research, key cultural sites such as OMPS-CS5, are also outside the Project area.

There are, however, notable impacts to cultural materials, including the potential loss of OMPS-SA1 and OMPS24-SA1, and OMPS-FA16, all sites of moderate or high significance. In the case of the stone arrangements, while they meet criteria developed in this report (Section 4), the significance of these site types more broadly is heavily reliant on the stories and activities that were carried out by traditional and historical Aboriginal communities; and which do not appear available here. A significant part of the value of these sites can already therefore be considered lost, and appropriate archaeological mitigation measures can suitably document the tangible cultural materials of these sites. OMPS-FA16 is a site on the Carrai Plateau, and is a rare site not aligned with general archaeological model's; and its loss would have an impact to the regional cultural assemblage. Suitable mitigation measures are proposed to try and offset this loss.

Many of the remaining sites reflect surface and/or buried stone cultural materials, which are considered prevalent across the Project area and broader region. The potential impacts to these sites (in most cases partial impact) would have limited impact to the regional cultural assemblage, with numerous other examples documented. Similarly with culturally modified trees, they are prevalent across the region including within the broader Project area. Many of the increasingly significant trees – those associated with the last 100–150 years of activity – would be unaffected by the Project (Section 4.3).

Given this, the Project would result in some minor cumulative impacts to the regional cultural assemblage, including to at least one rare site. However, as outlined in Section 8 and further in Section 9, management and mitigation measures are proposed to maximise avoidance and limit impacts to these sites of high significance wherever feasible, and to recover the cultural deposit where this cannot be achieved. It must also be noticed that the two sites considered of greatest significance through the EIS ACHA and subsequent processes, OMPS-FA7 and George's junction site (#21-5-0142) would remain unaffected by the Project.

Table 8.1 Summary of potential impact to Aboriginal objects and/or sites located within the construction envelope. Those values in red indicate sites that are committed to avoidance or impact minimisation in the EIS ACHA and this addendum report.

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.
OMPS-AS1	21-5-0203	Artefact scatter	Valid	Moderate	N/A	-	-	-	
OMPS-AS36	21-5-0200	Artefact scatter	Valid	Moderate	N/A	-	-	-	
Within Project area, but outside construction envelope									
George's junction Site	21-5-0142	Artefact scatter	Valid	High	N/A	-	-	-	
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-AS26	21-5-0202	Artefact scatter	Valid	High	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-Q1	21-5-0204	Quarry, artefact scatter	Valid	Moderate	N/A	-	-	-	
OMPS-R2	21-5-0159	Rockshelter	Valid	High	N/A	-	-	-	
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-ST12	21-5-0195	Culturally modified tree	Valid	Moderate	N/A	-	-	-	
OMPS-ST24	21-5-0208	Culturally modified tree	Valid	Moderate	N/A	-	-	-	
OMPS-FA 7		Cultural deposit	Valid	High	N/A	-	-	-	
Within construction envelope									
OMPS24-ST1		Culturally modified tree	Valid	Moderate	Direct	Eastern end of EAR	Whole	Complete loss of value	Section 9 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 9 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 9 includes mitigation measures to avoid or minimise impacts to this site.
OMPS-ST22	21-5-0205	Culturally modified tree	Valid	Moderate	Direct	North of upper reservoir	Whole	Complete loss of value	Section 9 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.

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-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	
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-AS33	21-5-0201	Artefact scatter	Valid	Moderate	Direct	Transmission line	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-FA1		Cultural deposit	Valid	Moderate	Direct	Surface works, north of the lower reservoir	Whole	Complete loss of value	Some 0 ha (0%) is within the construction envelope, and 0.63 ha (100%) 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-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-FA3		Cultural deposit	Valid	Moderate	Direct	Surface works, north of the lower reservoir	Whole	Complete loss of value	Some 0 ha (0%) is within the construction envelope, and 0.63 ha (100%) is within the disturbance footprint.
OMPS-FA4		Cultural deposit	Valid	Moderate	Direct	Surface works, north of the lower reservoir	Whole	Complete loss of value	Some 0 ha (0%) is within the construction envelope, and 1.06 ha (100%) 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.
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.

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-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 this ACHA. Text in red denotes tentative site classification and/or where OMPS has provided commitment to avoidance and/or harm minimization.
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).

9 Further definition of future mitigation measures

9.1 Key findings

- This section provides an updated summary of the cultural assemblage of the construction envelope following additional desktop and field investigations presented in the addendum report. This addendum report concludes that 12 Aboriginal objects and/or sites, 17 cultural deposits (totalling 6.58 ha [~46%]) and a broader background scatter are within the construction envelope.

- Of these, seven sites and 15 cultural deposits (totalling ~6.58 ha) are wholly or partially within the disturbance footprint and have the potentially to be adversely affected. These include stone arrangement, culturally modified trees, and various surface and sub-surface stone artefact deposits. Indirect impacts to two sites in the vicinity of Georges Creek Junction are also probable, but no loss to their values is considered probable. This is compared with 19 sites and 5.74 ha of cultural deposit proposed for direct and/or indirect impacts previously outlined in the EIS ACHA.

- Updated post-approval requirements and mitigation measures are proposed for inclusion in the project approval to offset potential and cumulative impacts and guide post-approval requirements for the protection and management of Aboriginal heritage. These include the development of an Aboriginal Cultural Heritage Management Plan (ACHMP) to provide a framework for such activities, as well as direction on its content and required archaeological mitigation requirements (further explored in Annexure E); the development of a cultural values mitigation offset package given the potential indirect impacts to intangible values in the vicinity of Georges Creek Junction; the application of a Cultural Flow Management Plan to further explore and manage hydrological regimes downstream in relation to documented Aboriginal sites and contemporary activities along the broader Macleay River; and the development of an Interpretation Strategy and Plan to provide acknowledgement and other visual/educational opportunities for the Aboriginal and broader local community.

9.2 Updated summary of findings and impacts

Following submission of the EIS ACHAR, and in response to Heritage NSW's comments, updated desktop information and additional field investigation was undertaken to inform the Project. These included:

- further consideration of tentatively classified Aboriginal sites and places through review and comparison with the regional cultural assemblage

- further consideration of the cultural places, sites and stories associated with the Project through review of other related EIS studies

- additional field survey of several proposed amendments, and steep relief where caves had been previously identified by other EIS studies

- additional test excavations of the EAR and across the proposed upper reservoir footprint on the Carrai Plateau

In summary, these works have resulted in refinement of the cultural assemblage within the Project area. While the additional field investigations identified additional cultural materials, notably a rare cultural deposit on the Carrai Plateau (OMPS-FA16), a substantive number of the previously documented sites were declassified. Both regional desktop information and additional on-Country inspections by specialists resulted in the removal of stone arrangements, culturally modified trees, and a grinding groove from the local cultural assemblage.

Previously, the EIS ACHA identified 44 discrete Aboriginal sites and places, along with 15 areas of foci and activity – high densities of sub-surface stone artefact materials, identified as 'cultural deposits' in this report – encompassed within a low density of stone artefact materials found discontinuously across the Project area (Table 9.1). Following the analysis in this addendum report, it is now considered that some 22 discrete identified sites, 19 areas of cultural deposits are found within a discontinuous and disparate distribution of surface and shallowly buried stone artefacts (OMPS-BS1 [#21-5-0178] within the Project area (Table 9.1). Overall, 5 stone arrangements, 13 culturally modified trees, 1 rockshelter, and 1 grinding groove from the EIS ACHA did not meet criteria outlined here, while several sites outside the Project area through refinements and/or shown to be unaffected are not considered further. A further five new sites (four culturally modified trees and a stone arrangement) have then been added from the additional field investigations. It must be noted the EIS ACHA included numerous sites outside the Project area, which also accounts for some of the difference between the two reports

When considering only the construction envelope, the number of affected cultural materials are similar between the EIS ACHA and the addendum report (Table 9.1). In the EIS ACHA, some 12 sites were considered to be directly impacted, three were to be inundated – considered to be a form of conversation – and some 5.74 ha (51%) of the cultural deposits would be lost. Based on the current cultural assemblage, some 12 sites would be adversely affected, and some 6.58 ha (~46%) of the cultural deposits would be lost – the latter encompassed within 17 discrete locations that would be completely or partially impacted. No sites are considered to be inundated with the construction of the reservoirs likely to require ground disturbance across their footprint limiting such an approach to conservation. These sites have now been included in those directly impacted where relevant. The EIS ACHA also considered that four cultural places may be subject to indirect impacts, including visual and/or water flow changes. Additional review of other EIS studies has demonstrated that only two of these may be subject to change (OMPS-CS4 [#21-5-0215], #21-5-0023), and neither would result in a loss of value.

The potential impacts would encompass a number of moderate and highly significant Aboriginal sites. While avoidance and Project refinement has occurred extensively and either completely avoided cultural materials, and/or substantively included them in the construction envelope where impact minimisation is required, a number are in areas where there is limited opportunity for avoidance. This notably includes OMPS-FA16, which is within the centre of the upper reservoir footprint, and OMPS-SA1 in the centre of surface activities for the lower reservoir. Given these impacts, mitigation measures are outlined in Sections 9.3 and 9.4. Of those sites proposed for impact, several are on the periphery of the disturbance footprint, and ongoing Project refinement may result in their avoidance and conservation. Where achievable, this would be included in the ACHMP proposed in Section 9.4.

Table 9.1 Aboriginal sites and places presented within the EIS ACHA and addendum report

Aboriginal sites and places	AHIMS #	EIS ACHA		Addendum report					Notes
		Significance¥	Potential impact	Significance	Within Project area	Within construction envelope	Within disturbance footprint	Potential impact≠	
OMPS-CS3	21-5-0214	High	Indirect	-	-	-	-	-	Analysis in Section 3 indicates that this site would be unaffected by the Project.
OMPS-CS4	21-5-0215	High	Indirect	High	-	-	-	Indirect	
OMPS-CS5	21-5-0215	High	Indirect	-	-	-	-	-	Analysis in Section 3 indicates that this site would be unaffected by the Project.
Georges Creek	21-5-0023	High	Indirect	High	-	-	-	Indirect	
OMPS-ST1	21-5-0184	Moderate	N/A	Moderate	✓	✓	-	Direct	
OMPS-ST2	21-5-0185	Moderate	Direct	Moderate	✓	-	-	N/A	
OMPS-ST3	21-5-0186	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST4	21-5-0201	Moderate	N/A	Moderate	✓	✓	-	Direct	
OMPS-ST5	21-5-0188	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST6	21-5-0189	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST7	21-5-0190	Moderate	N/A	Moderate	✓	-	-	N/A	
OMPS-ST8	21-5-0191	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST9	21-5-0192	Moderate	Direct	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST10	21-5-0193	Moderate	Direct	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST11	21-5-0194	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST12	21-5-0195	Moderate	N/A	Moderate	✓	-	-	N/A	

Aboriginal sites and places	AHIMS #	EIS ACHA		Addendum report					Notes
		Significance[¥]	Potential impact	Significance	Within Project area	Within construction envelope	Within disturbance footprint	Potential impact[≠]	
OMPS-ST13	21-5-0196	Moderate	N/A	Moderate	-	-	-	-	
OMPS-ST14	21-5-0179	Moderate	N/A	Moderate	-	-	-	-	
OMPS-ST15	21-5-0197	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST16	21-5-0198	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST17	21-5-0171	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST18	21-5-0174	Moderate	N/A	Moderate	-	-	-	-	
OMPS-ST19	21-5-0172	Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-ST20	21-5-0173	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST21	21-5-0175	Moderate	Direct	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST22	21-5-0205	Moderate	Direct	Moderate	✓	✓	-	Direct	
OMPS-ST23	21-5-0177	Moderate	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-ST24	21-5-0208	Moderate	N/A	Moderate	✓	-	-	-	
OMPS-SA1	21-5-0207	High	Direct	High	✓	✓	✓	Direct	
OMPS-SA2	21-5-0180	High	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-SA3	21-5-0206	High	Direct	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-SA4	21-5-0208	High	Indirect (inundation)	Moderate	✓	-	-	N/A	Site found to be non-cultural in Section 4.3.
OMPS-SA5	21-5-0182	High	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-SA6	21-5-0183	High	Direct	-	-	-	-	-	Site found to be non-cultural in Section 4.3.

Aboriginal sites and places	AHIMS #	EIS ACHA		Addendum report					Notes
		Significance¥	Potential impact	Significance	Within Project area	Within construction envelope	Within disturbance footprint	Potential impact≠	
OMPS-AS1 / George's junction Site	21-5-0142	High	N/A	High	✓	-	-	N/A	
George's junction scarred tree*	21-5-0143		N/A	High	✓	-	-	N/A	
OMPS-AS1	21-5-0203	Moderate	N/A	Moderate	-	-	-	-	
OMPS-AS26	21-5-0202	High	N/A	High	✓	-	-	N/A	
OMPS-AS33	21-5-0201	Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-AS36	21-5-0200	Moderate	N/A	Moderate	-	-	-	-	
OMPS-Q1	21-5-0204	Moderate	Direct	Moderate	✓	-	-	N/A	
OMPS-Q2	21-5-0205	Moderate	Indirect	Moderate	✓	✓	✓	Direct	Inundation
OMPS-R1	21-5-0158	High	N/A	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-R2	21-5-0159	High	N/A	High	✓	-	-	N/A	
OMPS-GG1	21-5-0199	Moderate	Indirect (inundation)	-	-	-	-	-	Site found to be non-cultural in Section 4.3.
OMPS-BS1	21-5-0178	Low	Direct	Low	✓	✓	✓	Direct	
OMPS-FA1		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA2		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA3		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA4		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA5		Moderate	N/A	Moderate	✓	✓	-	Direct	

Aboriginal sites and places	AHIMS #	EIS ACHA		Addendum report					Notes
		Significance[¥]	Potential impact	Significance	Within Project area	Within construction envelope	Within disturbance footprint	Potential impact[≠]	
OMPS-FA6		Moderate	N/A	Moderate	✓	✓	-	Direct	
OMPS-FA7		High	N/A	High	✓	-	-	N/A	
OMPS-FA8		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA9		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA10		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA11		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA12		Moderate	Direct	-	-	-	-	-	Cultural deposit re-assessed as part of the addendum report and considered to reflect background scatter. Incorporated into OMPS-BS1.
OMPS-FA13		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA14		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA15		Moderate	Direct	Moderate	✓	✓	✓	Direct	
OMPS-FA 16*		-	-	High	✓	✓	✓	Direct	Site identified as part of additional investigations outlined in Section 5.3.
OMPS-OS1*	21-5-0218	-	-	Moderate	✓	✓	✓	Direct	Site identified as part of additional investigations outlined in Section 5.3.
OMPS-OS2*	21-5-0219	-	-	Moderate	✓	✓	✓	Direct	Site identified as part of additional investigations outlined in Section 5.3.
OMPS-OS3*	21-5-0221	-	-	Moderate	✓	✓	✓	Direct	Site identified as part of additional investigations outlined in Section 5.3.
OMPS24-SA1*		-	-	Moderate	✓	✓	✓	Direct	Site identified as part of additional investigations outlined in Section 5.2.

Aboriginal sites and places	AHIMS #	EIS ACHA		Addendum report					Notes
		Significance[¥]	Potential impact	Significance	Within Project area	Within construction envelope	Within disturbance footprint	Potential impact[≠]	
OMPS24-ST1*		-	-	Moderate	✓	✓	-	Direct	Site identified as part of additional investigations outlined in Section 5.2.
OMPS24-ST2*		-	-	Moderate	✓	✓	✓	Direct	Site identified as part of additional investigations outlined in Section 5.2.
OMPS24-ST3*		-	-	Moderate	✓	✓	✓	Direct	Site identified as part of additional investigations outlined in Section 5.2.
OMPS24-ST4*		-	-	Moderate	✓	✓	✓	Direct	Site identified as part of additional investigations outlined in Section 5.2.

Notes: * denotes Aboriginal site not previously identified in the EIS ACHA. [¥] any significance value in red indicated a site given only a tentative status in the EIS ACHA, additional activities in the addendum report have been undertaken to validate or declassify these sites. [≠] values in red indicate a site within the construction envelope where avoidance and/or impact minimisation is proposed in Section 9.4.

9.3 Post-approval requirements

The post-approval requirements for the Project have been outlined in Section 11 of the EIS ACHA and, with some minor refinement, remain valid. These are presented in Section 9.4.

The recommendations below include development of an ACHMP to provide the post-approval management framework for all future Aboriginal heritage requirements for the Project. Specific components to be included in the ACHMP are outlined in the recommendation, with guiding principles for management of identified archaeological site types to be incorporated into the ACHMP presented in Annexure E. To maintain flexibility to facilitate the detailed design, a key component of the ACHMP is to maximise the conservation and retention of identified Aboriginal sites and places prior and during to construction. These actions and outcomes would form a key part of the ACHMP. Each of these requirements should be developed in consultation with the Aboriginal participants in the project and Heritage NSW.

Additional field investigations were proposed in the EIS ACHA and its mitigation measures, including further field survey, specialist investigations of key sites such as culturally modified trees and test excavations to continue to inform the assessment process. This report presents those activities that were achieved following the submission of the EIS and prior to approval, and therefore the recommendations to undertake these in the EIS ACHA have now been removed.

In relation to intangible values, additional review of other EIS studies on viewsheds and water flow changes has indicated that impacts would be limited to two places, with no loss of value expected. However, given there are impacts to cultural places and consultation on these issues has been limited to date, recommendations to further develop a suitable management framework is proposed. In the case of Georges Camp, a new recommendation has been developed to explore a cultural values mitigation package with the Aboriginal participants to offset any perceived indirect impacts from the Project. At this stage, the mitigation package remains uncertain, but is proposed to align with ongoing management of traditional activities and resource proliferation around Georges Junction. However, opportunities beyond this immediate vicinity may be proposed, with numerous important nearby cultural places, such as Lower Creek and Carrai water-holes, etc.

In relation to #21-5-0023, while EMM (2024a) indicates that changes would be minimal. While the Project appears to have negligible impact on water flow of the Macleay River, it has nonetheless remained a focus of consultation since inception of the EIS ACHA; and has formed part of recent discussions over the proposed bridge across the Macleay River and its impact to contemporary fishing activities. As such, we have modified the proposed cultural flows management plan outlined in the EIS ACHA, which would have been dictated by other water licensing requirements, to a more appropriate requirement in the proposed cultural values mitigation offsets to further explore traditional water related activities wherever feasible with the local Aboriginal community.

Finally, heritage interpretation continues to be proposed as a recommendation. Despite the Project being within an important cultural landscape, there is limited identification or acknowledgement of the cultural materials of the region. The Project being situated near Bellbrook, Lower Creek and Georges Junction has an unrivalled opportunity to consider and implement presentation of such values. As with the ACHMP, guiding principles to be integrated into these documents are presented in Annexure E.

9.4 Updated mitigation measures

Where feasible, OMPS should consider modifying the Project design and disturbance footprint to avoid identified Aboriginal objects and/or sites identified and areas of significant buried cultural material (or where they have a high likelihood of being present) within the disturbance footprint. These actions should be undertaken prior to construction and where achieved should be described in the proposed ACHMP for the Project.

The following recommendations should be integrated into the management for the Project:

- Prior to construction ground disturbance, an Aboriginal Cultural Heritage Management Plan (ACHMP) must be developed by a heritage specialist in consultation with the Registered Aboriginal Parties (RAPs) and consent authority to provide the post-approval framework for managing Aboriginal heritage within the Project area. The ACHMP should include the following issues:
    - processes, timing, communication methods and Project involvement (e.g. on-site activities) for maintaining Aboriginal community consultation and participation through the remainder of the Project. This should include a grievance mechanism that is readily available and designed for use by the local Aboriginal community.
    - 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. Further details of these activities are presented in Annexure E. For these activities, details of location/s, methods, personnel, and timing should be included.
    - detail descriptions and methods of any additional investigative and/or mitigative archaeological actions that may be required prior to construction works commencing or during the Project. These should include, but not limited to, archival recording of all identified Aboriginal objects, sites and places; suitable recovery or relocation, documentation and analysis of any archaeological sites proposed for direct impacts; management of any archaeological excavation of areas of significant buried cultural material and where direct impacts are proposed; and/or cultural monitoring for any areas identified by Aboriginal community as having significant cultural value. Further details of these activities are presented in Annexure E. For these activities, details of location/s, methods, personnel, and timing should be included.
    - description and methods for undertaking further Aboriginal heritage assessment, investigation and mitigation of any areas of the disturbance footprint that have changed following completion of the EIS ACHA and/or during the final design and construction phases of the Project.
    - description and methods of post-excavation analysis and reporting of the archaeological investigations and activities implemented as part of the ACHMP. For excavations, these should include suitable collection and processing of stone artefacts, and chronological, soil, and environmental samples.
    - procedures for managing the unexpected discovery of Aboriginal objects, sites and/or human remains during the Project.
    - procedures for the curation and long-term management of cultural materials recovered or relocated as part of the works outlined in the ACHMP and any preceding stages associated with the Project.
    - processes for reviewing, monitoring, and updating the ACHMP as the project progresses.
- A cultural values mitigation offset package must be developed in consultation with relevant Elders and key knowledge-holders. This document should be undertaken to explore mitigations for the perceived social and cultural impacts to Georges Junction and associated cultural values of the Macleay River corridor. The document should include, but not be limited to:
    - ongoing on-Country access within key parts of the Project area owned by the proponent into the future, notably surrounding Georges Creek junction, and/or other mutually agreed location for the local Aboriginal community to undertake traditional cultural and educative activities.

- further exploration and support of traditional hunting, fishing and other water-related activities along the Macleay River and at Georges Creek Junction on land owned and/or accessible by the proponent into the future

- suitable integration of Aboriginal participants, Indigenous knowledge and traditional ecological methods into future ecological and aquatic ecological requirements that result from the EIS assessment.

- suitable management and maintenance of any impacted view-lines of Georges Creek Junction by the Project within the limits of the proposed development activities.

- A heritage-interpretation strategy must be developed by a heritage specialist to identify the interpretive values of the Project, and specifically Aboriginal heritage values across the Project area, and to provide direction for potential interpretive opportunities for the Project and/or off-site (e.g. at Bellbrook, Lower Creek and/or Georges Creek Junction). This strategy should be made available for consultation and feedback with the Thunggutti, Dhungutti and Anaiwan traditional owners. Following consultation and feedback on the strategy, a heritage interpretation plan would refine the strategy with content (visual and textual) and design details in order to allow the implementation stage. The interpretation strategy and interpretation plan must include consideration of guiding principles presented in Annexure E.

- The Construction Environment Management Plan (CEMP), or equivalent, should reinforce how the cultural landscape is considered throughout the Project and detail the rehabilitation of the disturbance footprint. Rehabilitation of areas where infrastructure is not remaining after construction of the Project should be undertaken to determine suitable ecological communities and other factors in returning the cultural landscape as close to its current state as feasible.

- Consultation should be maintained with the RAPs during the finalisation of the assessment process and throughout the pre-construction and construction phase of the Project.

- A copy of the EIS ACHA and the addendum report should be lodged with AHIMS and provided to each of the RAPs.

- AHIMS Site Recording Forms for the newly identified Aboriginal objects and/or sites within the Project area and areas of archaeological sensitivity should be submitted to the AHIMS database once their validation has been completed.

- Where the heritage consultant changes through the Project, suitable hand over should be undertaken to minimise loss or mistranslation of the intent of the information, findings and future steps in heritage management occur.

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Abbreviations

AHD	Australian Height Datum
ACHA/ACHAR	Aboriginal cultural heritage assessment report
AHIMS	Aboriginal Heritage Information Management System
ACHMP	Aboriginal Cultural Heritage Management Plan
BP	Years before present
c.	circa
cm	centimetres
DCCEWW	Department of Climate Change, Energy, the Environment and Water
DEC	Department of Environment and Conservation, now Heritage NSW
DECCW	Department of Environment Climate Change and Water, now Heritage NSW
DPC	Department of Premier and Cabinet
DPE	Department of Planning and Environment, now DPHI and/or DCCEWW
DPHI	Department of Planning, Housing and Infrastructure
DPIE	Department of Planning, Industry and Environment, now DPHI and/or DCCEWW
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Ltd
EP&A Act	*Environmental Planning and Assessment Act 1979*
ESD	Ecologically sustainable development
FGS	Fine grained siliceous
g	grams
GIS	geographical information system
GPS	global positioning system
ha	hectare
ICOMOS	International Council on Monuments and Sites
IMTC	Indurated mudstone/tuff/chert
km	kilometres
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
m	metres
m^2	square metres
mm	millimetres
n	Number

NSW	New South Wales
OEH	Office of Environment and Heritage, now Heritage NSW
OMPS	Oven Mountain Pumped Hydro Storage
PAD	Potential archaeological deposit
RAP	Registered Aboriginal Party
SEARs	Secretary's Environmental Assessment Requirements
SPAL	Specific purpose access water license
t	Tonne
TP	Test pit