Technical report 2

Aboriginal cultural heritage assessment

Aboriginal Cultural Heritage Assessment

Hunter Transmission Project

Prepared for Energy Corporation of NSW

August 2025

Aboriginal Cultural Heritage Assessment

Hunter Transmission Project

Energy Corporation of NSW

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Acknowledgement of Country

We acknowledge that Aboriginal and Torres Strait Islander peoples are the First Peoples and Traditional Custodians of Australia, and the oldest continuing culture in human history.

We would like to respectfully acknowledge the Wonnarua, Awabakal and Darkinjung people as the Traditional Custodians of the land on which we deliver our project to the community. We pay our respects to Elders past, present and emerging and to all Aboriginal people of these communities.

We acknowledge the work that Aboriginal people have done to maintain land and water and would show respect through thoughtful and collaborative approaches to engage with the Aboriginal community to ensure local priorities and values inform and influence decision making.

We reflect on the continuing impact of government policies and practices and recognise our responsibility to work together, with and for Aboriginal and Torres Strait Islander peoples, families and communities towards improved economic, social and cultural outcomes.

Content warning

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

Glossary

Term	Definition
Aboriginal culturally modified tree	A tree of sufficient age to have been mature at the time of traditional Aboriginal hunter-gatherer life and therefore generally of more than 220 years ago with evidence of bark or cambium wood removal for the purpose of implement manufacture, footholds, bark sheet removal for shelter, or extraction of animals or other food. Care must be taken to distinguish Aboriginal scars from the much more common natural causes of branch tear, insect attack, animal impact, lightning strike and dieback. Culturally modified tree recognition guidelines exist to distinguish these features. Naturally scarred trees are often misidentified as Aboriginal culturally modified trees.
Aboriginal object	A physical manifestation of past Aboriginal activity. The legal term is defined in the *National Parks and Wildlife Act 1974* Section 5 as: any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains.
Aboriginal site	The location where a person in the present day can observe one or more Aboriginal objects. The boundaries of a site are limited to the extent of the observed evidence. In the context of this report a 'site' does not include the assumed extent of unobserved Aboriginal objects (such as archaeological deposit). Different archaeologists can have varying definitions of a 'site' and may use the term to reflect the assumed extent of past Aboriginal activity beyond visible Aboriginal objects. Such use of the term risks defining all of Australia as a single 'site'.
Aboriginal stone artefact	A stone object with morphological features derived from past Aboriginal activity such as intentional fracture, abrasion or impact. Artefacts are distinguished by morphology and context. Typically flaked stone artefacts are distinguished from naturally broken stone by recognition of clear marginal fracture initiation (typically hertzian/conchoidal or wedging initiation) on highly siliceous stone types which can often be exotic to the area. Care must be taken to distinguish modern broken stone in machine impacted contexts and therefore context must be carefully considered as well as morphology.
Access tracks	Temporary and permanent tracks used to access the project. Refer to *Chapter 4 – Project description* of the EIS for further details.
ACHA study area	The study area for the ACHA includes around 174,880 hectares centred on the project impact area and where relevant incorporates the broader areas of the Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie local government areas (LGAs). To assist in readability, the ACHA study area has been divided into 3 general zones: • HTP North – Bayswater to Broke includes Lake Liddell, the Bayswater power station, major coal mining complexes in the Upper Hunter Valley, Mount Thorley Industrial Estate, Singleton Military Area, and several rural properties generally on the alluvial floodplains of the Hunter River • HTP Central – Pokolbin to Corrabare includes the Pokolbin and Corrabare State forests and the rural residential areas between these forests at Cedar Creek, Millfield and Laguna • HTP South – Olney to Eraring includes the Watagan and Olney State forests, Watagans National Park, the residential areas in Martinsville and Cooranbong, and Eraring Power Station.
aggradation	A term used in geology for the increase in land elevation, typically in a river system, due to the deposition of sediment.
AHIMS	Aboriginal Heritage Information Management System — a computer software system employed by the Office of Environment and Heritage to manage many aspects of Aboriginal site recording and permitting. AHIMS includes an Aboriginal sites database which can be accessed via an internet portal.
archaeological deposit	Aboriginal objects occurring in one or more soil strata. The most common form of archaeological deposit relates to the presence of a single conflated layer of Aboriginal stone artefacts worked into the topsoil through bioturbation.
archaeological survey	A method of data collection for Aboriginal heritage assessment. It involved a survey team walking over the land in a systematic way, recording information. Activities are not invasive or destructive.

Term	Definition
backed artefact	A thin flake or blade-flake that has been shaped by secondary flaking (retouch) along one lateral margin. The retouched margin is typically steep and bipolar to form a blunt 'back' in the manner of a modern scalpel blade. Distinctive symmetrical and asymmetrical forms are typically found called geometric microliths and Bondi points respectively. A thick symmetrical form, called an Elouera, is typically the size of a mandarin segment.
Bayswater Power Station	Existing power station at Bayswater owned by AGL.
Bayswater South switching station	The new switching station that would be constructed south of Bayswater power station.
Bipolar flaking	Where the stone to be worked is rested on an anvil or other stone before being hit by the hammerstone. This results in the presence of negative flake scars on both ends of the core.
bioturbation	Is the reworking of soils and sediments by animals or plants. Its effects include changing texture of sediments (diagenetic), bio irrigation and displacement of microorganisms and non-living particles.
Bondi point	See backed artefact definition.
brown podosols	Topsoils have loamy textures. A2 horizons are common, there is a clear boundary onto the B horizon. They have a sandy clay to heavy clay texture (typically occur on upper and mid-slopes).
chocolate soils	Soils that are typically formed in a basaltic parent material where slope or bedrock strata influence drainage. Surface horizons comprise loam, clay loam or silty clay loam. There is a gradual boundary to a brown or brownish black B horizon. There is no A2 horizons.
conchoidal	A term used in relation to fracture surfaces on Aboriginal stone artefacts - bulb-like in the manner of a bulbous protrusion on a bivalve shell.
Construction impact area	The area that would be directly impacted by the construction of the project, including (but not limited to) transmission towers and lines, stringing sites, access roads, access tracks, substations, switching stations, adjustments and upgrades to existing lines, communications infrastructure, temporary worker accommodation, construction support sites, laydown areas and utility adjustments.
Construction access routes	Roads used by construction vehicles (light and heavy).
Construction support site	An area used as the base for construction activities, usually for the storage of plant/equipment and materials, processing facilities (concrete batching, aggregate crushing, grinding and screening), maintenance facilities/workshops, staff facilities, firefighting equipment, helicopter landing pad and support facilities, access and parking, and wastewater treatment. Construction support sites would also include temporary worker accommodation at selected locations. Construction support sites are discussed in *section 4.3.7* of the EIS.
Critical State significant infrastructure (CSSI) application area	The critical State significant infrastructure (CSSI) application for the HTP covers 5 local government areas (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie).
Cumulative impact	The combined impacts of the project on a matter with other relevant future projects.
Disturbance area	This is used primarily to assess potential impacts on biodiversity values in the Biodiversity Assessment Development Report (BDAR). Includes the following categories: • Disturbance area A • Disturbance area A (centreline) • Disturbance area B • Disturbance area HZ

Term	Definition
Disturbance area A	The area where vegetation would be completely removed. It includes areas at and around transmission towers (including tower pads and batters), stringing sites, laydown areas, switching stations, substation upgrades, construction support sites, new and upgraded access tracks and road upgrades. Impacts within this area would include sub-surface disturbance from construction activities such as grading, excavation, and full tree removal. With the exception of areas that only require temporary disturbance (i.e. temporary access tracks and stringing sites), this area would also be subject to ongoing maintenance during operation (including vegetation removal to ground level) for operational and safety requirements (including bushfire).
Disturbance area A (centreline)	A 20 metre wide centreline area between transmission towers where all vegetation would be removed to ground level during construction. This area would also be subject to ongoing maintenance during operation (i.e. removal to maintain vegetation clearance requirements) for operational and safety requirements (including bushfire).
Disturbance area B	The area within the transmission line easement, excluding disturbance area A and disturbance area A (centreline), where partial clearing would be undertaken. Removal of vegetation (including trees) would be required if there is a risk of vegetation exceeding the designated clearance heights. These heights are set for operational and safety requirements, including bushfire risk management (indicatively 13.5 metres below the conductors at maximum operating temperature). This area would be subject to ongoing maintenance during operation.
Disturbance area hazard tree zone (HZ)	Hazard trees are those that have the potential to pose a risk to safe operation of the transmission line by falling onto the transmission towers, conductors and associated infrastructure within the easement. A hazard tree zone has been identified in limited areas on either side of the transmission line easement through LiDAR analysis of tree heights and topography. Hazard tree management would occur during operation to maintain safe operating clearances for the conductors and tower structures. The hazard tree zone will be inspected for trees in the height range of 20 m or more, which is typically in the high-risk category. High-risk category trees will be assessed for structural instability and managed according to the risk present, including tree removal if required.
elouera	See backed artefact definition.
EnergyCo	The Energy Corporation of New South Wales constituted by section 7 of the NSW *Energy and Utilities Administration Act 1987* as the NSW Government-controlled statutory authority responsible for the delivery of NSW's REZs. The proponent for the HTP.
eraillure scar	The small flake scar on the dorsal side of a flake next to the platform. It is the result of rebounding force during percussion flaking.
Eraring Power Station	Existing power station at Eraring operated by Origin Energy.
Exclusion zone	A safe clearance area around the transmission line and structures to protect public safety, the network and to maintain access to the asset. It delineates the area where most land use activities are prohibited. The zone is located within the easement and is defined according to the operational voltage and design of the infrastructure.
exposure	estimates the area with a likelihood of revealing buried artefacts or deposits, not just an observation of the amount of bare ground.
Focus area/foci areas	A term applied to a location or area where substantive cultural materials have been recorded typically as part of test excavations
Geometric microlith	See backed artefact definition.

Term	Definition
Grinding groove	Grinding grooves typically derive from the sharpening of stone hatchet heads on sandstone rock. Grooves appear as elliptical depressions of around 25 centimetres length with smooth bases. Although mostly occurring in association with water to wash the abraded stone dust away from the groove, such sites have been recorded away from water. Narrow grooves or broad abraded areas may occur less commonly and may be derived from spear sharpening or other grinding activities.
haematite	A pigment featured in ochre used for tinting with a permanent colour.
Holocene	A period of time generally 10,000 years ago to present, which marks the end of the last ice age.
Hunter Transmission Project (HTP) or project	The HTP as described in *Chapter 4 (Project Description)* of the EIS and identified in the overview figures in the EIS.
HTP corridor	Comprises: • the transmission line corridor connecting Bayswater South switching station to Olney switching station • the transmission line corridor connecting the Bayswater South switching station to the existing 500 kV transmission line near Bayswater Power Station and the Olney switching station to the existing 500 kV transmission line between Eraring and Kemps Creek. The HTP corridor is around 140 metres wide.
HTP North, HTP Central and HTP South	3 geographical zones defined as: • HTP North – Bayswater to Broke includes the Bayswater Power Station, major coal mining complexes in the Upper Hunter Valley, Mount Thorley Industrial Estate, Singleton Military Area, and several rural properties generally on the alluvial floodplains of the Hunter River • HTP Central – Pokolbin to Corrabare includes the Pokolbin and Corrabare State forests and the rural residential areas between these forests at Cedar Creek, Millfield and Laguna • HTP South – Olney to Eraring includes the Watagan and Olney State forests, Watagans National Park, the residential areas in Martinsville and Cooranbong, and Eraring Power Station.
igneous	Relating to or involving volcanic or plutonic processes.
indurated mudstone/tuff (IMT)	The fine textured, very hard, yellowish, orange, reddish-brown or grey rocks from which stone artefacts are made.
isotropic	Having a physical property that has the same value when measured in different directions. In relation to stone used for stone tools a fracture path is not hindered by layer boundaries or other favoured plane of cleavage.
keeping place	A room or facility with the express and exclusive purpose of storing Aboriginal cultural heritage materials with accompanying documentation in a secure and accessible manner which protects their cultural heritage values.
knapping	This term is used in reference to stone tool production. Specifically, it relates to the production and shaping of a block of stone (e.g. a cobble) into a stone tool. The process is called knapping, while the individual undertaking the task is often called a knapper. A knapping floor or event often referenced in the literature relates to an archaeological deposit, usually of high densities of stone artefacts, where researchers believe this process has occurred in a given locale.
krasnozems	Mainly loams, clay loams and silty clay loams with a clear or gradual boundary to a dark reddish brown B horizon. Clays are typically light to medium and occasionally heavy.
Laydown areas	Established to allow for flexibility in construction and to minimise the need for vehicle movements to and from the construction support sites. These would act as temporary staging, storage, and complex plant/equipment setup areas. They would also act as traffic control nodes during construction of the HTP.
lithosols	Soils that have little or no profile development. They occur on steep slopes and are usually shallow and are left mainly as uncleared native bushland.
microlith	Very small fragments of flakes retouched into geometric shapes and usually present on tools like barbed spears, arrows and sickles.

Term	Definition
midden	A collection of shells and associated economic remains resulting from Aboriginal food gathering and processing activity. Middens comprise shellfish remains of consistent size in a rich dark earth matrix commonly associated with stone artefacts, fish bone and animal bone although shells are commonly the most obtrusive element.
No clearing zone	Areas within the transmission line easement where vegetation removal is not required. These areas would occur where there is sufficient separation of 10 metres or more between the maximum operating temperature conductor position and the existing vegetation. This area is excluded from the disturbance area.
Olney switching station	The new switching station that would be constructed in Olney State Forest.
open stone artefact site/stone artefact site	An unenclosed area where Aboriginal stone artefacts occur – typically exposed from a topsoil archaeological deposit by erosion. Typically the term is used to refer to two or more artefacts although this is an arbitrary distinction. A general 'rule of thumb' boundary definition employed by archaeologists is that artefacts or features more than 50 metres apart are regarded as separate sites, however there is no theoretical imperative dictating such as rule. (The 50 metres separation rule is used for the most part in EMM's work).
Operation impact area	The area that would be occupied by permanent components of the project and/or maintained, including transmission line easements, transmission lines and towers, substations, switching stations, communications infrastructure, maintenance facilities, permanent access roads to substations and switching stations and access tracks to the transmission line easement.
pirri point	A leaf-shaped stone implement with unifacial retouch extending from the lateral margins to a central keel running the length of the dorsal surface.
Pre-construction minor works	Activities with a low potential to impact the environment that may be permissible in advance of construction and without the requirement for an approved environmental management strategy/construction management plan.
project impact area	The area that has been assumed for the purpose of this EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
(the) proponent	The Energy Corporation of NSW (EnergyCo).
Pleistocene	A period of time 2.6 million years ago to 10,000 years ago. Reference to 'Pleistocene sites' generally means reference to sites older than 10,000 years.
podsols	Soils with accumulations of organic matter, iron and aluminium. They are usually sand textured to depth. Yellow and red podosols are generally acid neutral. Yellow podosols have coarse to medium textured A horizons.
point cluster	A group of GPS points used to identify the locations of individual artefacts in the field.
potential archaeological deposit (PAD)	An area where there is an inferred presence of Aboriginal objects in the soil based on the environmental context which is typically associated with discovery of Aboriginal objects in analogous areas. This is not strictly a 'site' type, although AHIMS records it as such for the purpose of associating Aboriginal heritage impact permits with geographical areas.
red podsols	Podosols with a pronounced texture contrast and clear to abrupt boundaries between A and B horizons. A2 is often massive and gravelly.
Refinement	A change that fits within the limits set by the project description contained in the EIS for the HTP and does not change what the proponent is seeking approval for and/or does not require an amendment to the application for the HTP.
Renewable Energy Zone (REZ)	A geographic area identified and declared by the NSW Government as a Renewable Energy Zone.
retouch	The modification of the edges of a flake or tool by the removal of a series of small flakes.

Term	Definition
scarp	a steep slope characterised by outcropping bedrock. In this report, scarp refers to a combination of landform elements including scarp foot slopes, scarps, and cliff lines where outcropping sandstone is present in the landscape 10% and above.
siliceous sands	Sands that are usually found on coarse-grained sandstones and in sandstone colluvium. They are often sandstone outcrops present in the landscape. The topsoil has a loamy sand to light sandy clay.
spit/s	This term reflects an arbitrary unit of depth that archaeologists excavate when lacking evidence of a stratigraphy within the soil profile. Commonly, archaeologists remove vertical intervals of 5, 10 or 20 centimetres, each representing a spit, down the soil profile. Through this process, archaeologists can determine the depth at which archaeological materials are found, even in soil profiles with no clear divisions or boundaries.
spur	The lateral crests of land that descend from the summit of hills or ridges. Spurs typically extend, with decreasing elevation, closer to streams and valley floors than the main crest of a hill.
Stringing site	Used for the preparation, assembly and operation of stringing equipment to connect the transmission line to the towers. Stringing sites would be positioned along the HTP corridor. On other transmission projects, they may be referred to as 'brake and winch' sites.
Substation	A facility used to increase or decrease voltages between incoming and outgoing lines (e.g. 330 kV to 500 kV).
Switching station	A facility used to connect 2 or more distinct transmission lines of the same designated voltage.
taphonomic	The events and processes, such as burial in sediment, leading to the degradation, decomposition or preservation of objects.
Temporary worker accommodation	Temporary accommodation that would be erected and used during construction to house the construction workforce. Worker accommodation would be located at some construction support sites.
thumbnail scraper	A thumbnail sized thin flake with steep unidirectional retouch or use-wear around a convex working edge.
transect	A sample unit which is walking line or corridor across the study area.
Transgrid	Preferred network operator for the HTP.
Transmission line easement	An area surrounding and including the transmission lines which is a legal proprietary right and allows for ongoing access and maintenance of the transmission lines. Landowners can typically continue to use most of the land within transmission line easements, subject to some restrictions for safety and operational reasons.
Transmission tower	For 500 kV transmission lines, this is typically a free-standing steel lattice structure (suspension or tension tower). Transmission towers for the HTP would generally be up to 85 metres high.
visibility	The amount of bare ground on exposures which might reveal artefacts or other archaeological materials.
yellow earths	Predominantly sandy-textured soils with earthy porous fabric, weak profile differentiation and gradual or diffuse boundaries except for the darker A1 horizon.
yellow podsols	Podosols which typically occur on the upper slopes of steep landscapes and on the mid to lower slopes of others. The A2 soil horizon is present in most profiles and the boundary change to the B horizon is generally clear. The B horizon is typically sandy clay to heavy clay.

Executive summary

ES1 Project overview

The Hunter Transmission Project (HTP, the project) involves the construction of a new overhead 500 kilovolt (kV) transmission line of around 110 kilometres connecting the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring in the Hunter region of New South Wales (NSW).

Due to its strategic importance, the NSW Minister for Planning and Public Spaces has declared the HTP to be critical State significant infrastructure (CSSI) under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act).

Under this process, the Energy Corporation of NSW (EnergyCo, the proponent) is required to prepare an environmental impact statement (EIS) in accordance with the NSW Environmental Planning and Assessment Regulation 2021. This Aboriginal cultural heritage assessment (ACHA) accompanies the EIS for the HTP and addresses the Secretary's environmental assessment requirements (SEARs) issued on 13 August 2024.

This Aboriginal Cultural Heritage Assessment (ACHA) provides an assessment of the potential impacts to Aboriginal cultural heritage from the construction and operation of the project and has been prepared to support the EIS. It documents the assessment methods, results and the initiatives built into the project design to avoid and minimise Aboriginal cultural heritage impacts. This ACHA also presents the results of archaeological and anthropological investigations undertaken to identify the extent and significance of any cultural materials and values, and outlines mitigation and management measures proposed to address residual impacts which cannot be avoided. To assess any impacts from the project to tangible and/or intangible cultural values, a detailed cultural values assessment was completed by an anthropologist concurrently to support this ACHA.

ES2 Aboriginal consultation

Aboriginal consultation has been undertaken in accordance with the processes and methods outlined in *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.

Overall, EMM Consulting Pty Limited (EMM) and the proponent have been liaising with 48 Aboriginal organisations and/or individuals from November 2023 when the project was developing its preliminary corridor. This dialogue will continue throughout the project development and into the delivery. The registered Aboriginal parties (RAPs) for the project include locally based Wonnarua, Awabakal and Darkinjung individuals and/or organisations based primarily in Singleton, Cessnock, and Newcastle as well as the broader Aboriginal community with an interest in cultural heritage management. Of these 48 RAPs, 31 have been involved in meetings and on-Country activities.

Opportunity for Aboriginal involvement in consultation for the project was provided throughout this ACHA, including:

i) attendance at 4 face-to-face meetings during key phases of the project

ii) participation in an extensive field survey of the project impact area

iii) participation in a targeted archaeological test excavation of sensitive parts of the project impact area

iv) participation for key knowledge-holders to undertake interviews with an anthropologist to discuss cultural values.

Ultimately, over 1400 interactions have been undertaken with the RAPs across these opportunities and included >600 person days of on-site activities. Discussions with the RAPs have been extensive and wide-ranging over the 16-month assessment process. Feedback on the project and ACHA activities has generally focussed on who speaks for Country, the potential impact to Dreaming places and stories within the region, targeted discussion around key sites including rockshelters, art sites and grinding grooves identified as part of the field investigation, and mitigation measures. These are all acknowledged in this report (see *section 4.3.3*, *Appendix B (Aboriginal community consultation)*), and proposed for management following project approval.

ES3 Summary of the findings of this assessment

This ACHA undertook archaeological field survey and test excavations to explore and document the Aboriginal objects, sites and places within the project impact area, and to align them within the regional context. Overall, the findings indicate the project to be situated within a rich cultural landscape with evidence of extensive, but disparate, past human activity, notably in the vicinity of Parnells Creek, Doctor Creek, Loder Creek, Sandy Hollow Creek, Monkey Place Creek and the Hunter River in HTP North, in the vicinity of Broken Back Trail, Jacobs Road, Crumps/Trig Road, and Langans Road in HTP Central, and Watagan Creek Road in HTP South. To the north, cultural materials were dominated by various surface and shallowly buried stone artefacts; while in the centre and south, rockshelters, grinding grooves and culturally modified trees were more prevalent.

The cultural values mapping study for the project identified a rich, complex and ceremonial landscape within which the project is proposed to be situated. Some 32 discrete places of archaeological, traditional, historical and/or contemporary value to the local Aboriginal community were identified across the general region. These highlighted the importance of major promontories and several water sources in the region, as well as focusing on a number of archaeological sites either known and/or identified through the field program.

Previous investigations across the region and the multiple activities (e.g. field survey, test excavations, on-Country meetings) for the project identified a large number of Aboriginal and cultural sites and places within or near the project impact area. Following a ratification process applying administrative (e.g. removal of destroyed recordings, removal of duplicate recordings, etc.) and analytical (e.g. aggregation of closely located site recordings, further consideration of field activity findings, and amalgamation of isolated stone artefacts and low density artefact scatters into a broader background scatter) methods to provide an overall archaeological resource for the project, some 32 Aboriginal and cultural sites and places are located within the project impact area.[1] These included high and moderate artefact scatters (n=10), subsurface cultural deposits (n=3), rockshelters (n=5), grinding grooves (n=3), stone arrangements (n=1), culturally modified tree (n=1), cultural places (including resource and gathering places) (n=6), and a background scatter (n=3). The latter reflecting an amalgamation of some 191 discrete site recordings of isolated Aboriginal objects and low density (less than 20 per square metre) artefact scatters into a broader low density background scatter known to extend across the region. Some 90 further significant sites are outside the project impact area, but within 200 metres, some as close as 10 metres.

In addition to discrete Aboriginal sites and places, a number of broader cultural landscapes were identified. These include the Warkworth sand system – a geological unit known to contain significant cultural materials and found in HTP North; view-lines and view-scapes between major promontories in HTP Central and HTP South; and a series of localised cultural landscapes encompassing clusters of significant archaeological sites in the vicinity of Trig Road, Flat Rock Lookout, Abbot Falls and the Dora Pinnacles. The project impact area bisects and/or is in close proximity to several of these, notably through Corrabare and Watagan State forests.

[1] A further 155 discrete Aboriginal sites and places, as well as 405 other discrete listings reflective of low densities or isolated stone artefacts are documented outside, but within 200 metres of the project impact area.

ES4 Potential impacts

The project would result in localised ground disturbance and vegetation clearance within the construction impact area. Following completion of construction, there are impacts that would continue throughout the operational period, primarily in the form of vegetation management that would allow improved visibility and/or access to Aboriginal sites and places.

The project impact area has been subject to ongoing refinements to avoid or minimise harm to cultural materials. Through information provided by RAPs, Aboriginal participants and the field investigations, multiple refinements have occurred to avoid and minimise impacts to cultural materials. This has included avoidance of a significant culturally modified tree in Glencore's Hunter Valley Operations mining complex, and multiple significant rockshelters and stone arrangements in Corrabare and Watagan State forests. The project has also sought to minimise visual prominence wherever feasible (and notably in the vicinity of Flat Rock Lookout) and has located the switching station in Olney State Forest to avoid impacts within Martinsville.

There are 32 identified Aboriginal sites and places in the construction impact area and therefore potentially impacted by the project. Five highly significant sites within this assemblage are committed for avoidance, while a further 12 are within project elements where impacts are expected to be minor (i.e. between proposed indicative tower locations and/or in deep gorges and ravines within the State forests). Several other sites are either only partially within the construction impact area, or would have their significance unaffected by the proposed impacts. Around 88 hectares of the Warkworth sands system are within the construction impact area and may also be adversely affected. However, similarly extensive portions of the deposit are between proposed indicative transmission tower locations where deep ground disturbance would not be expected.

While variable, discussions with Aboriginal participants generally suggest that obstruction and/or general interruption of view-lines and view-scapes between major promontories associated with Dreaming stories and/or contemporary traditional practises would occur as a result of the project. Potential impacts are also probable to localised cultural landscapes surrounding key archaeological sites at Trig Road, Dora Pinnacles and Flat Rock, and/or where values relate to broader Dreaming stories.

The potential impacts would result in cumulative impacts to some components of the regional cultural assemblage, notably culturally modified trees in HTP Central, and through the potential loss of up to 88 hectares of the Warkworth sand system documented to contain significant cultural materials. Any impacts to the 5 highly significant sites currently proposed for avoidance would also result in regionally significant impacts. Impacts to view-lines and view-scapes and localised cultural landscapes would also contribute to the increasing urbanisation of the region and constrain ongoing contemporary teaching and participation of traditional practice and are considered to result in some inter-generational loss. Mitigation measures in *Chapter 13 (Management strategy and recommendations)* are proposed to offset some of these impacts.

ES5 Management and mitigation measures

Based on the findings of this ACHA, a series of management measures are proposed to protect cultural heritage values. These measures are outlined in detail in Table 13.1 (see *Chapter 13 (Management strategy and recommendations)*) and should be read in conjunction with guiding principles in *Appendix H (Post-approval requirements – guiding principles)*. They 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; development of a cultural values impact strategy in discussion with Elders and knowledge-holders to offset adverse impacts to cultural places and values; and the development of an Interpretation Strategy and Plan to provide acknowledgement and other visual/educational opportunities for the Aboriginal and broader local community.

TABLE OF CONTENTS

Executive summary ES.1

Acknowledgement of Country I

Glossary III

1 Introduction 1

2 The Hunter Transmission Project 2

3 Assessment methodology 10

3.1 Government plans, policies and guidelines 10

3.2 Study area 10

3.3 Desktop assessment 11

3.4 Aboriginal consultation 12

3.5 Field investigations 14

3.6 Limitations 14

4 Aboriginal consultation 15

4.1 Summary of this chapter 15

4.2 Liaising with Heritage NSW 15

4.3 Liaising with the RAPs 16

4.4 Aboriginal stakeholder feedback and outcomes 20

5 Existing environment 23

5.1 Summary of this chapter 23

5.2 Landscape overview 24

5.3 Hydrology 59

5.4 Flora and fauna 65

5.5 Previous disturbance and land use 71

6 Ethnographic context 73

6.1 Summary of this chapter 73

6.2 Documentary ethnography 73

6.3 The Wonnarua People 74

6.4 The Awabakal people 78

6.5 The Darkinjung people 84

6.6 Contact history 85

6.7 Synthesis of the ethnohistorical record and contemporary connections 94

7 Cultural values mapping 95
7.1 Summary of this chapter 95
7.2 Previous investigations 96
7.3 Cultural values investigations for this project 100
8 Archaeological context 117
8.1 Summary of this chapter 117
8.2 Previous local studies 118
8.3 AHIMS search results 126
8.4 Predictive model 165
9 Field investigations 169
9.1 Summary of this chapter 169
9.2 Archaeological survey 170
9.3 Test excavations 294
10 The archaeological assemblage of the project impact area 326
10.1 Summary of this chapter 326
10.2 Results and synthesis 327
11 Significance assessment 354
11.1 General 354
11.2 Statement of significance 355
12 Impact assessment 364
12.1 Summary of this chapter 364
12.2 Avoidance and minimisation of impacts through design refinements 365
12.3 Potential impacts from the project 371
12.4 An assessment of potential impacts to Aboriginal cultural heritage 375
12.5 Regional impact 376
13 Management strategy and recommendations 400
13.1 Summary of this chapter 400
13.2 Summary of findings and potential impacts 400
13.3 Post-approval requirements 401
13.4 Mitigation measures 402
References 408

Appendices

Appendix A Legislation A.1
Appendix B Aboriginal community consultation B.1
Appendix C Additional environmental information C.1
Appendix D Supplementary cultural values information D.1

Appendix E	Archaeological background	E.1
Appendix F	Field investigation	F.1
Appendix G	Summary of all site recordings and archaeological resource formulation	G.1
Appendix H	Post-approval requirements – guiding principles	H.1

Tables

Table 4.1	Timeline and summary of the Aboriginal community consultation process (Heritage NSW consultation requirements) completed as part of this ACHA	17
Table 4.2	Timeline and summary of Aboriginal community consultation process (other communication methods) completed as part of this ACHA	18
Table 5.1	Subregions within the ACHA study area	24
Table 5.2	Geological units within the project impact area	26
Table 5.3	Major soil landscapes within the project impact area (Kovac and Lawrie 1991)	38
Table 5.4	Named watercourses intersecting the project impact area	60
Table 5.5	Plants used as food and medicines by the Aboriginal communities as documented by early ethnographers	66
Table 6.1	Totem system of the Darkinjung (from Darkinjung Aboriginal Land Council 2020; Paul Budde History, Philosophy n.d.)	85
Table 7.1	Summary of findings from early co-design workshops and the recommended refinements explored and/or implemented as a result	102
Table 7.2	Cultural places and values identified within or near the construction impact area	105
Table 8.1	Previously documented AHIMS sites within 200m but outside of the project impact area	128
Table 8.2	Previously documented AHIMS sites within the project impact area	131
Table 9.1	Aboriginal participants involved in the field survey	172
Table 9.2	Summary of field survey and archaeological findings within HTP North corridor	206
Table 9.3	Aboriginal sites documented by survey unit within the HTP North project impact area	208
Table 9.4	Summary of Aboriginal sites (newly identified and previously documented) within the HTP North corridor	230
Table 9.5	Identified Aboriginal sites recorded as part of the HTP North, both outside and within the project impact area by site type	231
Table 9.6	Summary of field survey and archaeological findings within HTP Central and HTP South transmission corridor	248
Table 9.7	Aboriginal sites documented by survey unit within the HTP Central and South project impact area	250
Table 9.8	Summary of Aboriginals sites (newly identified and previously documented validated) within the project impact area of HTP Central (SU17–24, 32 and 33) and HTP South (SU25–31 and 34)	273
Table 9.9	Identified Aboriginal sites recorded as part of the HTP Central and HTP South, both outside and within the project impact area by site type	274
Table 9.10	Synthesis of sites identified within and outside the project impact area recorded during the field survey, including both newly identified and previously documented and validated	293

Table 9.11	Aboriginal participants involved in the test excavations	295
Table 10.1	Sites which comprise the archaeological resource of the project impact area	336
Table 11.1	A summary of criteria used to assess cultural significance (OEH 2011, p.8–10)	354
Table 11.2	Significance of Aboriginal objects and/or sites identified within the project impact area	358
Table 12.1	A general overview of potential activities and disturbances caused by the project and their potential impact on Aboriginal site types where present	372
Table 12.2	Summary of potential impacts to Aboriginal objects and/or sites by the project. Those in red are in locations where low impact activities would occur (i.e. between tower locations) and the sites may be unaffected by the project	378
Table 13.1	Management and mitigation measures for Aboriginal cultural heritage	403
Table B.1	Registered Aboriginal parties	B.6
Table C.1	Geotechnical bore-logs (grey shading indicates alluvial units documented)	C.1
Table E.1	Aboriginal sites identified by EMM (2023) as being indicative of past occupation, and generally of high or moderate scientific significance. Those highlighted are within or in close proximity to the project impact area	E.10
Table E.2	Site definitions and recording	E.31
Table E.3	Previously documented AHIMS sites within the search area	E.35
Table E.4	Previously documented AHIMS sites within 200 metres of the project impact area. Note, where surveyed as part of the assessment, updated descriptions are provided in Appendix F.3	E.43
Table E.5	A review of rockshelters in proximity to the project impact area based on AHIMS data	E.116
Table F.1	Survey unit (SU) descriptions	F.2
Table F.2	Aboriginal sites identified during the field survey	F.9
Table F.3	Evaluation of potential rockshelters within the project impact area against the criteria established in Section 8.4.1; sites presented in red meet at least three criteria and are considered a valid site for the purposes of this assessment.	F.73
Table F.4	Summary of proposed and excavated test pits	F.118
Table G.1	All site recordings identified by the various components of this report within 200 metres of the project impact area, and the rationale for their inclusion/exclusion of the archaeological resource presented in Chapter 10 (The archaeological assemblage of the project area)	G.2
Table G.2	Sites which comprise the archaeological resource outside, but within 200 metres of the project impact area. Sites denoted in red are considered sensitive for the purposes of indirect impacts	G.58

Figures

Figure 2.1	Project overview	5
Figure 2.2	Key project elements	6
Figure 5.1	Topography of the project impact area	27
Figure 5.2	Geology of the project impact area	31
Figure 5.3	Soil landscapes of the project impact area	49

Figure 5.4	Predicted distribution of the Warkworth sand system within and/or near the project impact area	53
Figure 5.5	Geotechnical investigations within the project impact area	55
Figure 5.6	Main watercourses within and near the project impact area	61
Figure 5.7	Potential remnant vegetation within the project impact area	67
Figure 6.1	Reported incidents of frontier violence between 1825–1827 (Dunn 2015)	91
Figure 7.1	Cultural places identified as part of the Hunter Valley Operations mining complex Continuation project (as reproduced from Clarke 2022)	97
Figure 7.2	Results of cultural values mapping study	109
Figure 7.3	Locations visited during the sightlines site inspection and assessed for levels of impact	116
Figure 8.1	Previously documented Aboriginal cultural heritage studies in relation to the project impact area	122
Figure 8.2	Previously documented Aboriginal objects and sites within the AHIMS database	132
Figure 9.1	Field survey coverage of the HTP	174
Figure 9.2	Field survey transects in HTP North corridor	217
Figure 9.3	Identified Aboriginal sites in HTP North transmission corridor	234
Figure 9.4	Field survey transects in HTP Central transmission corridor	257
Figure 9.5	Field survey transects in HTP South transmission corridor	263
Figure 9.6	Identified Aboriginal sites in HTP Central transmission corridor	281
Figure 9.7	Identified Aboriginal sites in HTP South transmission corridor	287
Figure 9.8	Test excavation results	306
Figure 9.9	Test excavation results per metre squared	316
Figure 10.1	The archaeological resource of the project impact area	341
Figure 12.1	Previous alignments of the project showing where avoidance of cultural materials has been undertaken	367
Figure 12.2	Potential Aboriginal heritage impacts within the construction impact area	387
Figure C.1	Historical imagery – 1960s	C.23
Figure C.2	Historical imagery – 1970s	C.24
Figure C.3	Historical imagery – 1980s	C.25
Figure F.1	Proposed test excavation program	F.79
Figure G.1	All Aboriginal objects, sites and places identified within the project impact area	G.29
Figure G.2	Sites which comprise the archaeological resource outside, but within 200 metres of the project impact area	G.65

Plates

Plate 6.1	The AIATSIS Map of Indigenous Australia	74
Plate 6.2	*Corroboree at Newcastle*, oil painting by Jospeh Lycett, 1818 - Tools, weapons and apparel	80
Plate 6.3	Portraits of Aboriginal men from the Newcastle area, painted by James Wallis, from the *Album of original drawings by Captain James Wallis and Joseph Lycett*, ca. 1817-1818. The individual to the left is Burigon	82
Plate 6.4	*Magil [Biraban], Corroboree dance*, attributed to R. Browne, c. 1819–20	83
Plate 6.5	*Biraban*, Alfred Agate, c. 1846	83
Plate 6.6	Map showing the reported incidents of frontier violence in the Hunter Valley, chronicalled between 1825–1827. Dunn (2015) indicates that the 'massacre site' (12) is speculative based on distance and contemporary reports of the incident	90
Plate 6.7	*A party preparing to Bivouac,* from *An account of the state of agriculture & grazing in New South Wales,* by James Atkinson, 1826, p137	92
Plate 7.1	A map of cultural places and songlines as presented in Tocomwall (2015)	99
Plate 7.2	View-line SL3, looking northeast towards Mount Sugarloaf	113
Plate 7.3	View-line SL5, looking north towards Mount Sugarloaf	114
Plate 7.4	View-line SL8, looking southwest towards Mount Warrawalong	114
Plate 7.5	View-line SL9, looking west	115
Plate 9.1	Gentle rolling hills and undulating flats typical of SU1, view south	211
Plate 9.2	Sparsely populated clump of regrowth trees commonly found around Plashett Reservoir in SU1, view south	211
Plate 9.3	Example of the undulating hills intersecting the floodplain throughout the western portion of SU2, view southeast	211
Plate 9.4	An incised drainage channel showing the patches of isolated vegetation focussed on ephemeral watercourses in SU2, view east	211
Plate 9.5	Sandstone exposure common throughout the eastern portion of SU3, view northwest	211
Plate 9.6	View of the floodplain stretching across the eastern portion of SU3 across the Hunter River, view northwest	211
Plate 9.7	Gentle undulating foot-slopes east of the Hunter River found in SU4, view south	212
Plate 9.8	Example of vehicle tracks on low hills noted throughout SU4, view east	212
Plate 9.9	Evidence of flooding disturbance on the eastern bank of the Hunter River in SU5, view north	212
Plate 9.10	Cattle track crossing the flat grassy plain on either side of the Hunter River in SU5, view west	212
Plate 9.11	Flat reclaimed mining land forming SU6, view south	212
Plate 9.12	Example of mining disturbance neighbouring the reclaimed plain that forms SU6, view northeast	212
Plate 9.13	Gentle hills surrounding a dry Hobden Gully (2nd order creek) that dominates much of SU7, view south	213

Plate 9.14	Overview of the Hunter Valley Operations mining complex along the southern boundary of SU7 bordering the flat plains, view south	213
Plate 9.15	Example of regrowth sapling forest with limited exposures found in SU8, view west	213
Plate 9.16	Gently inclined alluvial terrace that forms part of reclaimed mining land in SU8, view south	213
Plate 9.17	Flat dirt track recorded off Archerfield Road typical of the landscape in SU9, view east	213
Plate 9.18	Reclaimed gently sloped embankment between Hunter Valley Operations mining complex and Archerfield Road in SU9, view east	213
Plate 9.19	Low undulating hills typical of the highly disturbed landscape present in SU10, view north	214
Plate 9.20	Example of a transmission line clearing in SU10, view north	214
Plate 9.21	Ground exposure commonly found in the areas surrounding watercourses in SU11, view south	214
Plate 9.22	Dense grass cover across agricultural fields observed throughout SU11, with (a heavily vegetated) Wollombi Brook pictured in the background, view east	214
Plate 9.23	Small exposures around a dam checked for artefacts in SU12, view southwest	214
Plate 9.24	Flat floodplain evident in much of SU12, view south	214
Plate 9.25	Eroding clay exposure noted around young saplings in SU13, view southwest	215
Plate 9.26	Flat terrace abutting Loder Creek (pictured left) which is heavily vegetated, view north	215
Plate 9.27	Revegetated open forest typical of flat plain observed in SU14, view south	215
Plate 9.28	Evidence of large dam on the border of Bulga Mine in SU14, view west	215
Plate 9.29	Vehicle track through the scrub commonly found in the relatively flat plain throughout SU15, view north	215
Plate 9.30	Transmission corridor and overgrown vehicle track observed in SU15, view northwest	215
Plate 9.31	Grassy plain noted in much of SU16 with a small dam, view north	216
Plate 9.32	Surface exposures evident in clearings surrounding drainage channels in SU16, view northeast	216
Plate 9.33	Moderately steep footslope surveyed throughout much of the southern end of SU17, view east	216
Plate 9.34	Tall grass growing around Monkey Place Creek in SU17, view south	216
Plate 9.46	HTP-N-GG01 detail from boulder exhibiting at least 14 grooves	233
Plate 9.47	Steep, densely vegetated slopes typical of the rugged landscape in SU18, view east	252
Plate 9.48	Example of outcropping sandstone forming a steep ridgeline in SU18, view south	252
Plate 9.49	Gently undulating plain situated on the bank of Congewai Creek in SU21, view east	252
Plate 9.50	Gentle hills straddling Pokolbin and Corrabare State forests in SU21, view west	252
Plate 9.51	Portion of juvenile forest that was previously logged in SU22, view north	252
Plate 9.52	Sandstone outcropping frequently observed in SU22, view south	252
Plate 9.53	Steep gully system carved by Sweetmans Creek that dominates SU23, view north	253
Plate 9.54	Rugged sandstone outcrops commonly recorded throughout SU23, view southeast	253

Plate 9.55 Open forest with large old trees straddled between steep slopes noted in some portions of SU24, view north 253
Plate 9.56 Revegetated overgrown forest with no visibility in SU24, view north 253
Plate 9.57 Watercourse crossing at the bottom of steep undulating hills frequently observed in SU26, view south 253
Plate 9.58 Rugged sandstone cliffs noted in the northern part of SU26, view southeast 253
Plate 9.59 Undulating hills with an overgrown and disturbed drainage channel noted in SU27, view southwest 254
Plate 9.60 Evidence of heavily disturbed forest recorded in SU27, view southwest 254
Plate 9.61 Previously logged undulating slopes with invasive vegetation typically found in SU28, view west 254
Plate 9.62 Intact sub-tropical vegetation noted in portions of SU28, view south 254
Plate 9.63 Relatively flat foot-slope commonly observed in SU29, view west 254
Plate 9.64 Overgrown logging road typical of disused tracks in SU29, view north 254
Plate 9.65 Steep slopes bordering a densely vegetated Jilliby Jilliby Creek in SU30, view north 255
Plate 9.66 Sandstone outcrops with a view of the valley floor typical of the landscape featured in SU30, view northwest 255
Plate 9.67 Cleared transmission tower pad on ridge in SU31, view north 255
Plate 9.68 Spanned areas between transmission towers, interspersed by dense vegetation frequently noted in SU31, view west 255
Plate 9.69 Established sand road commonly found throughout SU32, view north 255
Plate 9.70 Narrow and overgrown dirt access track typical of sections of SU32, view south 255
Plate 9.71 Example of a gravel road used by logging trucks frequently found in SU33, view east 256
Plate 9.72 Eroded dirt track recorded in portions of SU33, view northeast 256

1 Introduction

The Hunter Transmission Project (HTP, the project) involves the construction of a new overhead 500 kilovolt (kV) transmission line of around 110 kilometres connecting the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring in the Hunter region of New South Wales (NSW).

Due to its strategic importance, the NSW Minister for Planning and Public Spaces has declared the HTP to be critical State significant infrastructure (CSSI) under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act).

Under this process, the Energy Corporation of NSW (EnergyCo, the proponent) is required to prepare an environmental impact statement (EIS) in accordance with the NSW Environmental Planning and Assessment Regulation 2021.

This Aboriginal cultural heritage assessment (ACHA) accompanies the EIS for the HTP and addresses the Secretary's environmental assessment requirements (SEARs) issued on 13 August 2024 (see Table 1.1).

In addition to the SEARs, advice from several government agencies was received on the HTP. Agency advice relevant to and considered in this ACHA provided on the Major Projects website maintained by the NSW Department of Planning, Housing and Infrastructure (DPHI).

Table 1.1 HTP SEARs – Aboriginal cultural heritage assessment

HTP SEARs:
• An assessment of the impact to Aboriginal heritage (cultural and archaeological), including test excavations, in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (Code of Practice) (DECCW 2010a) • Evidence of consultation with Aboriginal parties in determining and assessing impacts, having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010b) • If the test excavations do not conform with the Code of Practice, then the excavations may only be carried out with the written endorsement of Heritage NSW following consultation with the Registered Aboriginal Parties

2 The Hunter Transmission Project

The Hunter Transmission Project (HTP, the project) is critical State significant infrastructure (CSSI). It must be built by the end of 2029 to protect energy security in New South Wales (NSW) as the remaining coal-fired power stations close.

The HTP includes:

- a new overhead 500 kilovolt (kV) double circuit transmission line of around 110 kilometres
- 2 new switching stations (Bayswater South and Olney)
- upgrades to the existing Bayswater and Eraring substations
- adjustments and upgrades to existing transmission lines
- property adjustment works to facilitate access to the transmission lines and switching stations
- utility adjustments required for the construction of the transmission network infrastructure
- ancillary works to support construction including road upgrades, establishment of new access tracks and upgrades to existing access tracks, construction support sites (some with temporary worker accommodation), and other construction facilities such as laydown areas.

The new transmission line would transport electricity generated in the Central-West Orana and New England Renewable Energy Zones (REZs). It would connect the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring. This would strengthen the State's core electricity grid and supply clean and reliable energy to NSW consumers for generations to come.

The HTP involves development across 5 local government areas (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie). Most of this development would be concentrated in and around the HTP corridor.

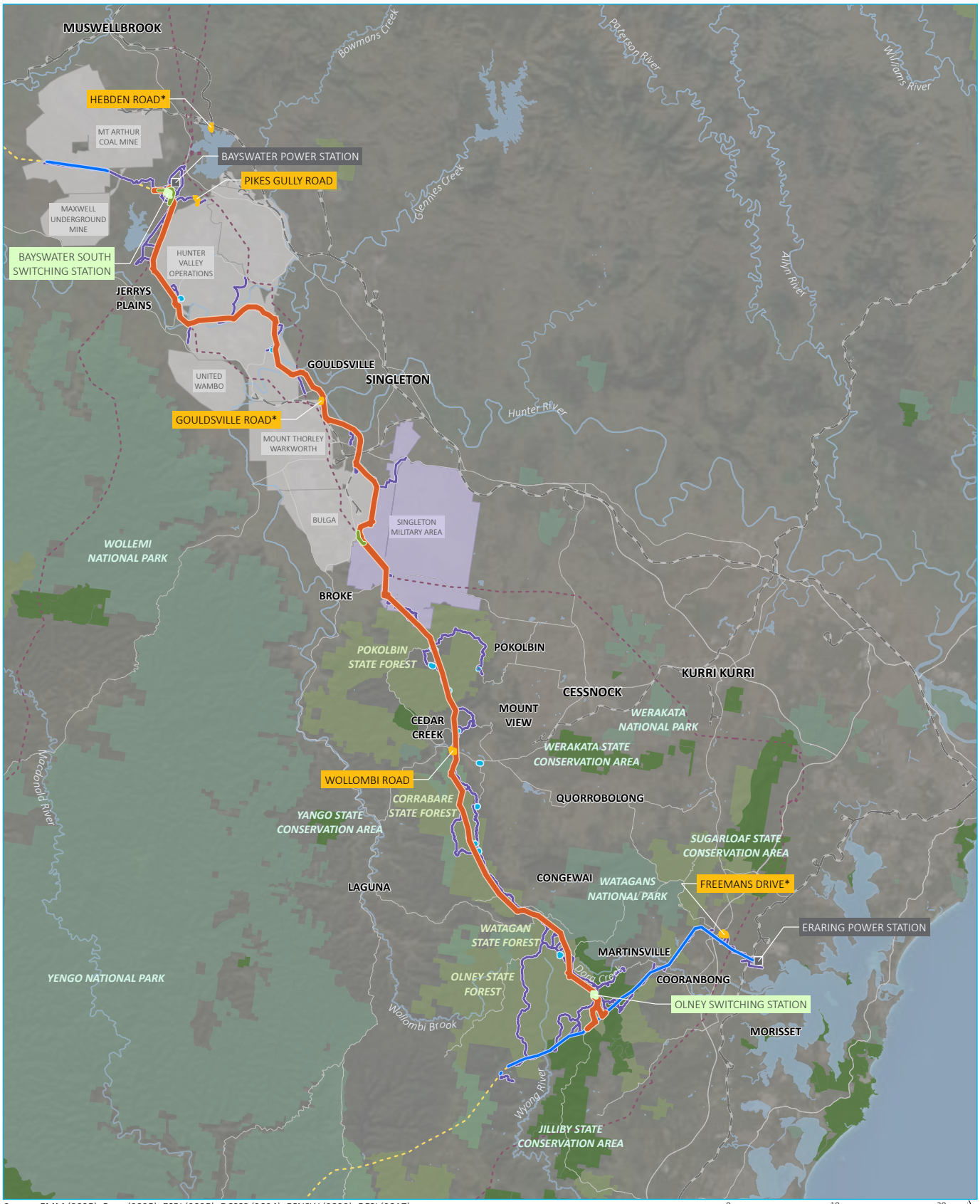
An overview of the HTP is provided in Table 2.1 and shown in Figure 2.1. The key project elements are shown in Figure 2.2.

Further details are provided in *Chapter 4 (Project description)* of the HTP environmental impact statement (EIS).

Table 2.1 Project overview

Aspect	Overview
The project	• The critical State significant infrastructure application for the HTP covers 5 local government areas • Most development would be concentrated in and around the HTP corridor. Some ancillary development such as construction support sites and temporary worker accommodation, road upgrades and laydown areas would be outside the HTP corridor
Project impact area	• The area that has been assumed for the purpose of this EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
Construction and operation	• Construction impact area around 2351 ha • Operation impact area around 1261 ha
Disturbance area	• Disturbance area around 1266 ha • Disturbance area A around 683 ha • Disturbance area A (centreline) around 214 ha • Disturbance area B around 367 ha • Disturbance area HZ around 1.84 ha
New transmission line	• Overhead 500 kV double circuit transmission line of around 110 km between Bayswater South 500 kV switching station and Olney 500 kV switching station • Steel lattice towers up to 85 m high and that are spaced anywhere between 75 m to around 1.3 km apart (typically between 300 m and 600 m) • 500 kV transmission lines with a minimum vegetation clearance of 13.5 m • Ancillary infrastructure such as earth wire and communications systems • Construction easement of around 140 m wide • Operational easement around 70 m wide
Switching stations/ substation works	• New Bayswater South 500 kV switching station – construction impact area around 26.6 ha • Modifications at the existing Bayswater 500 kV/330 kV substation within the existing footprint • New Olney 500 kV switching station – construction impact area around 20 ha • Augmentation and modifications at the existing Eraring 500 kV/330 kV substation, including installation of 2 new transformers
Adjustments and crossings - existing transmission lines	• Adjustments to existing double circuit 500 kV transmission lines: • Line 5A1 and 5A2: Eraring – Kemps Creek 500 kV at Ravensdale to connect to the new Olney 500 kV switching station • Line 5A3: Bayswater – Mt Piper 500 kV at Bayswater to connect to the new Bayswater South 500 kV switching station • Line 5A4: Bayswater – Wollar 500 kV at Bayswater to connect to the new Bayswater South 500 kV switching station • Adjustments to existing double circuit 330 kV transmission lines: – Line 31: Bayswater – Regentville 330 kV – Line 32: Bayswater – Sydney West 330 kV – Line 81: Newcastle – Liddell 330 kV • Crossing of existing double circuit 330 kV transmission lines: – Line 31: Bayswater – Regentville 330 kV at Bayswater – Line 32: Bayswater – Sydney West 330 kV at Bayswater – Line 81: 330 kV: Newcastle – Liddell 330 kV at Lemington and again at the Singleton Military Area – Line 82: 330 kV: Tomago – Liddell 300 kV at Warkworth and again at the Singleton Military Area

Aspect	Overview
Upgrades – existing transmission lines and towers	• Upgraded earth wire on Line 5A3 and Line 5A4 • Upgraded earth wire and communications systems on Line 5A1 and Line 5A2 • Tower strengthening on various existing towers on Line 5A1, Line 5A2, Line 5A3 and Line 5A4
Road works	• Modifications to the existing public road network • New and upgraded access tracks for construction and operation
Construction support sites	• Five construction support sites: Hebden Road, Pikes Gully Road, Gouldsville Road, Wollombi Road and Freemans Drive • Helicopter pads (helipads) indicatively at: Hebden Road, Pikes Gully Road, Gouldsville Road and Freemans Drive
Ancillary works	• Laydown areas, which would be established to allow for flexibility in construction and to minimise the need for vehicle movements to and from the construction support sites
Utility adjustments	• Third party utility works including gas, telecommunications, water, sewer and stormwater
Timing	• Construction to start in 2027 • Operation by end of 2029



Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); DFSI (2017)

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KEY

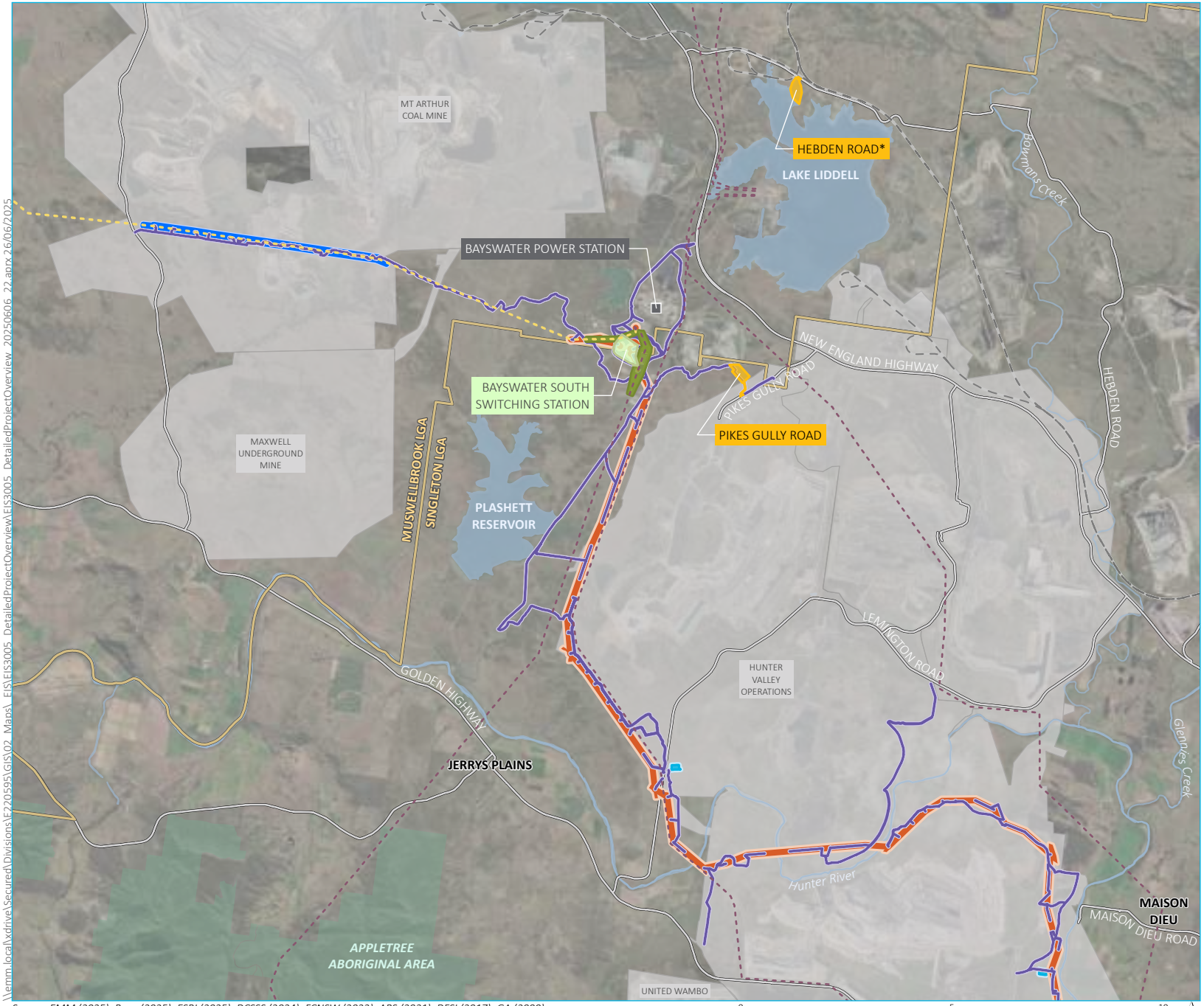
Project impact area
- HTP corridor
- Switching station
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Adjustment to existing transmission line
- Upgrades to existing transmission line
- Access track

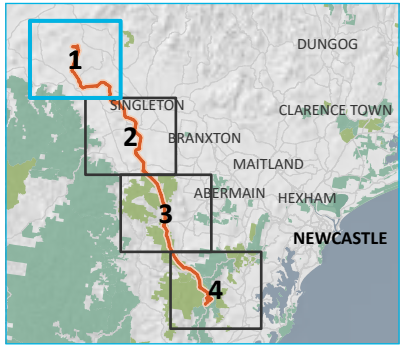
Existing environment
- Power station
- 330 kV transmission line
- 500 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Defence
- Mining

Project overview

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 2.1

EMM
creating opportunities





KEY

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

- Power station
- 330 kV transmission line
- 500 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- Mining
- Local government area

Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); ABS (2021); DFSI (2017); GA (2009)

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Key project elements
Map 1 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 2.2

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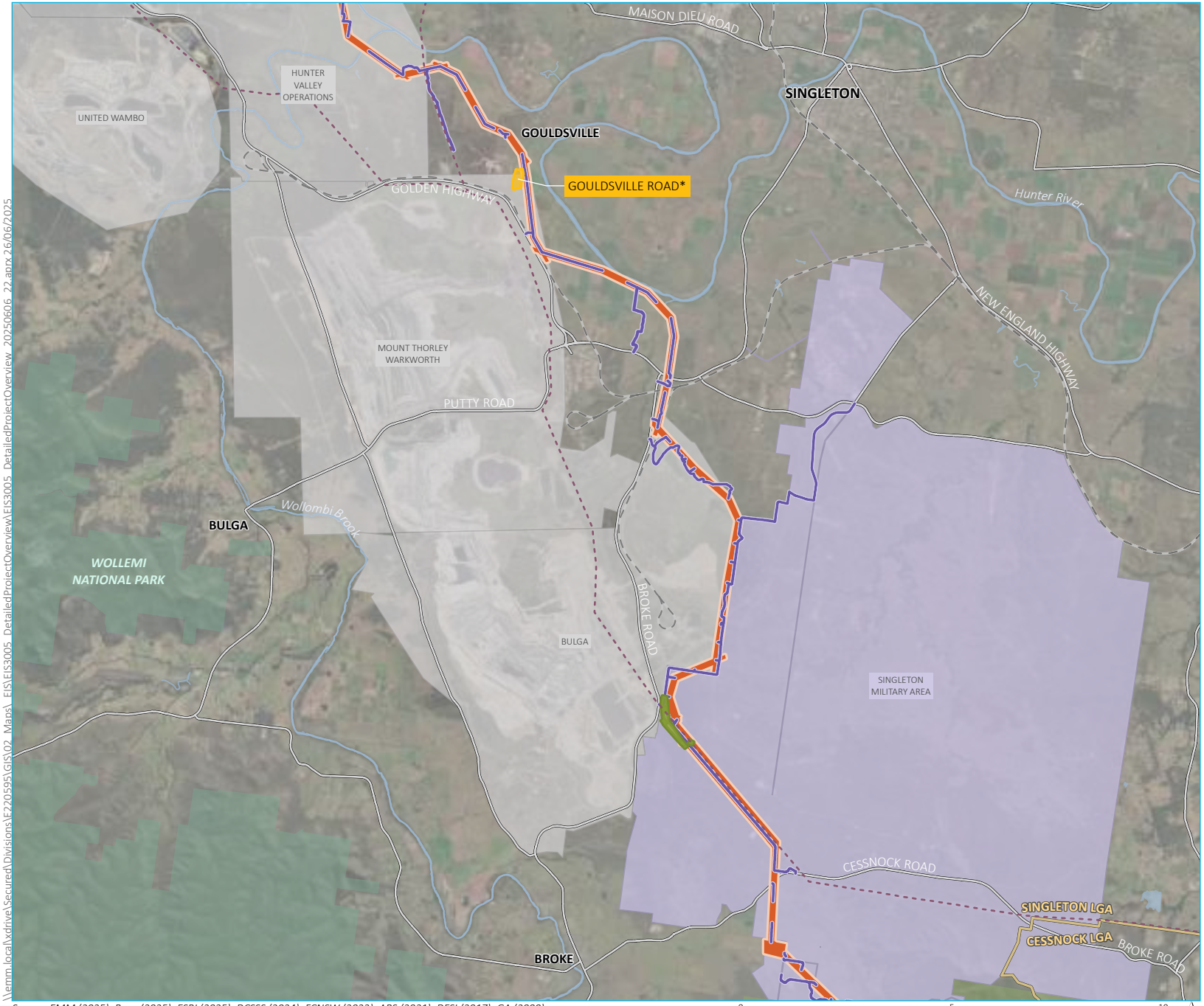

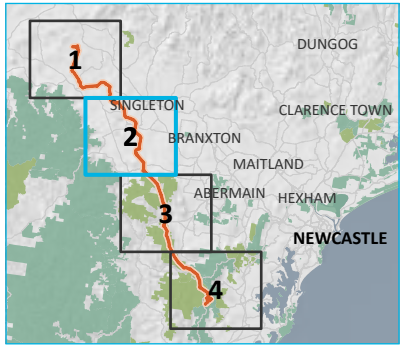

KEY

Project impact area

- HTP corridor
- Construction support site (*with temporary worker accommodation)
- Adjustment to existing transmission line (line 81)
- Access track

Existing environment

- 330 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest
- Defence
- Mining
- Local government area

Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); ABS (2021); DFSI (2017); GA (2009)

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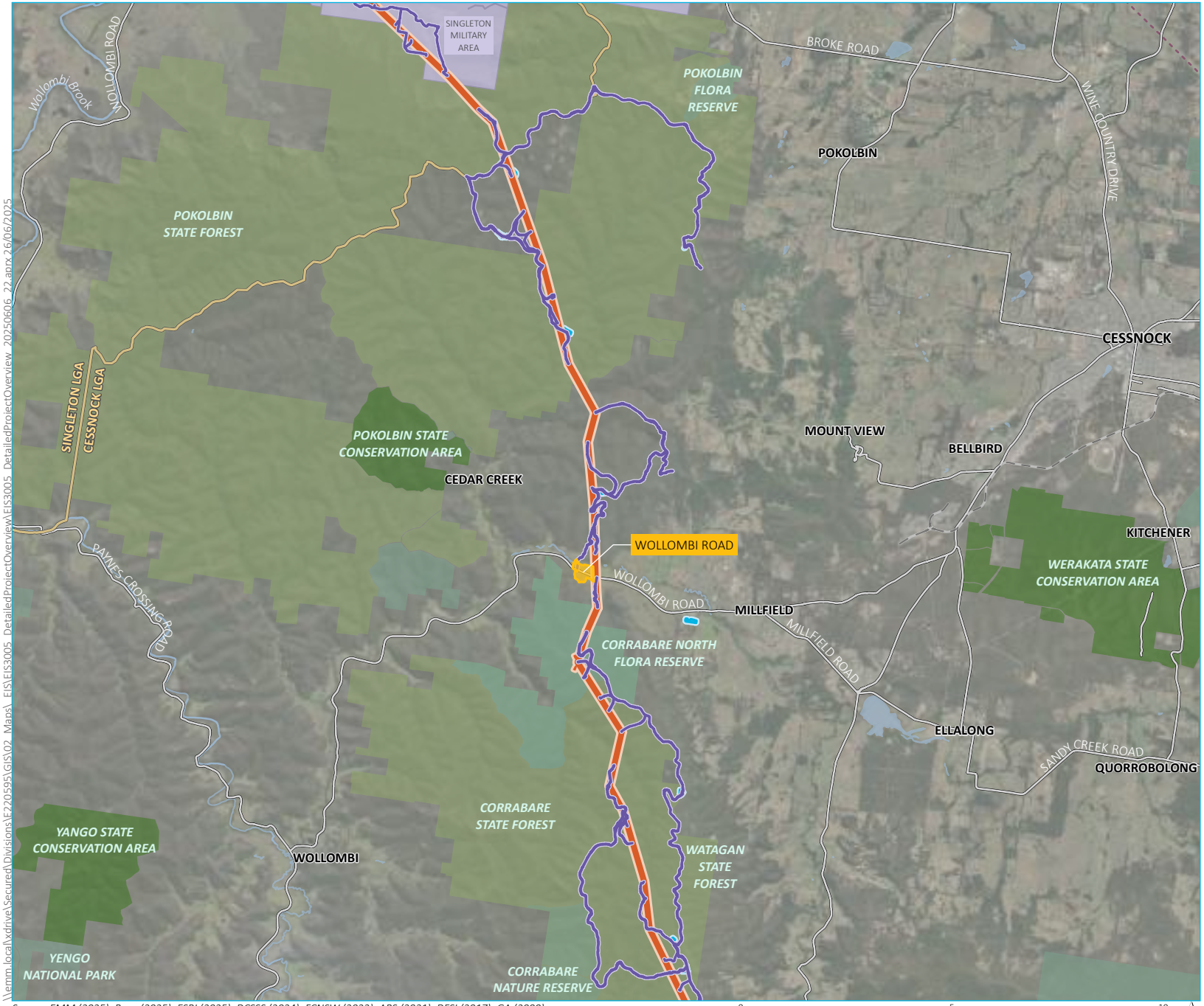
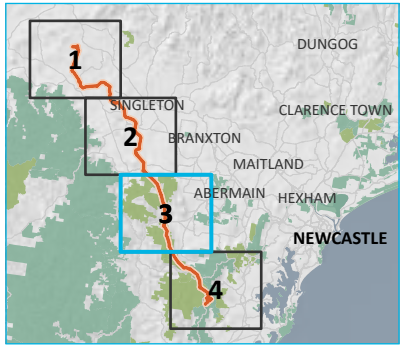
Key project elements
Map 2 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 2.2

EMM
creating opportunities





KEY

Project impact area
- HTP corridor
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Access track

Existing environment
- 330 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Defence
- Local government area

Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); ABS (2021); DFSI (2017); GA (2009)

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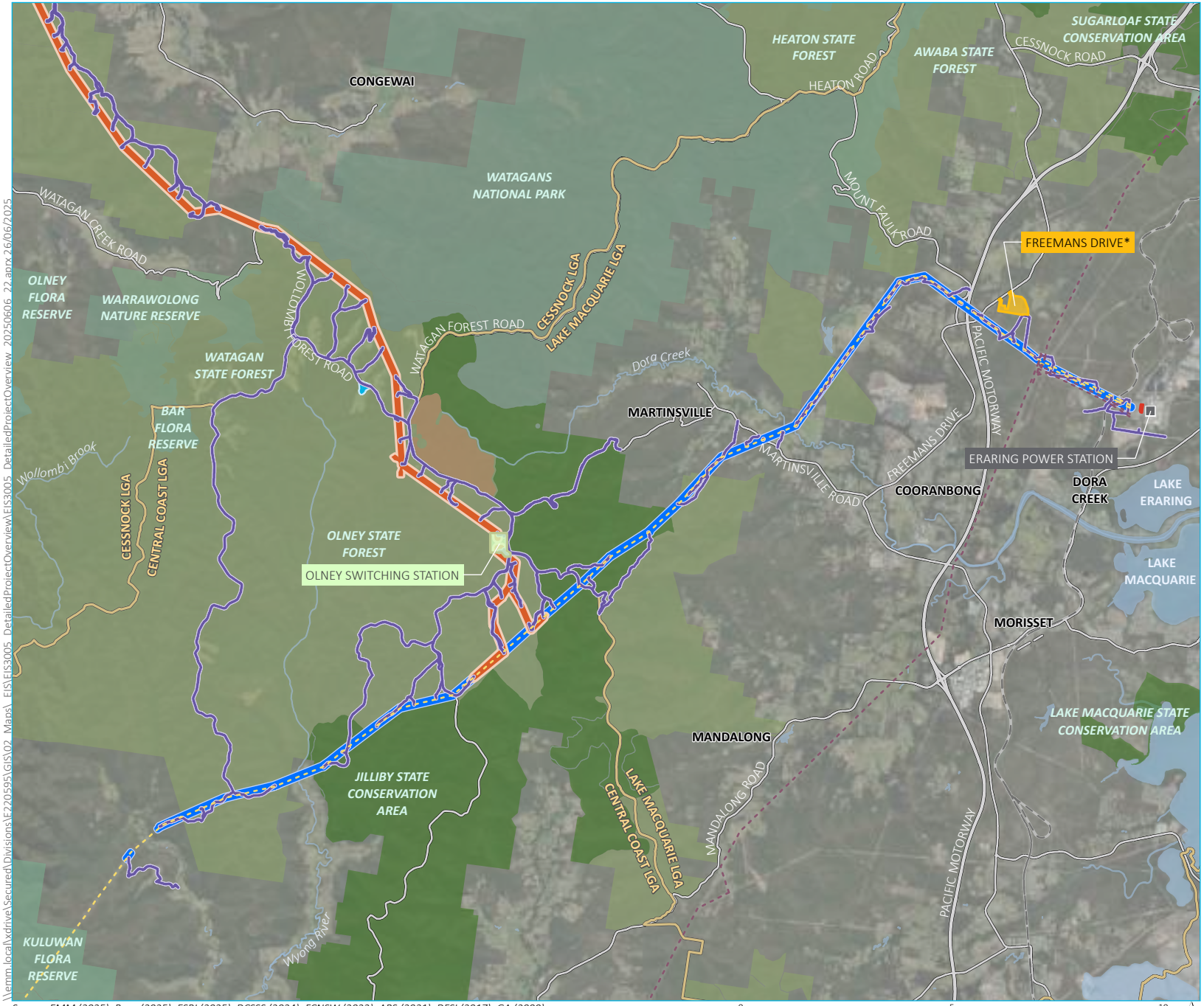
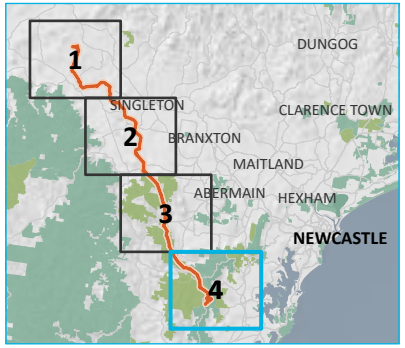
Key project elements
Map 3 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 2.2

EMM
creating opportunities





KEY

Project impact area
- HTP corridor
- Olney switching station
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment
- Power station
- 330 kV transmission line
- 500 kV transmission line
- Railway
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest
- Recreation area
- Local government area

Source: EMM (2025); Beca (2025); ESRI (2025); DCSSS (2024); FCNSW (2022); ABS (2021); DFSI (2017); GA (2009)

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Key project elements
Map 4 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 2.2

EMM
creating opportunities

3 Assessment methodology

This Aboriginal cultural heritage assessment (ACHA) documents the results of archaeological and anthropological investigations undertaken to identify the extent and significance of any physical remains and intangible values of past Aboriginal visitation, use and occupation within the study area for this ACHA (ACHA study area). The objectives of the investigations were to:

- consult with and involve key Aboriginal community members and knowledge holders to identify areas and places of cultural value within or in the vicinity of the Hunter Transmission Project (HTP, the project)
- compile a review of existing environmental, historical, and archaeological information for the ACHA study area (focusing on the project impact area) by identifying and summarising known and previously recorded Aboriginal heritage places, cultural values areas and landforms of archaeological interest in its immediate surrounds
- determine if any Aboriginal objects, places, cultural values areas, or areas of archaeological potential are present (or are likely to be present) within the project impact area, as well as areas of existing disturbance, through ground truthing, including field survey and test excavations
- synthesise the above data by the type, nature, and extent of any Aboriginal sites, objects, archaeological deposits, potential archaeological deposits, and cultural values areas within or near the project impact area map the locations of known and potential Aboriginal sites, objects and deposits and cultural values areas identified throughout the development of this ACHA
- assess the archaeological and cultural significance of the project impact area
- assess and identify heritage constraints and opportunities and the potential impacts of the project. Further details of the project impacts are outlined in *Chapter 12 (Impact assessment)*
- identify and recommend measures to mitigate any heritage impacts and risks to the project.

3.1 Government plans, policies and guidelines

This ACHA has been prepared with reference to the following plans/policies/guidelines:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011)
- *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a)
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010b).

Further Commonwealth and State legislation relevant to the ACHA is provided in *Appendix A (Legislation)*.

3.2 Study area

The ACHA study area includes around 174,880 hectares centred on the project impact area and where relevant incorporates the broader areas of the Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie local government areas (LGAs). The ACHA study area also encompasses earlier project design elements including earlier proposed access routes which no longer form part of the project. The ACHA study area broadly aligns with the extent of Aboriginal Heritage Information Management System (AHIMS) searches carried out to inform the ACHA.

For readability and interpretation, the ACHA study area has been divided into 3 zones, which collectively encompass the HTP corridor and other project development activities:

- **HTP North – Bayswater to Broke** includes Lake Liddell, the Bayswater power station, major coal mining complexes in the Upper Hunter Valley, Mount Thorley Industrial Estate, Singleton Military Area, and several rural properties generally on the alluvial floodplains of the Hunter River

- **HTP Central – Pokolbin to Corrabare** includes the Pokolbin and Corrabare State forests and the rural residential areas between these forests at Cedar Creek, Millfield and Laguna

- **HTP South – Olney to Eraring** includes the Watagan and Olney State forests, Watagans National Park, the residential areas in Martinsville and Cooranbong, and Eraring Power Station.

3.3 Desktop assessment

A database review was undertaken to identify Aboriginal objects, sites and places and included searches of the following:

- Commonwealth
    - Department of Climate Change, Energy, the Environment and Water's Australian Heritage Database, which includes the Register of National Estate
    - Australian government's Federal Register of Legislation (that lists nominations under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*)
- New South Wales (NSW)
    - Heritage NSW's AHIMS
    - Heritage NSW's State Heritage Inventory and Register
    - NSW Government's' The Central Resource for Sharing and Enabling Environmental Data in NSW (SEED).

Information sources used in the desktop assessment to identify Aboriginal objects, sites and places included:

- a review of a wide range of environmental documents and reports to inform the geological, geomorphological, soil, vegetation and hydrology of the project (see *Chapter 5 (Existing environment)* for further details)

- a review of publicly available Aboriginal heritage investigations, assessments and management plans extending across the project impact area (see *Appendix E (Archaeological background)* for further details). Notable reports relevant to the project include:
    - Umwelt (Australia) Pty Limited (Umwelt) (2023a), *Attachment F - Historic heritage assessment* unpublished report prepared for the Department of Defence
    - Umwelt (2023b), *Hunter Transmission Project heritage risk assessment*, unpublished report prepared for the Energy Corporation of NSW (EnergyCo)
    - Umwelt (2023c), *Singleton Military Area heritage management plan: Attachment D - Indigenous heritage assessment*, unpublished report prepared for the Department of Defence

- EMM Consulting Pty Limited (EMM) (2022), *Aboriginal cultural heritage assessment: HVO continuation project*, prepared for Hunter Valley Operations Pty Ltd

- EMM (2023) *HVO continuation project Aboriginal cultural heritage assessment addendum*, prepared for Hunter Valley Operations Pty Ltd

- other reports developed for the environmental impact statement (EIS) for the project, and which have components that can inform the presence and/or survivability of cultural materials, including:

  - *Technical Report 1 Biodiversity Development Assessment Report* – prepared by WSP Australia Pty Limited (WSP)

  - *Technical Report 3 Landscape character and visual assessment* Visual – prepared by Iris Visual Planning + Design (Iris)

  - *Technical Report 8 Heritage impact statement* – prepared by Biosis Pty Ltd

  - *Technical Report 11 Surface water assessment* – prepared by EMM

  - *Technical Report 12 Groundwater assessment* – prepared by EMM

  - *Technical Report 14 Contamination preliminary site investigation* – prepared by WSP.

3.4 Aboriginal consultation

Two parallel and overlapping consultation processes were undertaken as part of this ACHA. As a requirement of the Secretary's environmental assessment requirements (SEARs), consultation was undertaken in accordance with Heritage NSW guidelines (see *section 4.2*). In addition, due to the size, complexity and fluidity of the project, numerous other communication strategies were employed to improve and maintain dialogue with the local Aboriginal community (see *section 4.3*).

3.4.1 Heritage NSW guidelines

Aboriginal consultation for this project has been undertaken in accordance with procedures set out in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010b). These guidelines identify a 5-stage process:

1. Pre-notification – identification of the Aboriginal individuals and/or communities relevant to the project impact area by contacting several State government agencies.

2. Notification – contacting all Aboriginal individuals and/or communities identified in the pre-notification stage to determine their interest in being consulted about the project. This includes direct communication and the placement of advertisements in local media seeking further expressions of interest from Aboriginal individuals and/or communities that may have been missed through the pre-notification stage. Those Aboriginal individuals and/or communities that wish to be consulted become a registered Aboriginal party (RAP).

3. Presentation of project information/assessment methodology – briefing RAPs about the project and scope of any Aboriginal heritage assessment and investigations. This is usually undertaken through written correspondence, but can include meetings, and may undergo several iterations through the project as the nature of the assessment changes (e.g. surface ground-truthing may lead to a requirement for test excavations).

4. Impacts and mitigation strategies – discussion of potential impacts to cultural materials and mitigation options with the RAPs prior to developing this ACHA. This is often undertaken either onsite at the end of any field program and/or as part of ACHA report review.

5. Report review – the RAPs are provided an opportunity to review and comment upon the draft ACHA to contribute input into the overall findings, significance and management of cultural heritage.

The consultation process for this project has 3 aims:

1. to comply with the mandated consultation procedures to obtain input on the ACHA process

2. to provide Aboriginal stakeholders with the opportunity to have input into the assessment and ACHA findings

3. to identify cultural places and intangible values that may be impacted by the project.

3.4.2 Other communication methods

In addition to the required steps outlined in *section 3.4.1*, EnergyCo and EMM implemented a project-specific engagement strategy, which maximised involvement of locally based traditional owners and undertook a range of other on-Country activities to promote transparent and frequent 2-way dialogue between the Aboriginal community and the proponent. Specifically, the strategy included the following additional activities:

- initial briefings and early identification of issues – early engagement with known locally based traditional owners to discuss the project, identify co-design opportunities and highlight any key concerns or issues for further consideration and exploration

- face-to-face meetings – Aboriginal focus group (AFG) meetings were held to promote 2-way dialogue, allow project flexibility and to maintain regular interaction with locally based traditional owners. These were held during the initial stages of the project and during report preparation at a location within the project impact area and/or nearby venue, with options for online and/or phone meetings as required

- regular catch ups and a local base of operations – EnergyCo's locally based Community Liaison Officer routinely liaised with locally based Aboriginal individuals and organisations as part of broader operations. This enabled ongoing consultation that has extended throughout this ACHA process and enabled regular liaison and discussion to be undertaken. This consultation has and will continue to extend beyond the remit of this ACHA

- field investigation participation – locally based traditional owners were offered the opportunity to attend a range of field survey and test excavations activities carried out across the project impact area

- cultural values mapping study – a dedicated investigation of intangible and cultural places, stories and values by an anthropologist in consultation with several Elders and/or knowledge-holders across the Singleton, Cessnock, Newcastle, and Gosford region. This enabled a broader range of the local Aboriginal community that would otherwise have been unable to provide input to the project.

3.5 Field investigations

Four main on-Country activities were undertaken for this ACHA:

- Cultural values mapping study – a project specific investigation of important intangible and cultural values in or near the project impact area with Elders and key knowledge-holders. This included initial co-design development of the approaches and methods for the study, identification of participants, and on-Country activities with an anthropologist. On Country activities included group workshops, oral history interview, specific visits to places and view-lines of importance to understand their proximity to and potential impacts from the project, and general field inspection. Further details are presented in *Chapter 7 (Cultural values mapping)*.

- Archaeological field survey – the physical non-invasive inspection of the project by a team of archaeologists and Aboriginal participants. Due to the iterative process of project design and refinement to maximise avoidance of cultural materials, this included multiple field campaigns of both the current project impact area, as well as earlier proposed alignments. The field investigations focussed on the proposed project impact area and any newly proposed access tracks within HTP Central and HTP South. Investigation was more limited in parts of the project that were existing (e.g. the existing Line 81, established bitumen roads, etc.) compared with those that would be newly constructed. The field investigations extended over around 30 weeks of investigation and included over 590 person days of observation. Further details are presented in *section 9.2*.

- Culturally modified tree investigations – following the identification of a number of potential culturally-modified trees within HTP Central and HTP South, a re-inspection of these sites was undertaken by a specialist arboriculturist and Aboriginal participants to validate the field survey results. Further details are provided in *section 9.2.3i* and *Appendix F.6*.

- Archaeological test excavations – the excavation of areas that were considered to potentially contain sub-surface stone artefactual material. These focussed on areas of potential Warkworth sand system deposits in HTP North as well as localised landforms identified during the field survey, usually in proximity to major watercourses. Excavations were undertaken by a team of archaeological and Aboriginal participants and consisted of systematic grids of manually dug test pits across features of interest to determine the presence/absence of cultural materials. Further details are provided in *section 9.3*.

The results of these field investigations were also used in project designs and refinement over the duration of the project, with several findings resulting in changes to the project impact area (and presenting as outside the project impact area as a result). Further details are provided in *section 12.2*.

3.6 Limitations

This ACHA is based on existing and publicly available environmental and archaeological information (including AHIMS data) and reports, and inputs from Aboriginal participants about the project impact 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). Further, this ACHA makes archaeological predictions based on the existing data and targeted ground-truthing, which may contain errors depending on the accuracy of these third-party studies and the extent of ground-truthing investigations.

This ACHA does not consider historical and/or built heritage unless specifically related to Aboriginal heritage values. Such heritage items are addressed in the non-Aboriginal heritage assessment appended to the EIS (refer to *Technical Report 7 – Historic heritage impact statement* of the EIS).

4 Aboriginal consultation

4.1 Summary of this chapter

The following provides a summary of key activities and/or findings of the consultation activities completed as part of this Aboriginal cultural heritage assessment (ACHA):

- The consultation activities completed as part of this ACHA were undertaken in accordance with Heritage New South Wales (NSW) guidelines. The Hunter Transmission Project (HTP, the project) also undertook additional project-specific communication strategies to promote transparent and frequent two-way dialogue. Activities included early briefings and exploration of co-design opportunities, Aboriginal focus group meetings (face-to-face) throughout the assessment process, a cultural values mapping study with Elders and key-knowledge-holders, and on-site field investigations.

- As required by Heritage NSW guidelines, consultation included provision of information to registered Aboriginal parties (RAPs), and notification of the various field survey and excavation activities associated with the project. Ongoing discussions with Heritage NSW were also undertaken primarily in relation to the scope and extent of the field investigations.

- Since November 2023 and throughout the development of the project and progression of this ACHA, EMM Pty Limited (EMM) and the Energy Corporation of NSW (EnergyCo) have been liaising with 48 RAP organisations and/or individuals. These RAPs were identified through the formal notification process as part of the Heritage NSW consultation requirements. The RAPs include locally based Wonnarua, Awabakal and Darkinjung individuals and/or organisations based primarily in Singleton, Cessnock, and Newcastle as well as the broader Aboriginal community with an interest in cultural heritage management. Of these, 31 locally based individuals and organisations were identified within a project specific engagement strategy (refer to *section 4.3*) have been involved in meetings and on-Country activities. Ultimately, over 1400 interactions have been undertaken with the RAPs across the various consultation opportunities and included around 600 person days of on-site activities.

- Discussions with the RAPs have been extensive and wide-ranging over the 22-month assessment process. Feedback on the project and ACHA activities has generally focussed on who speaks for Country, the potential impact to Dreaming places and stories within the region, targeted discussion around key sites including rockshelters, art sites and grinding grooves identified as part of the field investigation, and mitigation measures. These discussions are all acknowledged in this report (see *section 4.4* and *Appendix B (Aboriginal communication consultation)*), and/or proposed management measures following project approval.

4.2 Liaising with Heritage NSW

As part of this ACHA, various interactions with Heritage NSW have been undertaken:

- seeking information on relevant Aboriginal individuals and/or organisations – 8 November 2023 (see Appendices B.1 and B.5)

- notification of the Aboriginal stakeholders that registered to be consulted about the project – 20 December 2023 (see Appendices B.1 to B.5)

- ongoing consultation – various discussions have occurred with Heritage NSW throughout the development of this ACHA including:
    - discussions relating to next steps for the field program and anticipated complexities with rockshelters and access – 7 March 2024
    - general discussion on project progress and activities – 13 June 2024
    - discussion on proposed test excavations, including provision and review of an archaeological research design for the test excavation approach and strategy – 18 September to 24 October 2024
    - discussions on the draft report, highlighting key sections and management measures, finalisation process and outstanding field activities that may form subsequent stages of reporting – 6 March 2025
- notification of the initiation of archaeological test excavations for the project –9 October 2024 (see Appendix B.8).

4.3 Liaising with the RAPs

Aboriginal consultation for this project has been undertaken in accordance with procedures set out in *section 4.2* and included over 1400 interactions with the RAPs between October 2023 and August 2025 (see Table 4.1 and *Appendix B (Aboriginal community consultation)*) and 600+ person days of on-site participation.

4.3.1 Early engagement

A project-specific engagement strategy was developed in mid-2023 to provide an initial direction on consultation for the project. This identified a number of locally based traditional owner individuals and organisations known to be involved in cultural heritage management in the region (see *Appendix B (Aboriginal community consultation)*). In September 2023, EnergyCo released a preliminary study corridor for the project that ran from Bayswater to Eraring to connect to the State's existing 500 kilovolt (kV) transmission lines. Traditional owners were contacted in October 2023 to provide briefings, discuss the project and explore co-design opportunities for the project, most notably in the exploration of cultural values.

In November 2023, EnergyCo carried out community and stakeholder engagement on the proposed transmission route. This included:

- letters sent out to landowners
- community information sessions
- community events
- social media posts and print advertisements
- meetings with landowners, community members, Aboriginal stakeholders, local councils and other stakeholders
- establishment of a dedicated phone number, email address and website to provide project information.

Several early cultural values workshops and a rapid investigation to identify key areas of heritage risk were undertaken with traditional owners between December 2023 and January 2024 (see Table 4.1).

During these workshops, and throughout the subsequent AFG meetings held for the project, the traditional owner list for on-Country participation was revisited and updated to include relevant individuals and organisations. This co-design approach ultimately resulted in 31 individuals and organisations of the broader 48 RAPs (see Appendix B.3) being more extensively involved in project activities.

4.3.2 Heritage NSW requirements

Table 4.1 provides a summary of the consultation process completed as part of this ACHA, including both steps associated with the DECCW (2010) guidelines and other communication strategies adopted for the project (see Appendix B.1).

Initial identification and notification of Aboriginal individuals and organisations was undertaken in November and December 2023 (see Appendix B.5). This process identified 48 RAPs (see Appendix B.3). The majority of RAPs identified as locally based Wonnarua, Awabakal and Darkinjung traditional owners and organisations. Additionally, several individuals and organisations from Gomeroi and Wiradjuri Country also registered (being in the general vicinity of elements of the project), along with a number of broader Aboriginal community organisations interested in cultural heritage management. Of these 48 RAPs, 31 were identified through a project-specific engagement strategy co-designed and refined with traditional owner groups, to be more extensively involved in the on-site activities (see Appendix B.4).

Additional information on the project and specific activities were provided in February and March 2024 and implemented throughout 2024 and into 2025. Engagement with RAPs to finalise this ACHA was undertaken in February to April 2025. Following some refinements and changes to the mitigation measures of the report in June 2025, a further phase of consultation to discuss these and finalise the report was undertaken in July and August 2025.

Table 4.1 Timeline and summary of the Aboriginal community consultation process (Heritage NSW consultation requirements) completed as part of this ACHA

Stage*	Description	Date started	Date completed	Notes
1	Government Agency Pre-Notification	8 November 2023	22 November 2023	Additional details provided in Appendix B.5
	Cultural values workshops	20 November 2023	10 January 2024	Meeting minutes provided in Appendix B.8
	Advertisement in the Singleton Argus and Newcastle Herald	30 November 2023	14 December 2023	Tear sheets provided in Appendix B.5
	Notification and registration of potential Aboriginal stakeholders	30 November 2023	14 December 2023	Additional details provided in Appendix B.5
	On-Country cultural values survey	5 to 8 December 2023		Additional details provided in Appendix B.8
	Provision of information to Heritage NSW and LALCs	20 December 2023		Additional details provided in Appendix B.5
2/3	Presentation of information about the proposed project and gathering information about cultural significance	5 February 2024	4 March 2024	Additional details provided in Appendix B.6
	Field investigations (survey), discontinuous	18 March 2024	14 March 2025	Additional details provided in *section 9.2*
	Cultural values mapping study	3 June 2024	7 August 2024	Additional details provided in *Chapter 7 (Cultural values mapping)*

Stage*	Description	Date started	Date completed	Notes
	AFG meeting #1	9 July 2024, 8 to 9 August 2024		Meeting minutes provided in Appendix B.8
	Presentation of Archaeological Research Design (ARD)	17 September 2024	15 October 2024	Additional details provided in Appendix B.5
	AFG meeting #2	8 to 9 October 2024		Additional details provided in Appendix B.8
	Field investigation (test excavation)	22 October 2024	29 November 2024	Additional details provided in *section 9.3*
	Review and finalisation of cultural values mapping study with key participants	12 December 2024	4 February 2025	Additional details provided in *Chapter 7 (Cultural values mapping)*
	Review of draft report	12 February 2025	19 March 2025	Additional details provided in Appendix B.7
	AFG meeting #3	27-28 February 2025 7 March 2025 14 March 2025		Additional details provided in Appendix B.8
	Review of mitigation measures following refinements and modifications prior to inclusion in final report	4 July – 1 August 2025		Additional details provided in Appendix B.7
	AFG meeting #4	15 July 2025		Additional details provided in Appendix B.8

Notes: *Consultation stages outlined in *section 4.2*.

4.3.3 Other communication

A summary of the additional activities carried out with RAP involvement throughout the development of this ACHA (as outlined in *section 4.2*) is presented in Table 4.2. Further details of these activities are presented throughout the report (notably in *section 7.3* and *Chapter 9 (Field investigations)*) and Appendix B.8.

Table 4.2 Timeline and summary of Aboriginal community consultation process (other communication methods) completed as part of this ACHA

Description	Date	Notes
Various inception meetings, discussions and correspondence to introduce the project between Aboriginal stakeholder groups, EnergyCo and EMM	16 to 24 October 2023	Additional details provided in Appendix B.1
Cultural values workshop focussed on HTP North	20 November 2023	Additional details provided in *section 7.3.1* and Appendix D.1
Cultural values workshop focussed on HTP Central	30 November 2023	Additional details provided in *section 7.3.1* and Appendix D.1
On-Country cultural values survey focusing on HTP South	5 to 8 December 2023	Additional details provided in *section 7.3.1* and Appendix D.1
Cultural values workshop focussed on the preliminary project corridor and potential impacts to key sites/places	10 January 2024	Additional details provided in *section 7.3.1* and Appendix D.1
On-Country cultural values survey to ground truth the location of Lizard Rock in relation to the project	8 February 2024	Additional details provided in *section 7.3.1* and Appendix D.1

Description	Date	Notes
Field survey of the project impact area	18 March to 17 October 2024	Additional details provided in *section 9.2*
Project update (written/email distribution) of the cultural values workshop and initial outcomes	10 April 2024	Additional details provided in Appendix B.8
Project update (written/email distribution) of the Scoping Report lodgement	10 May 2024	Additional details provided in Appendix B.8
Project update (written/email distribution) of initial field survey findings	29 May 2024	Additional details provided in Appendix B.8
Cultural values mapping field investigations	3 June to 7 August 2024	Additional details provided in *section 7.3.2* and Appendix D.2
Project update (written/email distribution) of initial field survey findings specific to HTP areas	3 July 2024	Additional details provided in Appendix B.8
Aboriginal focus group meeting #1 – HTP North primarily focussed on initial findings/concerns but also included discussion of the broader project	9 July 2024	Additional details provided in Appendix B.8
Aboriginal focus group meeting #1 – HTP Central/South primarily focussed on initial findings/concerns but also included discussion of the broader project	8 to 9 August 2024	Additional details provided in Appendix B.8
Project update (written/email distribution) of field survey findings	10 September 2024	Additional details provided in Appendix B.8
Aboriginal focus group meeting #2 – HTP North, Central and South primarily focussed on the findings of the field survey and the proposed test excavations outlined in the archaeological research design	8 and 9 October 2024	Additional details provided in Appendix B.8
Test excavations of Congewai Creek and within the Singleton Military Area	21 October to 26 November 2024.	Additional details provided in *section 9.3*
Invitation to nominate trainees and/or early career individuals for inclusion in the test excavation program	25 October 2024.	Additional details provided in Appendix B.1
Project update (written/email distribution) of completion of field work and the ACHA reporting process	19 December 2024	Additional details provided in Appendix B.8
Aboriginal focus group meeting #3 – HTP North, Central and South primarily focussed on the overall findings and management of the report.	27-28 February 2025 7 March 2025 14 March 2025	Additional details provided in Appendix B.8
Aboriginal focus group meeting #4 – opportunity to present and discuss changes to the proposed mitigation measures of the report.	15 July 2025	Additional details provided in Appendix B.7

4.4 Aboriginal stakeholder feedback and outcomes

Extensive Aboriginal consultation has been completed between October 2023 and April 2025. Consultation included over 1100 interactions, including 21 discrete meetings with traditional owners in groups or 1-on-1 meetings (see Appendices B.1 to B.8), and some 190 days of on-site activity. As such, discussions have been wide-ranging, initially focusing on who is relevant to the project, the potential impacts to important Dreaming places and stories in the region, then the methods and approach to field investigation, and finally into the potential impacts and management of identified cultural sites and values. Minutes of the meetings are presented in Appendix B.8.

In summary, the main discussion topics have included the following:

- Who speaks for Country – early discussions were focussed on how the consultation process for the project was going to be undertaken, and who would speak for Country and participate in on-site activities. A strong preference from the local traditional owners and organisations was to ensure that broader Aboriginal communities from outside of the ACHA study area, that become involved through the notification of government agencies as part of the DECCW (2010b) guidelines process, be limited. This was managed through the early introduction of a project-specific engagement strategy that outlined locally based traditional owners known to be involved in cultural heritage management; and which was only modified and updated in discussion with the traditional owners at key meetings throughout this ACHA preparation. This strategy included applying boundaries around areas of the project, largely following traditional cultural boundaries of the Wonnarua, Awabakal and Darkinjung groups; this allowed engagement to be targeted to the appropriate groups depending on the issue being discussed. However, ongoing disagreement over the boundaries applied to the project impact area remain, especially between HTP North and HTP Central. A single participant has also provided repeated views on the location and relevance of the Guringai people, which are documented in recent years as being in the Central Coast, but traditionally may have been from the lower Hunter Valley.

- Significant Dreaming places, stories and view-lines – early and ongoing consultation has identified the potential project impacts to important cultural landscapes in the vicinity of Lizard Rock, Mount Sugarloaf, Mount Yengo, Mount Warrawalong and Martinsville. While some distance from the project, view-lines, connections, and the broader cultural landscape were identified as potentially being adversely affected. These concerns have mainly come from a few Awabakal traditional owners. Ongoing efforts are being made to better understand these locations and work on their management with these traditional owners (*Chapter 7 (Cultural values mapping)*).

- Ravensworth Estate Homestead Complex and post-Contact cultural materials – A Wonnarua traditional owner expressed concerns about the potential impact of the project on the Ravensworth complex (and its buffer), which had been nominated by the Wonnarua for protection under the *Commonwealth Aboriginal and Torres Strait Islander Heritage Protection Act 1984* due to its historical significance as a site of frontier violence. Although early preliminary corridor images did encroach on the proposed buffer area, the project impact area does not. The Australian Minister for the Environment and Water rejected the nomination on 22 December 2023. Subsequent concerns raised by the same individual indicated that contact materials were known in the Hunter Valley, and test excavations of such cultural materials do not conform with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010a; hereafter, the Code of Practice). The SEARs for the project were specifically developed to address these concerns, by requiring a project specific archaeological research design for test excavations that do not conform with the Code of Practice.

- Field survey methods and application – as the project design continued to develop during the preparation of this ACHA, there was ongoing communication and discussion with the RAPs about refinements to the project impact area. This also led to additional on-site investigations and multiple field visits to review or revisit areas due to these refinements.

- Draft report, contents and mitigation measures – an extensive program of meetings and opportunities to comment on the draft report was provided to the RAPs. Overall, there was general support for the report and proposed future management, with generally minor points of clarification and/or refinement sought. Following refinement of the mitigation measures of the report in June - August 2025, a further opportunity to comment and provide inputs to these was provided to ensure the views of the RAPs remained unchanged. *Section 4.4.2* provides further information of this process.

The outcomes of these discussions and the feedback received have been considered in the development of, and content included in this ACHA. While not necessarily individually mentioned throughout this ACHA, they have nonetheless been considered in its preparation.

4.4.1 Review of draft report

A copy of this ACHA has been provided to the RAPs (see Appendix B.7). An original draft was provided on 12 February 2025 for a period of 35 days, and a number of meeting opportunities were provided to discuss the report on 27 to 28 February 2025 (in person), 7 March 2025 (2 online opportunities), 14 March 2025 (online opportunity). The online meetings were extended to all RAPs, as well as the locally based Wonnarua, Awabakal and Darkinjung traditional owners and organisations.

- Key outcomes of these processes included:

    - Ongoing concerns about the level of involvement of some participants and the specific division of the project, especially between Wonnarua and Awabakal traditional boundaries. This was in large part the result of perceived WHS and health requirements that some, especially Elders, could not achieve to participate in on-Country activities. EnergyCo is exploring ongoing and future opportunities to improve the accessibility of the project to such individuals, including on-Country vehicular tours, etc. In relation to the boundary, there were differing views on whether the Pokolbin State Forest was within Wonnarua and/or Awabakal traditional boundaries. Ultimately, representatives of both traditional groups were involved in the on-Country activities of this locale across the broader field campaign.

    - An acknowledgement of the level of avoidance and refinement undertaken and achieved to avoid cultural materials, and general support for the findings of the report, its conclusions and proposed recommendations. There was, however, ongoing concern for Aboriginal sites and places in close proximity to the project impact area. It was highlighted that around 400+ sites were within 200 metres of the project impact area curtilage, including numerous highly significant and 'fragile' rockshelters, stone arrangements, etc. Significant sites outside, but in close proximity to the project impact area, are now protected from adverse harm in mitigation measures outlined in *Chapter 13 (Management strategy and recommendations)*. Despite this, a broader concern remains around impact to sites near to the project impact area.

    - Concerns over the legacy and future management of cultural materials following the construction and operation of the project. This was most evident in sites and places that may become more accessible through the creation of a corridor areas that are currently relatively inaccessible. An additional mitigation measure (AH12) was developed as an approach to manage this issue.

- One Aboriginal participant had a substantive database of sites and places within the Pokolbin and Corrabare State forests, which was inaccessible via other publicly available databases. There were some concerns that sites identified by this individual had not been captured in the ACHA. Subsequent on-Country activities are being planned with the individual to ensure this data (if relevant) is captured and integrated into later stages of the project.

- Two sets of written comments were received. One of which identified no concerns or issues with the report. The other sought further discussion on the potential for cultural offsets that could be offered to the Aboriginal community, similar to biodiversity offsets. This was raised during some of the AFG meetings, and EnergyCo indicated that it would form further discussion in the broader socio-economic benefits required for this and other related projects.

4.4.2 Review of mitigation measures

Prior to EIS submission, a review and ratification were undertaken to the mitigation measures of the report. While minor, given these changes inform future stages of the project, further consultation was considered necessary. In addition, additional mitigation measures were developed as an outcome of the finalisation of the report in February and March 2025 (e.g. AH12), and which had not been reported back to the RAPs.

As a result, updates to the mitigation measures were distributed to RAPs on the 4 July 2025, with an online meeting held on the 15 July 2025. The comment period was extended to encompass 28 days, with completion on 1 August 2025. Any comments provided from this process are provided in Appendix B.7, Appendix B.8 and summarised below:

- Phone
  - [redacted] reiterated his concerns in relation to identifying who speaks for Country, notably in HTP South, and which is previously captured in *section 4.4.1.*
- Written comments
  - Wonnarua Nation Aboriginal Corporation provided comments seeking cultural offsets from the project as has occurred on some other recent major infrastructure developments. EnergyCo is speaking with the Wonnarua Nation Aboriginal Corporation separately to the ACHA process on this issue, since it has broader implications for their activities in the Hunter Valley
  - Yurwang Gundana Consultancy Cultural Heritage Services, Long Gully Cultural Services and Jarban & Mugrebea all provided short statements indicating agreement and support of the proposed revisions.
- Online meetings
  - Representatives of Didge Ngunawal Clan and Long Gully Cultural Services attended an online briefing that went through the proposed refinements in detail. Both were satisfied with the changes and sought no modifications
  - [redacted] requested and was provided an online briefing of the mitigation measures. She indicated concerns over potential impacts to rockshelters with art motifs and/or deposits in HTP South, and which are proposed for protection under AH02-AH04 inclusive. Otherwise, [redacted] had no concerns with the proposed refinements.

5 Existing environment

5.1 Summary of this chapter

Understanding environmental context assists with predictions of archaeological potential, such as the likelihood of archaeological material being present in the landscape, its spatial distribution and its preservation. Landscape features were an important factor for the choice of camping, transitory and ceremonial areas used by Aboriginal people. Similarly, these landscape features and historical land use play a role in the level of preservation and the integrity of archaeological sites and cultural materials.

A landscape consisting of suitable topography, hydrology, geology and soils has strong links with natural resources that would have been available to, and sought by, Aboriginal people. Flora and fauna would have provided food, tools and ceremony (culturally modified trees). Proximity to fresh water was necessary for life and growing crops, as well as gathering fish and eels. Landscape features, such as sandstone overhangs, were useful for shelter. Stone artefacts were manufactured from raw stone material that was collected from quarry sites and stone arrangements relied on the landscape.

In summary:

- The Hunter Transmission Project (HTP, the project) extends across around 110 kilometres between Bayswater and Olney State Forest and is encompassed within the Sydney Basin (SYB) bioregion. It encompasses around 37 distinct geological units and 16 major soil landscapes. Overall, it can be broadly divided into 2 main environmental contexts to inform cultural heritage:
    - between Bayswater and Pokolbin, the project impact area is encompassed by the central lowlands of the Hunter Valley. These consist of gentle undulating hills and slopes intersected by floodplains encompassing a range of creeks and tributaries, including the Hunter River and Wollombi Brook. Soil profiles are typically texture contrast soils. While these areas would have historically been dominated by open woodland, they are now subject to pastoralism and coal mining activities that have resulted in modified ecological communities
    - between Pokolbin and Martinsville, the project impact area is characterised by increasingly steep and dissected sandstone plateaus intersected with steep ravines and gorges. River systems are typically found in the base of these gorges and ravines and prone to rapid flooding and elevational changes, which can result in scouring and erosion. These areas are currently flora reserves and/or State forests and include a range of dense *Eucalypt* dominated forests. These areas have been part of a working landscape and will have been subject to localised impacts in the past, such as forestry activities.
- Desktop soil mapping, supplemented by field observations of the soil profiles, was undertaken across the project impact area. These found primarily shallow soil profiles in the steep and highly eroded southern portion of the project impact area, with the potential for deep sandy deposits in areas throughout the northern portion of the project impact, where alluvial plains and terraces abut major watercourses. Despite this, large areas of the alluvial plains and steep sandstone relief throughout the project impact area are prone to movement and/or loss of cultural material through natural erosion processes. During the fieldwork (see *Chapter 9 (Field investigations)*), deeper alluvial soils profiles were occasionally observed and constrained to larger creek corridors within the northern and central portions of the project impact area, and that may be of archaeological interest depending on the age of formation.

- In terms of hydrology, the project impact area intersects with around 53 watercourses. These include the major watercourses of the Hunter River and Wollombi Brook, as well as significant local watercourses, such as Loder Creek, Jigadee Creek, Cedar Creek, Congewai Creek, Dora Creek, Deep Creek and Monkey Place Creek. These would have formed important resources to past Aboriginal populations in the region.

- The project impact area has been subject to both natural and anthropogenic disturbance that will affect the survivability of cultural materials if present. These primarily include coal mining activities, as well as forestry clearance and agricultural activities across much of the project impact area. Additional historical disturbance in the project impact area includes localised impacts, such as dams, roads, fire trails, urbanisation, etc.

5.2 Landscape overview

As noted above, understanding environmental context assists with predictions of archaeological potential, such as the likelihood of archaeological material being present in the landscape, its spatial distribution and its preservation. The project impact area is within the SYB bioregion (DCCEEW 2020). The bioregion is characterised by rolling coastal plains and rugged terrain associated with exposed Hawkesbury Sandstone rock outcrops (see Figure 5.1). Much of the topography was formed through interactions with major river and catchment systems, including the Hawkesbury-Nepean River basin, as well as fluctuating ocean levels. The SYB bioregion is on the central east coast of New South Wales (NSW) and extends from Capertee in the north to Durras in the south, with the project impact area within the northwest portion of the bioregion. This bioregion is broken down into subsequent subregions and the attributes of subregions present in the Aboriginal cultural heritage assessment (ACHA) study area are summarised in Table 5.1.

Historical agricultural, pastoral, forestry and mining activities have resulted in significant land clearance within the ACHA study area, starting from the early 1820s (see *section 5.5*). This long-term disturbance would have had a significant impact on the surface and subsurface integrity of the soils and archaeological material contained therein.

Table 5.1 Subregions within the ACHA study area

Subregion	Summary	Location
Hunter	Rolling hills with wide valleys that are dominated by flood plains and river systems. Includes the Greta and Wittingham coal measures. Permian age shale and sandstone underly contrast alluvial soils. Mainly open *Eucalypt* woodlands in the lower valleys with oaks found along the watercourses.	Northern portion of the ACHA study area from Bayswater to the northern edge of Pokolbin State Forest
Wyong	Coastal fall of the Sydney Basin with rolling hills and sandstone plateaus. Triassic sediments formed from sandstone beds are covered by Quaternary estuarine fills. The native vegetation throughout the upper slopes comprises of mostly *Eucalypt* species with other shrubs and swamp mahogany found along creek flats.	Most of the southern portion of the ACHA study area from Pokolbin State Forest to Watagans National Park
Yengo	Benched sandstone plateau with steep slopes into narrow valleys including the Hawkesbury River gorge. Quaternary aged sandy soils overlay Triassic Hawkesbury Sandstone throughout much of the region with volcanic necks and basalt caps common in the incised valleys. Open woodlands formed of bloodwood species are dominant with many other *Eucalypt* derived tree species.	Southern end of the ACHA study area from the Watagans National Park and State Forest to the Jilliby State Conservation Area

5.2.1 Geology

The project impact area can be divided into 2 main geomorphological divisions:

1. between Bayswater and Pokolbin, the project impact area is encompassed by the central lowlands of the Hunter Valley. These consist of gentle undulating hills and slopes intersected by floodplains encompassing a range of creeks and tributaries, including the Hunter River and Wollombi Brook. Soil profiles are typically texture contrast soils. While these areas would have historically been dominated by open woodland, they are now subject to pastoralism and coal mining activities that have resulted in modified ecological communities

2. between Pokolbin and Martinsville, the project impact area is encompassed by increasingly steep and dissected sandstone plateaus intersected with steep ravines and gorges. River systems are typically found in the base of these gorges and ravines, and are prone to rapid flooding and elevational changes, which can result in scouring and erosion. These areas are currently flora reserves and/or State forests and include a range of dense *Eucalypt* dominated forests. These areas have been part of a working landscape and would have been subject to localised impacts in the past.

The project impact area forms part of the greater Sydney-Gunnedah-Bowen Basin complex (SGBB), an extensive geological structure of interconnected sedimentary basins in eastern Australia (see Figure 5.2). The SGBB extends around 1600 kilometres from the south coast of NSW to near Bowen on the coast of northern Queensland. It stretches offshore to the continental shelf (eastern boundary), is bound by the older geological formations of the Lachlan Fold Belt to the south and west and the New England Fold Belt to the north and west. The SGBB is bordered by the Lachlan, Thomas, New England and North Queensland orogens. Differing geodynamics starting in the early-Permian largely centred around volcanic rifts led to a series of compressional and extensional sporadic and migrating events which produced the SGBB as it is today (O'Neill and Danis 2013). Geology within the SGBB typically comprises sandstone and basalt sedimentary rock, quartz, shale, mudstone, conglomerate and coal seams.

The geologic formations across the project impact area are formed from 7 major geological units from Permian (298 to 252 million years ago (mya)) to Quaternary (2.8 to 11,700 mya) in age that comprise of many stratigraphic units. Within the project impact area, 37 individual geological units were identified during the background research for this ACHA; however, these have been grouped and/or condensed to better reflect the underlying geology that would impact the Aboriginal heritage inputs for the project (see Table 5.2 and Figure 5.2).

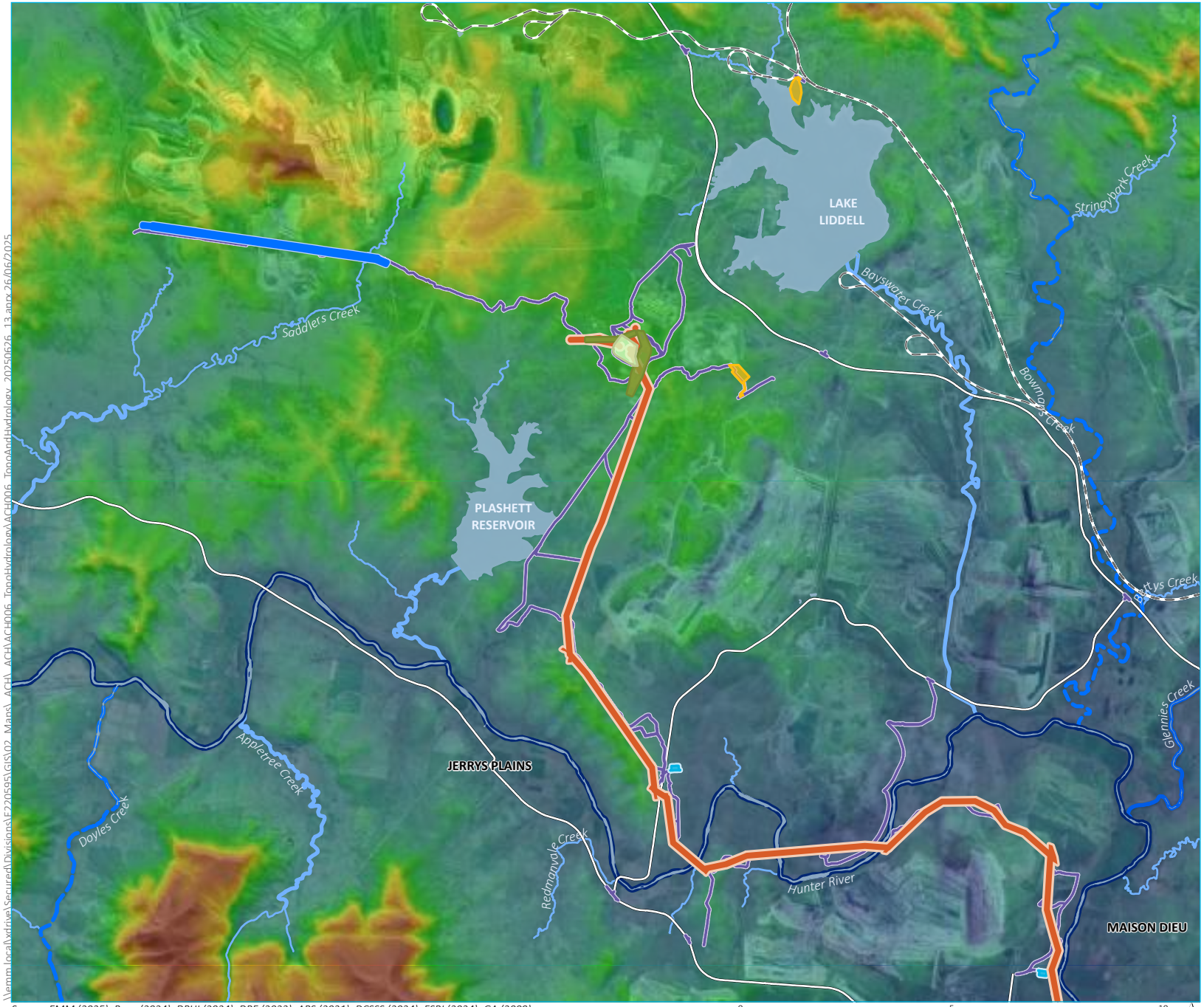
Generally, the Hunter Basin is bordered by Triassic units formed mostly of sandstone and conglomerates (Stewart and Adler 1995). The central lowlands are characterised by Permian rock with diverse lithology that's geological structure follows the bedload of major tributaries including the Goulburn River where silicified tuffs and sands have accumulated. The valley system includes multiple coal measures (e.g. Singleton, Greta, Tomago and Newcastle) as well as the Muree Sandstone and a number of major geological formations in NSW (e.g. Farley, Rutherford and Branxton). These formations include interbedded coals, mudstones, claystones, tuff, sandstone and conglomerates (Umwelt 2023b). Additionally, basalt could be potentially sourced from the nearby Merriwa Plateau (around 60 kilometres northwest of the ACHA study area).

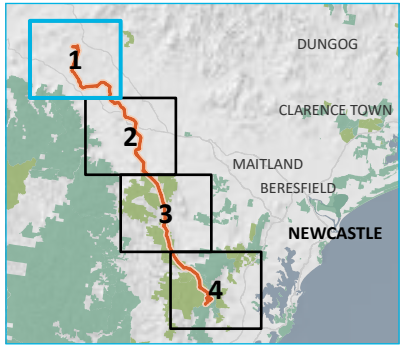
Overlying the Permian and Triassic aged geology throughout the ACHA study area are Quaternary and Tertiary sediment deposits, that commonly follow the corridors of the major tributaries, including the Hunter River. This includes river terraces that are often formed of wind-blown (source bordering) dunes, as well as the valleys flats, floodplains and terraces.

Table 5.2 Geological units within the project impact area

Geology	Map unit	Description	Implications for cultural heritage
Quaternary basal sands/gravel	Qha	Basalt derived sandy silt and gravel materials usually concentrated in levee or overbank deposits surrounding major watercourses (Hunter River and Wollombi Brook) across the floodplains.	Potential for sub-surface cultural deposits associated with deep levee deposits.
Quaternary surficial alluvium	Qhb	Shallow sequences of clay, silty sand and sand in levee or overbanks deposits along watercourses across the floodplains.	Surface and/or displaced artefacts due to shallow deposits subject to erosion.
Quaternary alluvial terrace	Cza	Silt, sand and gravel formed into relict alluvial terraces (Pleistocene or older) with high terraces formed in areas such as the Wollombi Brook junction.	Potential for deep, stratified Pleistocene cultural deposits and burials.
Cainozoic silicified weathering profile	Czas	Silcrete cobbles with a deeply weathered background grouped in large outcrops on elevated land between the Wollombi Brook and Hunter River extending south to Putty Road.	Possible area of raw material procurement due to presence of silcrete.
Cainozoic volcanic rock	Czb	Sand and aeolian dunes (dated to the Last Glacial period, over 11,500 years ago) that often but don't always overlay relict alluvial terraces and bedrock. Part of these deposits are known as the Warkworth Sands.	Potential for deep, stratified Pleistocene cultural deposits and burials.
Hawkesbury Sandstone*	Tuth	Triassic aged units limited to the Watagans National Park area of the project impact area. Hawkesbury Sandstone was formed through sand accumulation in braided river systems where after burial and lithification, the sandstone was gently folded, fractured and faulted. Over time, it was intruded by dykes and sills of basalt and uplifted.	High potential for rockshelter sites due to suitable sandstone geology and steep, rugged topography. Rockshelter sites are often associated with art, artefacts and subsurface cultural deposits. Some potential for rock engravings, grinding groove sites due to potential for sandstone outcropping.
Jerrys Plains Subgroup and Archerfield Sandstone*	Pwj	Permian aged geological units underlay most of the project impact area. The Jerrys Plains Subgroup is formed of coarse-grained sandstone, fine- to medium-grained lithic (to quartz-lithic) sandstone, mudstone, coal seams and thin coaly partings, carbonaceous claystone, tuffaceous (25% to 75% ash) claystone and siltstone with fossil plant debris. Much of the conglomerate in this geology is formed of a pebble para-conglomerate (floating matrix). Archerfield sandstone is a lithic sandstone marker bed that was formed through beach/barrier beach-lagoon deposits.	Outside areas of steep topography, low potential rockshelters sites. Some potential for rock engravings, grinding groove sites due to potential for sandstone outcropping.

Note: * Including but not limited to these geological units for the epoch.





KEY

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Strahler stream order

- 4th order
- 5th order
- 6th order
- 7th order
- 9th order

Topographic elevation (mASL)

845.29

-130.06

Existing environment

- Rail line
- Major road
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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Topography of the project impact area
Map 1 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.1

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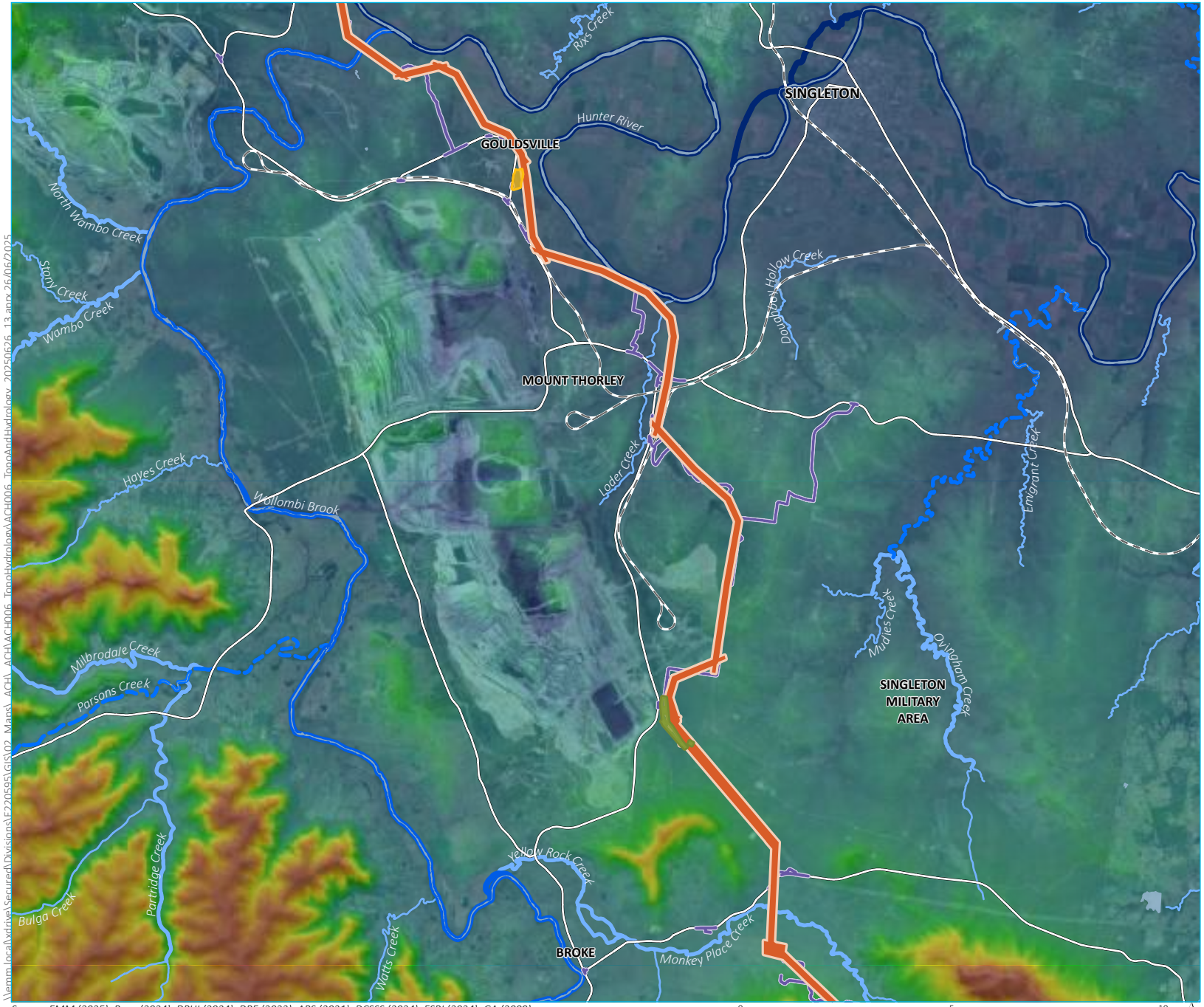
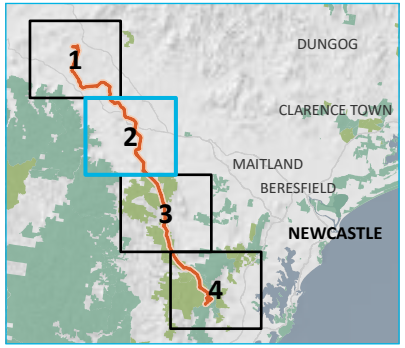
creating opportunities





KEY

Project impact area
- HTP corridor
- Construction support site
- Adjustment to existing transmission line (line 81)
- Access track

Strahler stream order
- 4th order
- 5th order
- 6th order
- 8th order
- 9th order

Topographic elevation (mASL)
- 845.29
- -130.06

Existing environment
- Rail line
- Major road
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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Topography of the project impact area
Map 2 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.1

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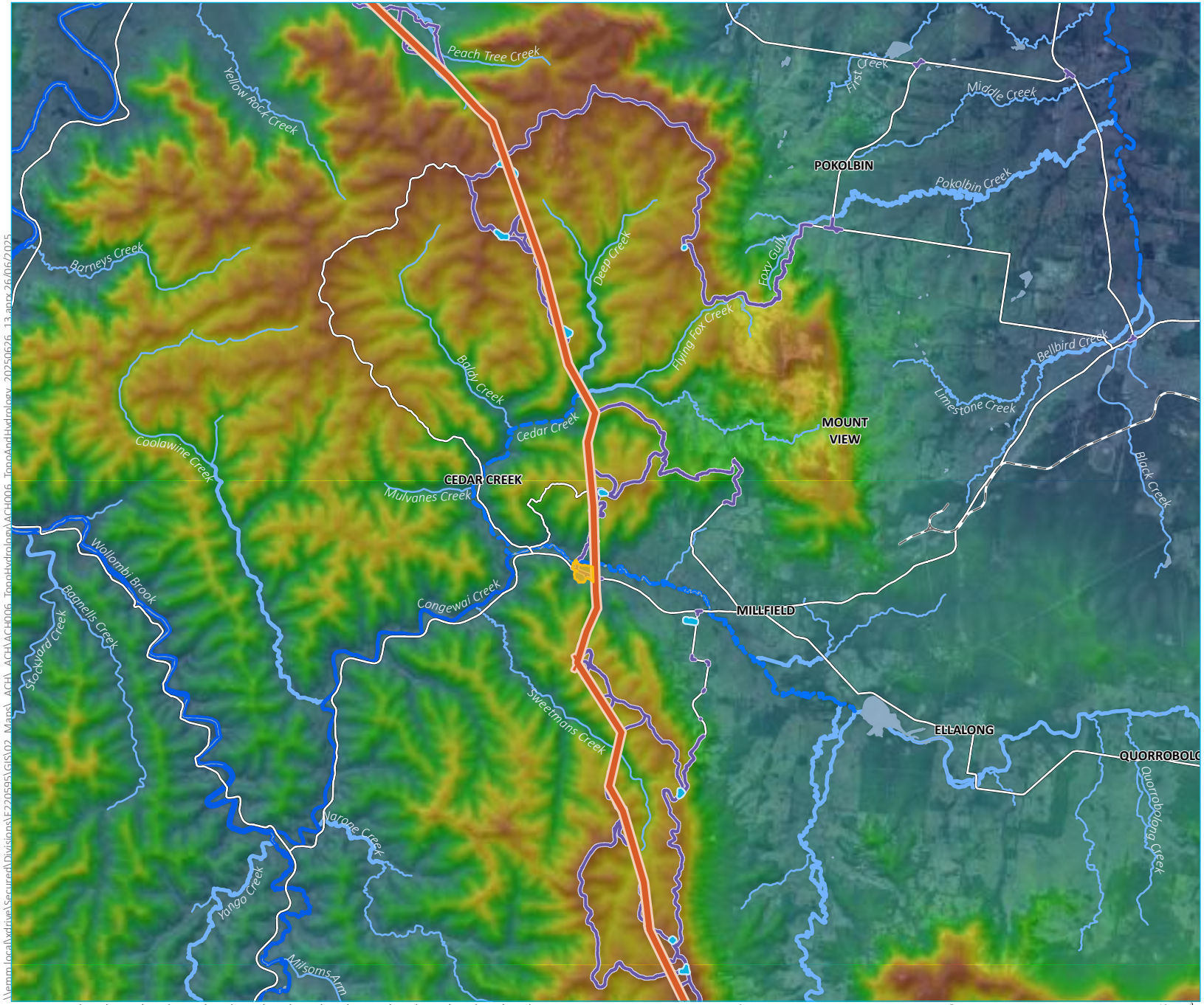

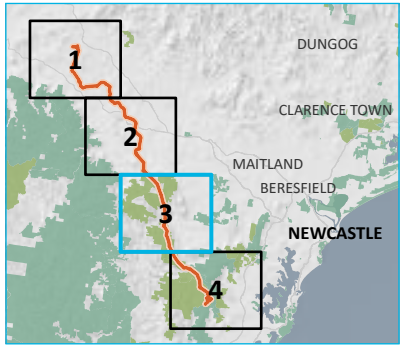

KEY

Project impact area
- HTP corridor
- Construction support site
- Laydown area
- Access track

Strahler stream order
- 4th order
- 5th order
- 6th order
- 7th order
- 8th order

Topographic elevation (mASL)
- 845.29
- -130.06

Existing environment
- Rail line
- Major road
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Topography of the project impact area
Map 3 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.1

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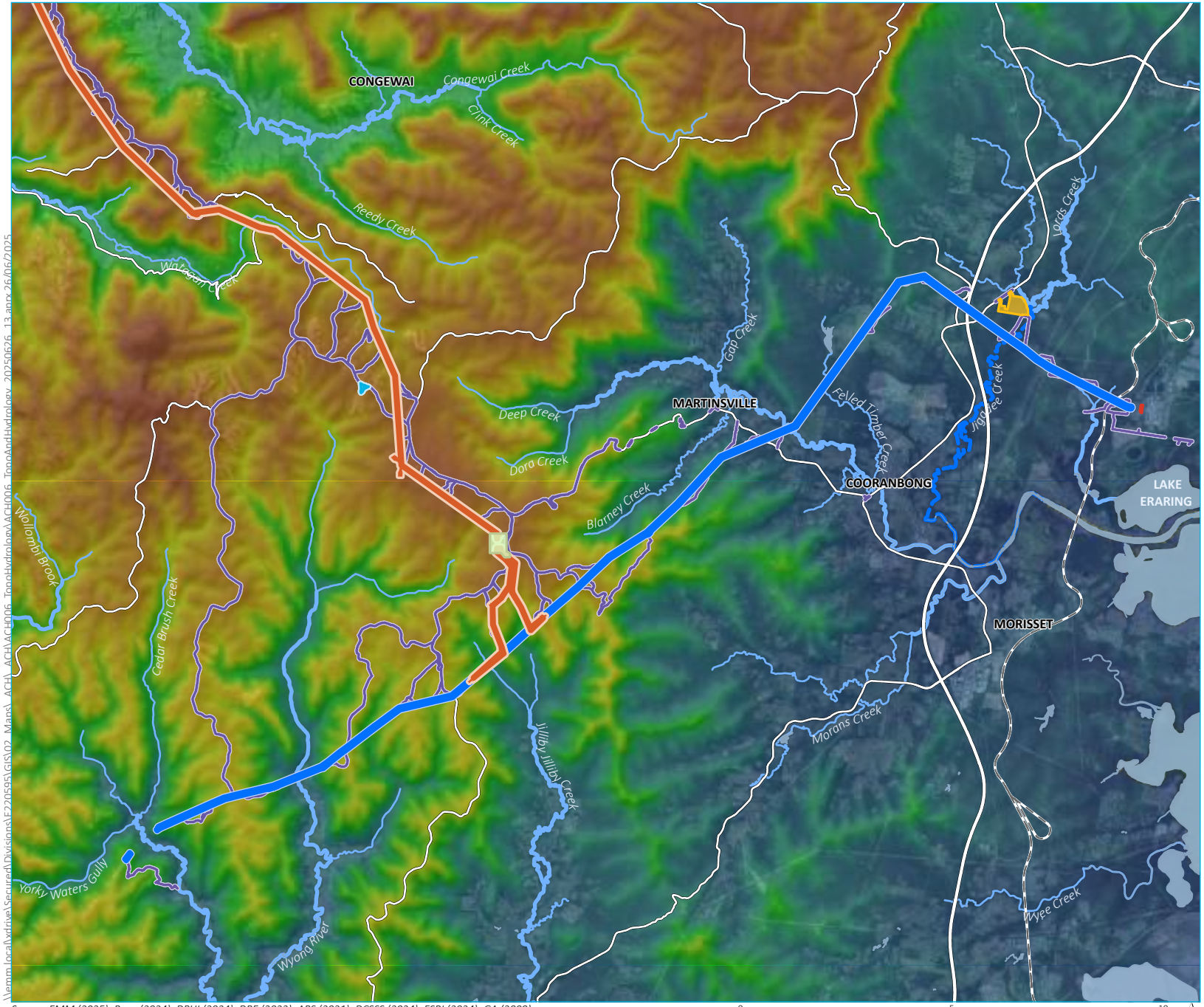

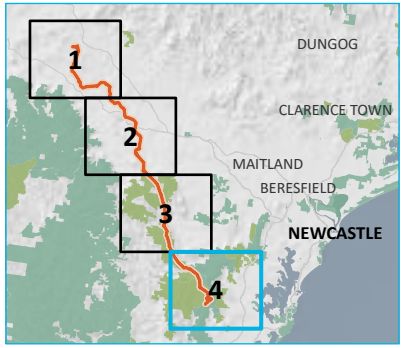

KEY

Project impact area
- HTP corridor
- Olney switching station
- Construction support site
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Strahler stream order
- 4th order
- 5th order
- 6th order

Topographic elevation (mASL)
- 845.29
- -130.06

Existing environment
- Rail line
- Major road
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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Topography of the project impact area
Map 4 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.1

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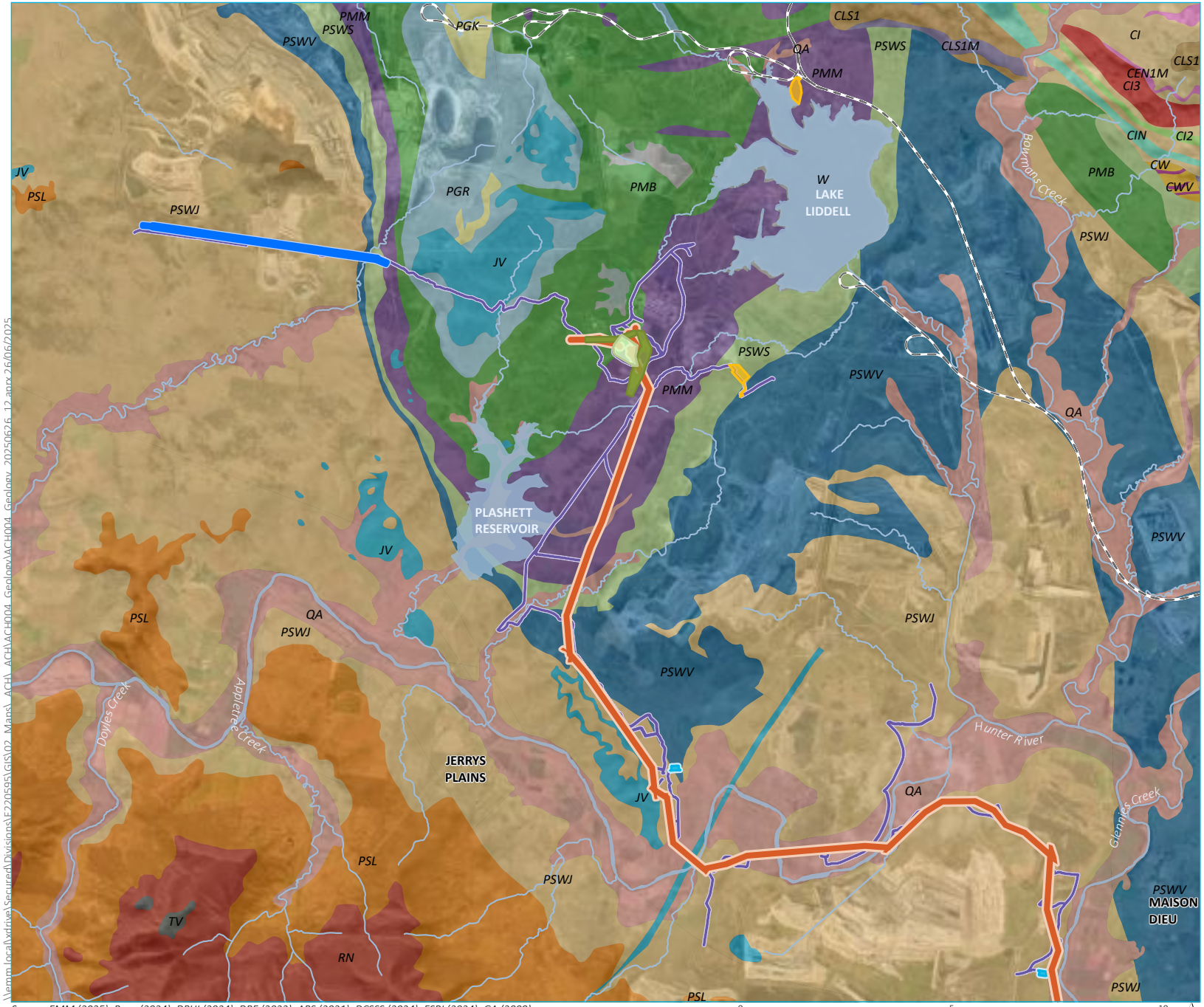

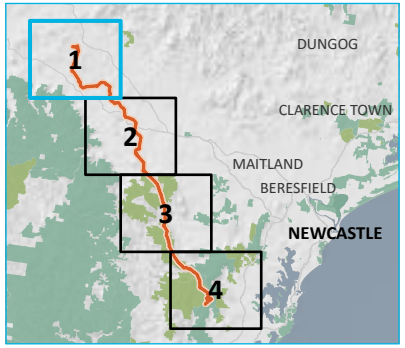

KEY

Project impact area
- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Geology 250k
- Cen1m | Martins Creek Ignimbrite Member
- Ci | Isismurra Formation
- Ci2 | unnamed
- Ci3 | unnamed
- Cin | Native Dog Member
- Cls1 | Seaham Formation
- Cls1m | Mirannie Volcanic Member
- Cw | Waverly Formation
- Cwv | unnamed
- Jv | undifferentiated
- Pgk | Skeletar Formation
- Pgr | Rowan Formation
- Pmb | Branxton Formation
- Pmm | Mulbring Siltstone
- Psl | Wollombi Coal Measure
- Pswj | Denman Formation
- Psws | Saltwater Creek Formation
- Pswv | Archerfield Sandstone
- Qa | undifferentiated
- Rn | Narrabeen Group
- Tv | unnamed
- w | unnamed

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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Geology of the project impact area
Map 1 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.2

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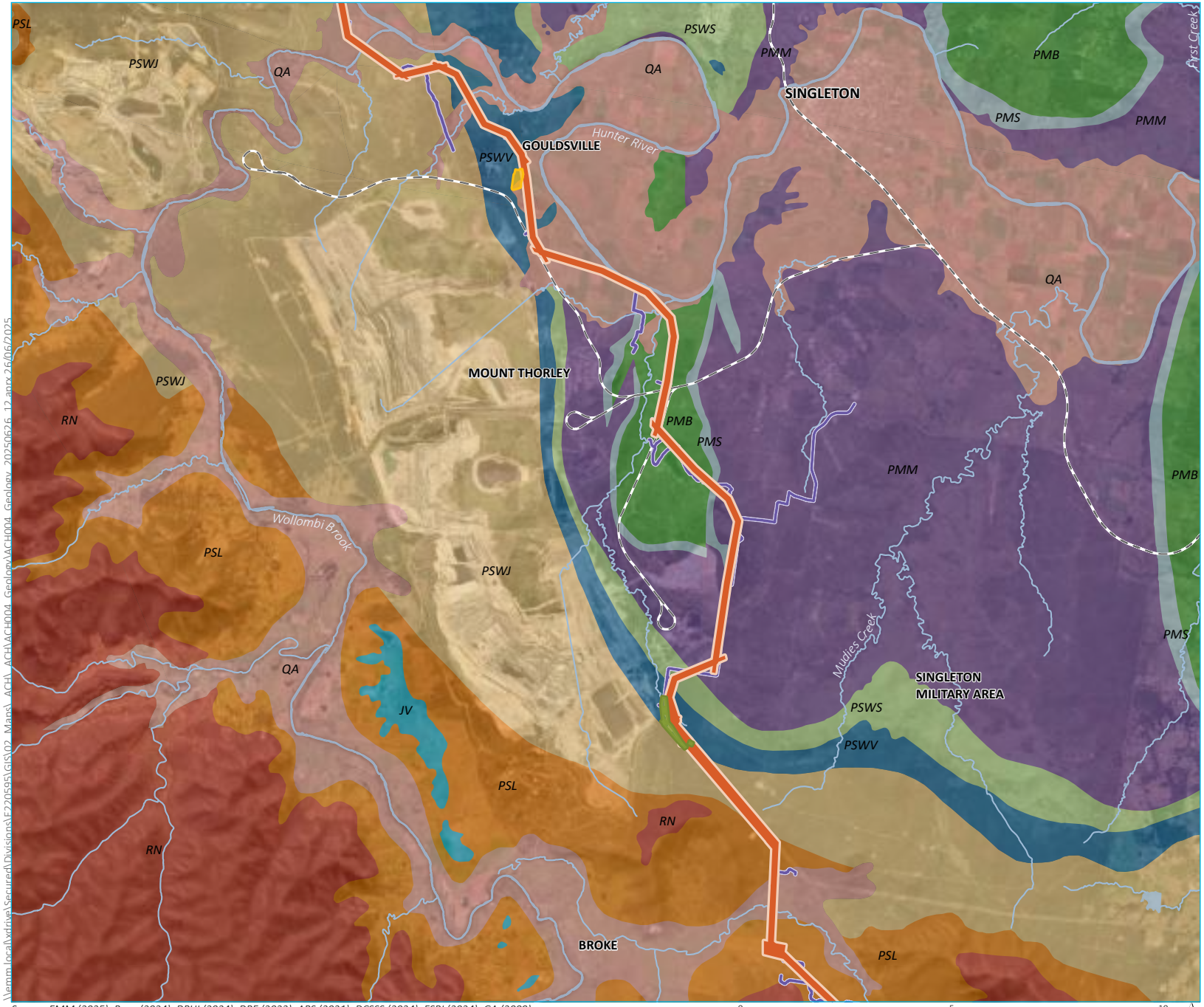

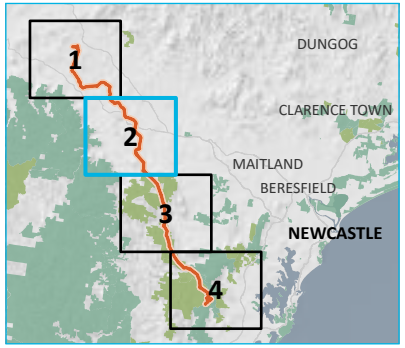

KEY

Project impact area
- HTP corridor
- Construction support site
- Adjustment to existing transmission line (line 81)
- Access track

Geology 250k
- Jv | undifferentiated
- Pmb | Branxton Formation
- Pmm | Mulbring Siltstone
- Pms | Muree Sandstone
- Psl | Wollombi Coal Measure
- Pswj | Denman Formation
- Psws | Saltwater Creek Formation
- Pswv | Archerfield Sandstone
- Qa | undifferentiated
- Rn | Narrabeen Group

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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Geology of the project impact area
Map 2 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.2

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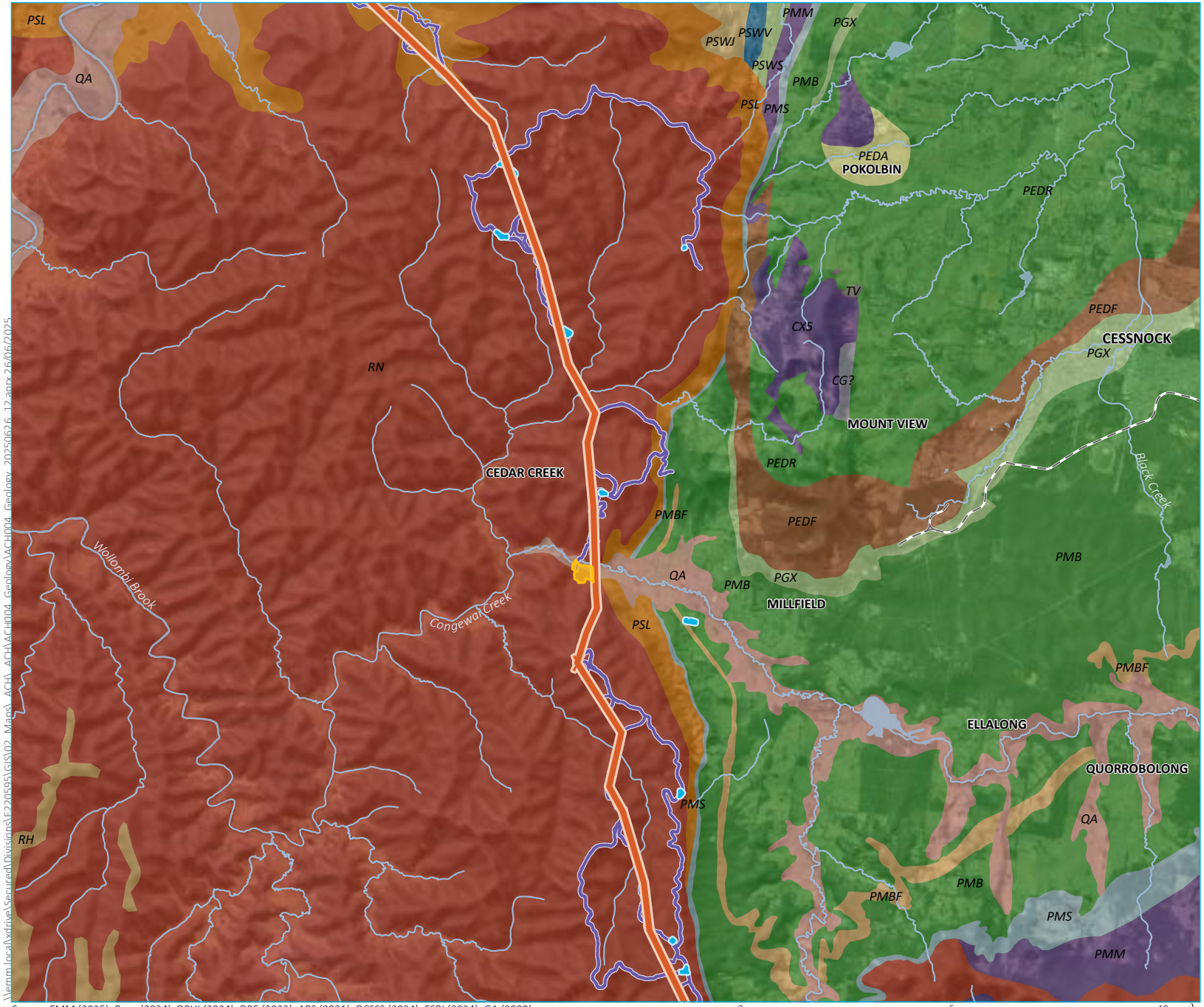

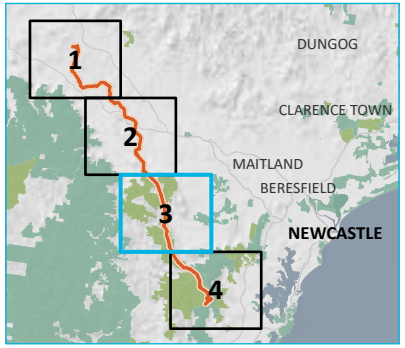

KEY

Project impact area
- HTP corridor
- Construction support site
- Laydown area
- Access track

Geology 250k
- Cg? | undifferentiated
- Cx5 | undifferentiated
- Peda | Allandale Formation
- Pedf | Farley Formation
- Pedr | Rutherford Formation
- Pgx | Greta Coal Measures
- Pmb | Branxton Formation
- Pmbf | Fenestella Shale
- Pmm | Mulbring Siltstone
- Pms | Muree Sandstone
- Psl | Wollombi Coal Measure
- Pswj | Denman Formation
- Psws | Saltwater Creek Formation
- Pswv | Archerfield Sandstone
- Qa | undifferentiated
- Rh | Hawkesbury Sandstone
- Rn | Narrabeen Group
- Tv | unnamed

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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Geology of the project impact area
Map 3 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.2

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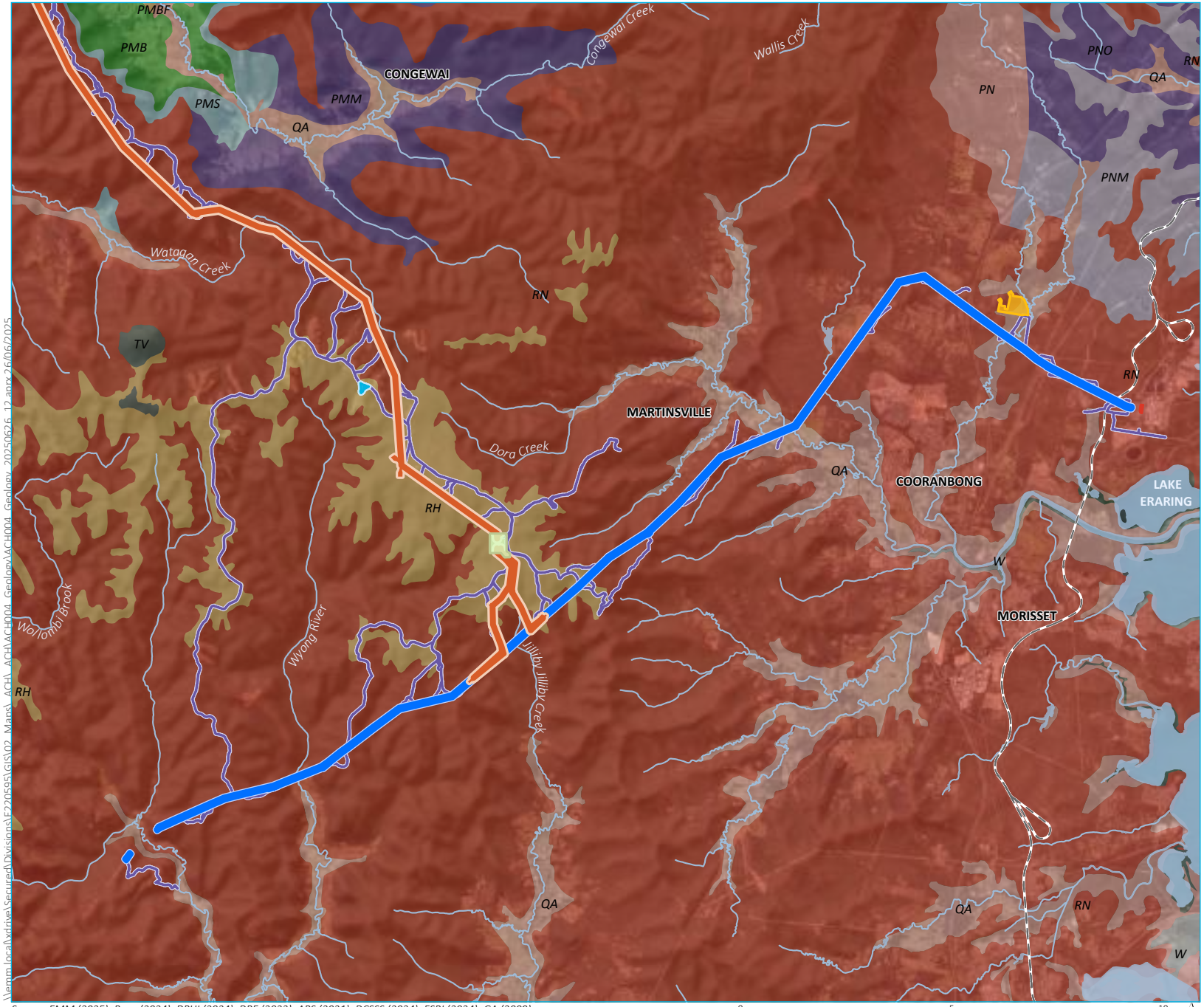

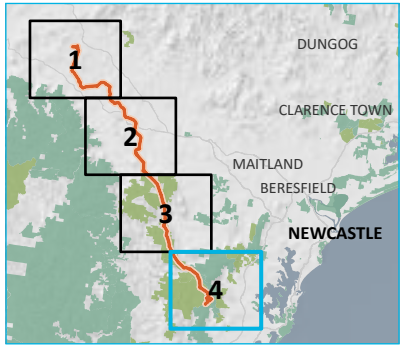

KEY

Project impact area
- HTP corridor
- Olney switching station
- Construction support site
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Geology 250k
- Pmb | Branxton Formation
- Pmbf | Fenestella Shale
- Pmm | Mulbring Siltstone
- Pms | Muree Sandstone
- Pn | Newcastle Coal Measures
- Pnm | Moon Island Beach Subgroup
- Pno | Boolaroo Subgroup
- Qa | undifferentiated
- Rh | Hawkesbury Sandstone
- Rn | Narrabeen Group
- Tv | unnamed
- w | unnamed

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

N

Geology of the project impact area
Map 4 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.2

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5.2.2 Soil landscapes

Soil landscapes and their boundaries provide pre-defined areas that are classified by several geographic features, and which are informative for archaeological investigations. They offer detailed, localised data on landform patterns, soil types, geological features, rock outcrop percentages, land use, and vegetation. This information adds an extra layer for landscape categorisation within predictive models, enhancing what can be derived from basic topographic descriptions. They identify areas that are characterised by erosion or skeletal soils and exposed bedrock versus those that may contain a deeper profile where cultural material may be buried.

The soil landscapes that are summarised in Table 5.3 contribute to a cumulative coverage of around 87% of the project impact area, which is greater than 30 hectares. These are shown on Figure 5.3 (Kovac and Lawrie 1991). The soil landscapes within the ACHA study area share 1 of 2 common topographical features: they are either gently rolling low hills, especially prevalent in the northern and central sections, or marked by steep relief, which are more prominent in the central and southern areas.

Ten of the 13 dominant soil landscapes described in Table 5.3 include low undulating hills cut by drainage channels and account for 52% of the total land within the project impact area. These areas have archaeological potential for surface or sub-surface stone artefacts, grinding grooves (usually near prominent water sources), stone arrangements and quarries where boulders are naturally occurring (e.g. within the Wollombi and Bulga landscapes where Czas silcrete geological units are present). As previously discussed, several soil landscapes have a high potential for deep Pleistocene deposits to be present (Hunter, Wollombi and Hawkesbury landscapes). Within these areas, there is potential for significant sub-surface artefacts to be present as well as human burials.

Within the Watagan, Three Ways and Hawkesbury landscapes, which cumulatively account for around 28% of the project impact area, a prevalence of underlying sandstone geologies results in escarpment and plateau landforms with frequent outcropping. The archaeological implications for this are an increased likelihood of rockshelter (including both habitation and art) sites, as well as grinding groove or quarry sites.

i HTP North

The northern portion of the project impact area is characterised by shallow soil profiles, with cultural materials typically constrained to the upper ~50 centimetres. These depths are often subject to adverse impacts by agricultural and mining activities prevalent throughout the project impact area.

In the northern portion of the project impact area, the majority of the soil landscapes around Liddell, Bayswater, Hunter, Dartbrook, Branxton and Jerrys Plains, are characterised as texture contrast soils. The 2 major groups of texture contrast soils include solonetzic and podzolic soils, which retain a very shallow, generally loamy sand topsoil (A horizon) over older clay subsoils (B2 horizon) (Dean-Jones and Mitchell 1993; Hughes, Spooner and Questiaux 2014). Typically, cultural material in the form of stone artefacts is limited to the topsoil unit, which is commonly <50 centimetres thick. Various studies have suggested that such soils are between 200 and 3000 years in age (Hughes, Spooner and Questiaux 2014), although older cultural material is considered probably present within these soil profiles (Umwelt 2023b). The B2 horizon of duplex soils are identified as having very low archaeological potential as they were formed prior to human occupation of the continent. Based on this, areas that have been subject to development activities >50 centimetres are highly likely to have impacted and/or destroyed cultural materials if present. The excavation of dams and roads, as well as the extensive coal mining activities, will all typically have impacted the soil profile to such depths.

The notable exception to these broader soil characteristics is the identification of sand dunes and sand sheets that fringe the Hunter River and Wollombi Brook (Galloway 1963; Hughes 1984; Hughes, Spooner and Questiaux 2014). As part of Glencore's Hunter Valley Operations mining complex continuation project – through which the project is proposed - a geomorphological study of the site was undertaken to further understand the distribution of the Warkworth sand system (Fluvial Systems 2023):

> The mapped distribution of Warkworth Soil Landscape was limited to the vicinity of the Hunter River and Wollombi Brook between Camberwell and Singleton. In addition to its occurrence as dunes on a meander bend of the Hunter River adjacent to the [Hunter Valley Operations mining complex continuation project impact area], and on a meander bend of Wollombi Brook on the southern extent of the [Hunter Valley Operations mining complex continuation project impact area], there is another distinctive dune deposit on the inside of a large meander of the Hunter River upstream of Singleton. In addition, a small area of Warkworth sand was mapped on the floodplain in the Singleton area. In fact, much of the Singleton area floodplain surface is covered by an extensive NW – SE trending linear dune system. While Warkworth system dunes typically form on high terraces, on the Singleton area floodplain, the low amplitude dunes have developed on the low active floodplain. A small area of Warkworth sand was mapped on the left (western) side of Wollombi Brook... Another somewhat unusual Warkworth sand deposit is mapped east of Wollombi Brook on a ridge up to 60 m higher than the bed of Wollombi Brook.
>
> ...A small area of Warkworth Sand Woodland occurs north of the intersection between the Golden Highway and Long Point Road, and another small area occurs on low hills within the Singleton Military Area.
>
> …it appears that Warkworth sand system occurs in patches confined to the Hunter River and Wollombi Brook extending from the [Hunter Valley Operations mining complex continuation project impact area] to Singleton.

While many of these locales are some distance from the project impact area, there is potential intersection in the southern portions of the Hunter Valley Operations mining complex and around the Hunter River and Wollombi Brook. Figure 5.4 presents the predicted distribution of the Warkworth sand system for the project based on the methods of Fluvial Systems (2023). Landscapes covered by sand dunes or sheets of the Warkworth sand system (also known as source bordering dunes) are one of several geomorphic contexts across the Hunter Valley with potential to contain older cultural materials (Dean-Jones and Mitchell 1993) (see Appendices E.1 and E.2 for further details).

In addition to the Warkworth sand system, Hughes, Spooner and Questiaux (2014) identified the potential for Pleistocene colluvial deposits off the Hunter River in Lemington, labelled as CM-CD1. These were initially identified as part of the proposed Carrington Mine in the 1990s (now part of Hunter Valley Operations) and are situated several hundred metres north of the project impact area. EMM (2022) undertook additional investigation of these deposits as part of the Hunter Valley Operations mining complex continuation project and demonstrated their age to be between 9000 to 13,000 years old. The deposit was shown to be constrained to a narrow ~500 metres x 20 metres landform adjacent a minor tributary and is not considered to extend into the project impact area. Additional geomorphological investigation of these types of deposits was also undertaken as part of the Hunter Valley Operations mining complex continuation project. It concluded that such colluvial deposits were common on 'cut and fill' style rivers, and included parts of the Hunter River, Saddlers Creek, Doyles Creek, Waterfall Creek, Appletree and Saltwater Creek, with some potential along Wollombi Brook, Redbank Creek, Wambo Creek and North Wambo Creek (Fluvial Systems 2023). None of these locales are in close proximity to the project impact area. The project impact area extends immediately south of CM-CD1, by approximately 2.4 kilometres.

Disturbances associated with agricultural land uses (such as grazing and cultivation) and mining across the northern and central zones of the project impact area are prevalent across all soil landscapes and has frequently resulted in extensive vegetation clearance (see *section 5.5*). The archaeological implications of these historic and ongoing landform disturbances are the deleterious effect they can have on more intrusive Aboriginal sites such as culturally modified trees and stone arrangements. Destabilisation of land surfaces as a result of vegetation clearance as well as ongoing cultivation or livestock impacts, is well documented throughout the region to have increased landform susceptibility to erosion. Erosional impacts can contribute to the degradation of surface and subsurface archaeological material, and the movement of cultural objects into secondary contexts.

ii HTP Central and South

The southern portion of the project impact area encompassed by HTP Central and HTP South is mainly dominated by steep sandstone relief.

Soil landscapes throughout the hilly terrain are generally shallow and residual having formed through the diagenesis of the under-lying geological substrate. A typical soil profile within the Watagan soil landscape that covers much of the site, includes a shallow organic loam (A1 horizon) some 10 to 30 centimetres overlying sandy clay loam (B2 horizon). Deeper deposits may be found in gorges and close depressions within the landscape. In this location the geology has greater influence of cultural materials, with the natural formation of overhangs and caves often used by Aboriginal people in the past. Equally, large flat areas of sandstone found on ridgelines and/or in creek bases are known to be used for engravings and/or grinding grooves, respectively.

The southern portion of the project impact area is mainly characterised by shallow soil profiles. However, the steep relief increases the likelihood of caves and overhangs that would have been conducive to past Aboriginal use and occupation. Extensive flat sandstone areas on ridgelines and/or creek beds are also prevalent and are conducive to engravings and/or grinding grooves, respectively.

iii Geotechnical investigations

Geotechnical investigations were undertaken as part of the project to inform the soil and geological units in the project impact area (see Figure 5.5; Appendix C.1). Overall, around 96 bore-holes were undertaken along the project impact area and focusing on the potential tower locations.

While there is some variation, the program largely conforms with the broader soil landscape mapping presented in preceding sections. The majority of geotechnical bore-logs indicate shallow residual soil profiles generally under various levels of fill, ranging from 10 to 250 centimetres. A topsoil unit between 10 to 40 centimetres thick is found across most bore-logs, and within which cultural material would be found if present.

Several of the bore-logs indicate the presence of alluvial or sandy soils (see Appendix C.1). These include BHB05-ABE adjacent to Congewai Creek; BHA20-BB, BHA23-BB, and BHA24-BB adjacent to the Hunter River at Gouldsville; BHA28-BB and BHA-28.2BB east of Broke Road near Mount Thorley; and BHB215 near Oakley Road and Monkey Place Creek. It is noted that several of these locations are disturbed by mining and/or urban activities. None of the descriptions appear consistent with the Warkworth sand system, but to date no geotechnical activities have occurred in locales where it is predicted to occur.

None of the boreholes indicated any evidence of colluvial deposits similar to CM-CD1 based on the descriptions. A deep colluvial unit is noted in BHB10-ABE; however, this borehole is in the Watagan State Forest and some distance from the ‘cut and fill’ style rivers along which Pleistocene colluvium is predicted (Fluvial Systems 2023).

Table 5.3 Major soil landscapes within the project impact area (Kovac and Lawrie 1991)

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Watagan (wn), colluvial	505.3	21.5	Steep to very steep hills with elevations from 160–465 m. Drainage lines occur every 600–1000 m. Rock outcrops mainly confined to ridge margins.	Landforms elements affected include drainage lines, rockshelters, overhangs, plateaus as well as low, mid and upper slopes.	Slope 30–70% Plateau slope 0–15% Relief 100–170 m	Narrabeen Group Parent rock: quartz sandstone, small areas of lithic sandstone, claystone and siltstone	The main soils are podzolic soils on slopes and earths at lower elevations. Podzolic: • Topsoil: Loamy sand to a sandy clay loam to a depth of 15 cm • Subsoil: Clear change to sandy clay Earths: • Topsoil: Sandy clay loam to a depth of 55 cm • Subsoil: Gradual change to sandy clay loam Minor sheet erosion in areas associated with clearing activities.	Potential for rockshelters, overhangs, rock art, grinding grooves, surface stone artefacts. Subsurface potential on lower elevations.

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Hunter (hu)	204.6	8.7	Landscape covers the floodplains of the Hunter River and associated tributaries including level plains and river terraces.	Landform elements affected include drainage lines, major rivers and alluvial terraces.	Slope is very gently inclined (0–3%) Relief is very low to low (20–60 m)	Quaternary alluvium	The main soils are all formed in alluvium. They include earths on tributary flats and terraces, and alluvial soils on levees and river flats. Earths: • Topsoil: Clay loam with moderate structure; depth to 30 cm • Subsoil: Gradual change to medium clay with strong structure Alluvial soils: • Topsoil: Fine sandy loam; depth to 50 cm • Subsoil: Gradual change to clayey sand to sandy clay loam with weak structure Minor stream bank erosion occurs on watercourses and gully erosion on adjacent terraces. Aggrading landscape.	High potential for older deposits in Quaternary alluvium. Potential for surface and subsurface stone artefacts, grinding grooves and stone arrangements.

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Three Ways (BPtw)	229.4	9.8	Rugged rolling to very steep hills with sandstone cliffs and rounded summits. Drainage lines run mainly south to east at intervals of 400–1000 m.	Landform elements affected include drainage lines, rockshelters, overhangs, plateaus as well as low, mid and upper slopes.	Slopes range from moderately inclined to very steep (25–75%) Relief is high to very high (100–220 m)	Narrabeen Group Parent rock: sandstone with small quantities of shale	The main soils are podzolic soils on midslopes and crests with earths, sands and soils on the flats. Podzolic: • Topsoil: Sandy loam with weak structure to a general depth of 40 cm • Subsoil: Sharp change to medium clay with a strong structure Earths/sands/soils: • Topsoil: loamy sand to find sandy loam to a depth between 70–100 cm • Subsoil: Gradual change to clayey sand Minor to moderate sheet erosion where the surface was disturbed from logging activities. Moderate gully and hill erosion in some areas.	Potential for rockshelters, rock art, grinding grooves, surface and subsurface stone artefacts. Potential for somewhat deeply buried deposits on flats.
Liddell (SHld)	226.9	9.7	Undulating low hills with higher crests ranging in elevation from 140–220 m.	Landforms elements affected include drainage lines, upper slopes and mid slopes.	Slope 4–7% Relief 6–120 m	Singleton Coal Measures Parent rock: sandstone, shale, mudstone, conglomerate and siltstone	The main soils are solodic soils on slopes. • Topsoil: Loamy sand to sandy loam to a depth of 25 cm • Subsoil: Clear change to sandy clay with weak or strong structure Minor sheet and gully erosion, some areas of severe gully erosion.	Potential for surface and (shallowly buried) subsurface stone artefacts, grinding grooves and stone arrangements.

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Branxton (YPbx)	223.7	9.5	Undulating rises to low hills and creek flats. Elevations range from 50–80 m above sea level. Drainage lines 400–1500 m apart.	Landform elements affected include drainage lines, low hills and creek flats.	Slopes are gently inclined (3–5%) Relief is very low to low (10–40 m)	Muree Sandstone, Branxton Formation and Singleton Coal Measures Parent rock: mudstone, siltstone, shale, tuff, coal, conglomerate and limestone	The main soils are podzolic soils on midslopes and crests, and soloths on lower slopes and in drainage lines. Podzolic: • Topsoil: Sandy loam with weak structure with a depth to 25 cm • Subsoil: Sharp change to light medium clay with strong structure Soloths: • Topsoil: Loamy sand with weak structure to a depth of 25 cm • Subsoil: Sharp or clear change to light medium clay with strong structure Tunnel and gully erosion in the soloths due to their high dispersibility. Little erosion associated with the alluvial soils and siliceous sands. Some salt scalds in the soloths.	Potential for surface and (shallowly buried) subsurface stone artefacts, grinding grooves and stone arrangements.

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Rothbury (ro)	133.8	5.7	Undulating rolling hills with elevations from 60–140 m. Drainage lines are common throughout the area and occur at intervals of 200–1000 m.	Landform elements affected include drainage lines and lower slopes.	Slopes are gently inclined (6–10%) Relief is low (60–80 m)	Singleton Coal Measures, Rutherford Formation, Farley Formation, Branxton Formation, Mulbring Siltstone and Muree Sandstone Parent rock: sandstone, mudstone, siltstone, shale, tuff, conglomerate, limestone and coal	Fine sandy loam to clay loam topsoil extending to 20–30 cm overlying medium clay on upper and mid slopes. Loamy sand and sandy loam becoming sandy clay loam topsoil extending 15–25 m overlying medium clay on lower slopes. Silt loam becoming silty clay loam to 20 cm overlying light clay in drainage lines. Grazing and mining land use. Minor sheet erosion with moderate sheet and gully erosion on lower slopes.	Potential for surface and subsurface stone artefacts, quarries and stone arrangements.
Sydney Town (st), erosional	146.4	6.2	Undulating low hills with broad crests roughly 100–300 m wide with narrow drainage lines exposing sandstone benches.	Landform elements affected include drainage lines, lower slopes and upper slopes.	Slope 5–25% Relief 0–80 m	Hawkesbury Sandstone and Narrabeen Group Parent rock: quartz sandstone, shale, siltstone and claystone	The main soils are mainly podzolic. • Topsoil: Loose sandy loam to a depth of 50 cm • Subsoil: Clear change to clayey sand to sandy clay loam Moderate to severe sheet erosion where vegetation has been cleared.	Potential for grinding grooves, surface and subsurface stone artefacts.

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Jerrys Plains (jp)	140.5	6.0	Undulating low hills ranging in elevation from 80–180 m with numerous small drainage lines flowing to the north and east at intervals of 200–1100 m.	Landform elements affected include drainage lines, lower and upper slopes.	Slope is very gently to gently inclined (2–10%) Relief is low (60 m)	Wittingham Coal Measures Parent rock: lithic sandstone, mudstone, some siltstone lenses and polymictic conglomerates	The main soils are soloths on crests to midslopes with solodic soils on the lower slopes and drainage depressions. Soloths: • Topsoil: Hard setting fine sandy loam to loam to a depth of 20 cm • Subsoil: Sharp change to medium clay with strong structure Solodic: • Topsoil: Silt loam to sandy loam to a depth of 25 cm • Subsoil: Sharp change to sandy clay or medium clay with strong structure Severe gully erosion in some drainage lines with occasional salt scalds. Minor sheet erosion in some disturbed areas on hillslopes.	Potential for surface and subsurface stone artefacts, grinding grooves and stone arrangements.

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Doyalson (do), erosional	80.7	3.4	Gently undulating rises on the central coast lowlands. Broad crests and ridges and long gently inclined slopes. Drainage lines are broad.	Landform elements affected include crests, ridges, gently inclined slopes, drainage lines.	Slopes are level to gently inclined (<10%) Relief is very low (30 m)	Munmorah Conglomerate Formation comprising conglomerate, pebbly sandstone, grey green and grey siltstone and claystone and small areas of quartz sandstone Rock outcrop is usually absent	Loamy sand reaching depths of 10–20 cm overlying hardsetting clayey sand to medium clay. Urban residential with some areas of grazing and uncleared bushland prevalent across the landscape. No erosion is noted.	Potential for surface stone artefacts.
Bayswater (bz)	87.1	3.7	Undulating low hills with elevation ranging from 140–220 m. Drainage lines occur at 700–1000 m intervals.	Landform elements affected include drainage lines, lower and upper slopes.	Slope is gently inclined (3–10%) Relief is low (40–60 m)	Singleton Coal Measures Parent rock: sandstone, shale, mudstone, conglomerate and coal	The main soils are solodic soils on slopes with alluvial soils in drainage lines. Solodic soils: • Topsoil: Fine sandy loam with weak structure to a depth of 20 cm • Subsoil: Clear change to medium clay with strong structure Alluvial: • Topsoil: Single-grained loamy sand to sandy clay Moderate sheet and gully erosion common on slopes. Salt scalds common in some areas.	Potential for surface and subsurface stone artefacts, grinding grooves and stone arrangements.

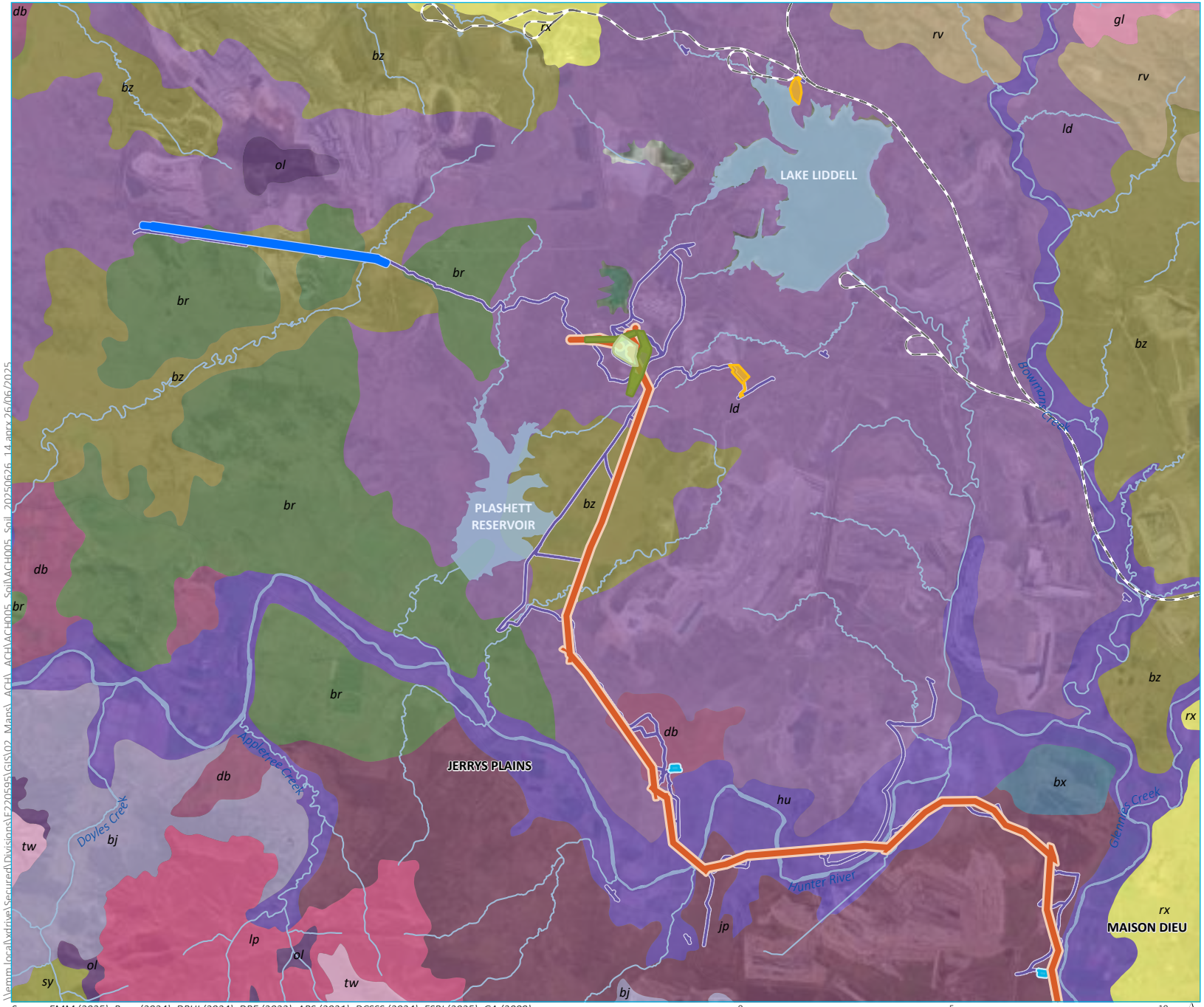
Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Bulga (bu)	73.3	3.1	Smooth slopes forming undulating rises with elevations from 80–160 m. Drainage lines are at 200–500 m intervals.	Landform elements affected include drainage lines, lower and upper slopes.	Slope is level to gently inclined (0–10%) Relief is very low to low (20–40 m)	Narrabeen Group and Singleton Coal Measures Parent rock: sandstone, conglomerate, red and green claystone, shale, mudstone and coal	Sandy loam to light sandy clay loam to depths of 40 cm overlying sandy clay loam or sandy to medium clay. Sandy loam depth to 30 cm overlying sandy clay on upper to mid slopes. On lower slopes, sandy loam to 20 cm overlying sandy clay loam to clayey sand. Much of the landscape has been cleared for grazing with minor to moderate sheet erosion common and recently disturbed areas showing minor rilling.	Potential for surface and subsurface stone artefacts, quarries, grinding grooves and stone arrangements.

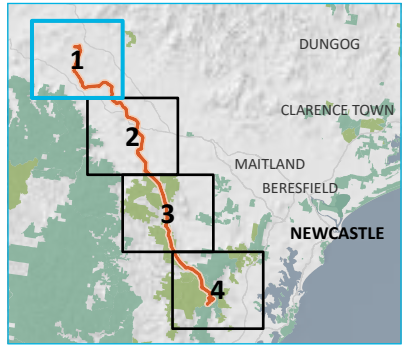
Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Hawkesbury (ha), colluvial	54.2	2.3	Rolling to very steep hills ranging in elevation from 180–300 m with narrow ridges that feature steep sided valleys and horizontal rock benches.	Landforms elements affected include drainage lines, rockshelters, overhangs, as well as low, mid and upper slopes.	Slope is moderately inclined to very steep (20–70%) Relief is high (120–150 m)	Hawkesbury Sandstone Parent rock: quartz and quartz-lithic sandstone, shale and siltstone	The main soils are podzolic on the upper slopes, earthy sands on the mid-slope and sands on lower slopes to the flat. Podzolic: • Topsoil: Loamy sand to a depth of 15 cm • Subsoil: Clear change to a sandy clay loam with a weak structure Earths: • Topsoil: Sandy loam to a depth of 50 cm • Subsoil: Gradual change to light sandy clay loam Sands: • Topsoil: Loamy sand to a depth of 70 cm • Subsoil: Gravel Minor sheet erosion where surface disturbance has occurred.	Potential for surface and subsurface stone artefacts, rock art, grinding grooves and stone arrangements.

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Erina (er), erosional	31.6	1.3	Rolling to hills to moderately steep footslopes ranging in elevation along the ridges and crests from 100–300 m.	Landform elements affected include drainage lines, lower and upper slopes.	Slope is moderately inclined (<25%) Relief is low (<60 m)	Terrigal Formation, Narrabeen Group Parent rock: sandstone and conglomerate	The main soils are deep coarse sands on the footslope, and podzolic on the lower slopes. Coarse sands: • Topsoil: Sandy loam to a depth of <15 cm • Subsoil: Clear change to clay to a depth of >100 cm Podzolic: • Topsoil: Loamy sand to a depth of 40 cm • Subsoil: Clear change to a sandy clay loam with a weak structure to a depth of >200 cm	Potential for surface and subsurface stone artefacts, grinding grooves and stone arrangements.
Dartbrook (db)	39.0	1.7	Undulating rises and low hills with elevation ranges of 100–140 m and 200–260 m. Drainage lines occur at intervals of 400–600 m, with some to 1000 m. Some of this landscape is made up of old gravel terrace remnants by the Hunter River.	Landform elements affected include drainage lines, lower and upper slopes.	Slope is level to gently inclined (0–10%) Relief is low (30–80 m)	Singleton Coal Measures Parent Rock: calcareous shale and sandstone with some alluvial sediments	The main soils are clays on slopes and prairie soils on alluvial flats. Clays: • Topsoil: Light clay with strong structure to a depth of 15–45 cm • Subsoil: Gradual or clear change to light to medium clay with strong structure Prairie Soils: • Topsoil: Clayey sand to a depth of 15 cm • Subsoil: Gradual change to silty clay loam with strong structure Minor to moderate sheet erosion on some hillslopes.	Potential for surface and subsurface stone artefacts, grinding grooves and stone arrangements.

Soil landscape and type (where available)	Cumulative coverage within the project impact area[1]		Landform pattern and hydrology	Landform elements	Slope and relief	Geology	Soil summary	Implications for cultural heritage
	(Ha)	(%)						
Wollombi (wo), alluvial	32.2	1.4	Valley flats and undulating rises of the Wollombi Brook and its tributaries. Valley flats and levees of low relief where the river has incised through steeper Narrabeen Sandstone terrain, the width of the landscape is about 600 m, increasing to 2000 m or more at Broke and Bulga. Elevation from 60–140 m, decreasing toward Warkworth.	Landform elements affected include valley flats, major rivers and associated drainage lines.	Slope is level to very gently inclined (0–3%) Relief is extremely low to very low (0–20 m)	Narrabeen Group and Quaternary alluvium Parent rock: sandstone and conglomerate	Loamy sand and fine sandy loam to depths of 80 cm, overlying older sandy clay to medium clay. Grazing and vegetation clearance present in this landscape. Moderate stream bank erosion along watercourses.	High potential for older deposits in Quaternary alluvium. Potential for surface and subsurface stone artefacts, quarries, grinding grooves and stone arrangements.

Notes: * Excludes soil landscapes with <30 hectares inside the project impact area including Aberdare, Brays Hill, Quorrobolong, Laguna, Wyong, Mandalong, Ogilvie Awaba, Mount View, Pokolbin, Sandy Hollow and Yarramalong.





KEY

Project impact area
- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Soil landscape
- Bj | Benjang
- Br | Brays Hill
- Bx | Branxton
- Bz | Bayswater
- Db | Dartbrook
- Gl | Greenland
- Hu | Hunter
- Jp | Jerrys Plains
- Ld | Liddell
- Lp | Lees Pinch
- Ol | Ogilvie
- Rv | Rosevale
- Rx | Roxburgh
- Sy | Sandy Hollow
- Tw | Three Ways

Existing environment
- Rail line
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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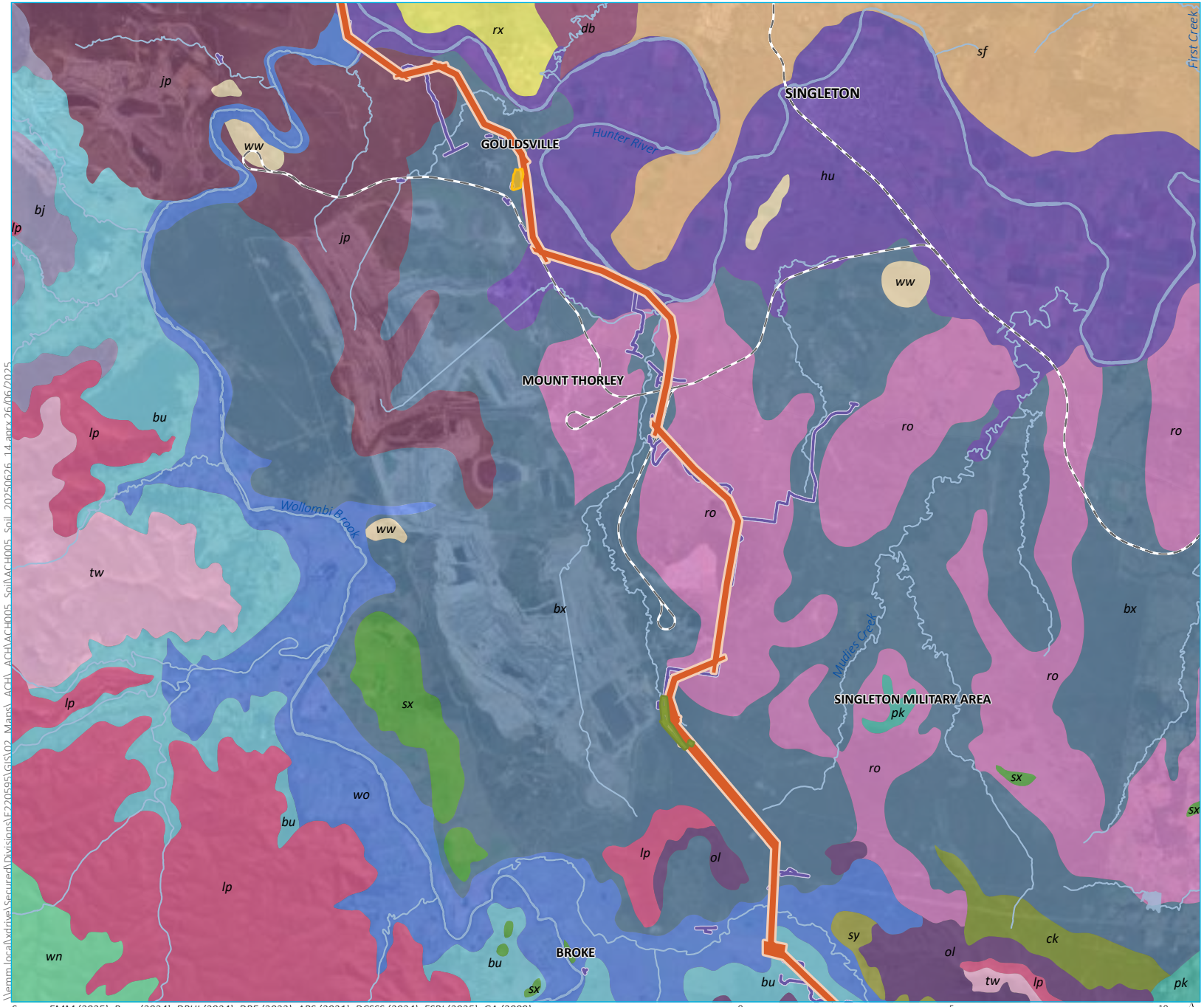
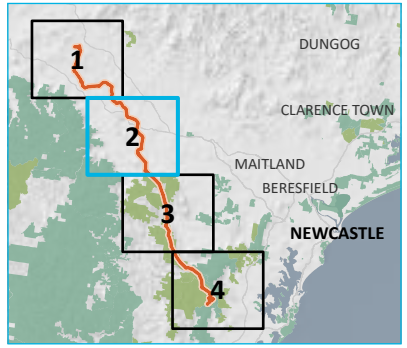
Soil landscapes of the project impact area
Map 1 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.3

EMM
creating opportunities





KEY

Project impact area
- HTP corridor
- Construction support site
- Adjustment to existing transmission line (line 81)
- Access track

Soil landscape
- Bj | Benjang
- Bu | Bulga
- Bx | Branxton
- Ck | Castle Rock
- Db | Dartbrook
- Hu | Hunter
- Jp | Jerrys Plains
- Lp | Lees Pinch
- Ol | Ogilvie
- Pk | Pokolbin
- Ro | Rothbury
- Rx | Roxburgh
- Sf | Sedgefield
- Sx | Saxonvale
- Sy | Sandy Hollow
- Tw | Three Ways
- Wn | Watagan
- Wo | Wollombi
- Ww | Warkworth

Existing environment
- Rail line
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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Soil landscapes of the project impact area
Map 2 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.3

EMM
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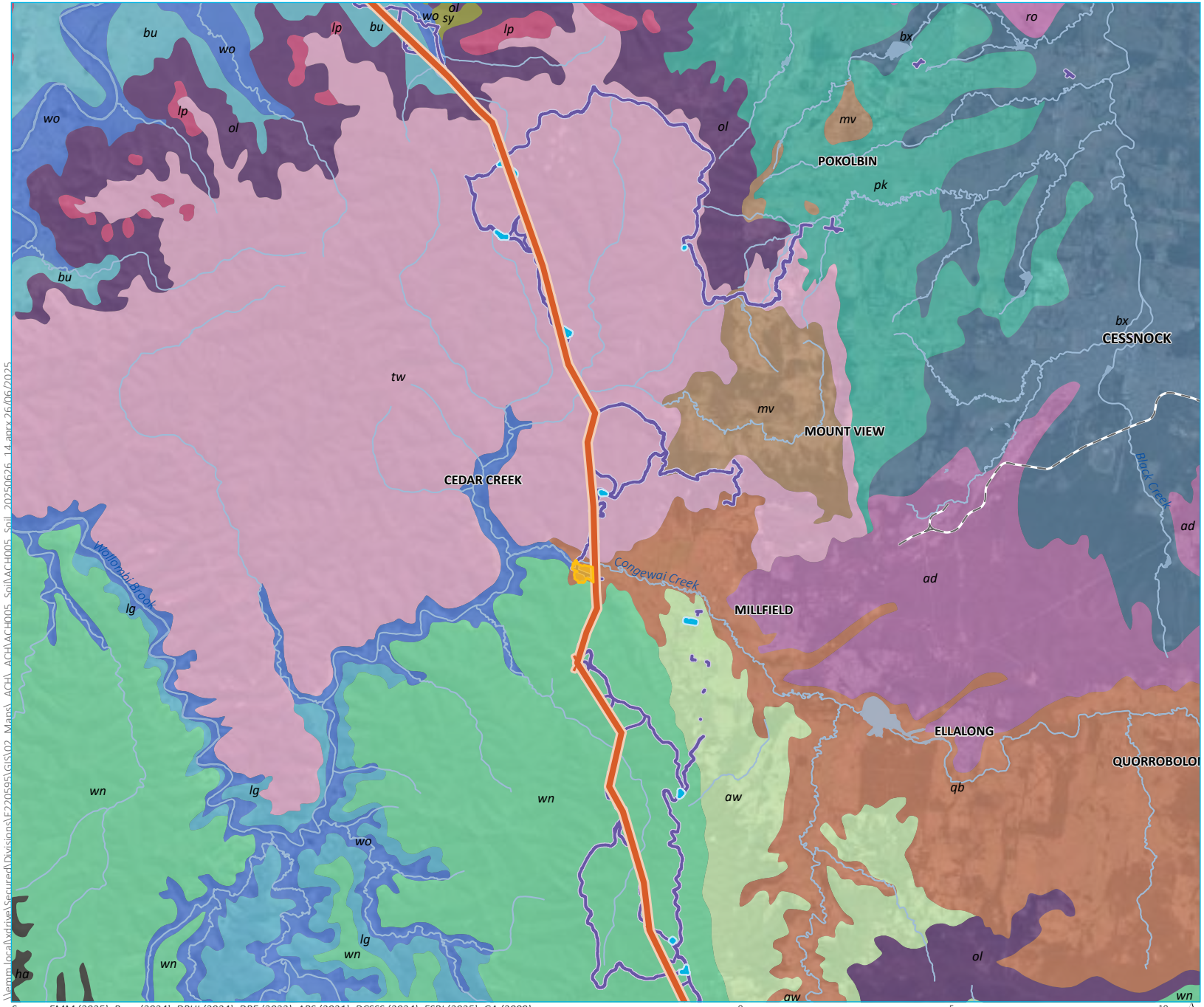

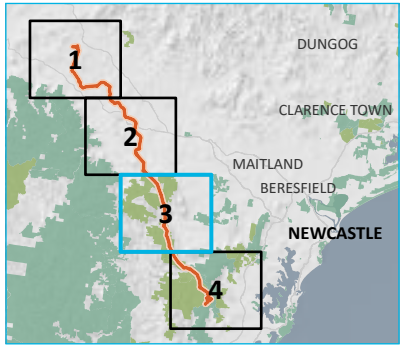

KEY

Project impact area
- HTP corridor
- Construction support site
- Laydown area
- Access track

Soil landscape
- Ad | Aberdare
- Aw | Awaba
- Bu | Bulga
- Bx | Branxton
- Ha | Hawkesbury
- Lg | Laguna
- Lp | Lees Pinch
- Mv | Mount View
- Ol | Ogilvie
- Pk | Pokolbin
- Qb | Quarrabolong
- Ro | Rothbury
- Sx | Saxonvale
- Sy | Sandy Hollow
- Tw | Three Ways
- Wn | Watagan
- Wo | Wollombi

Existing environment
- Rail line
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

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Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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Soil landscapes of the project impact area
Map 3 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.3

EMM
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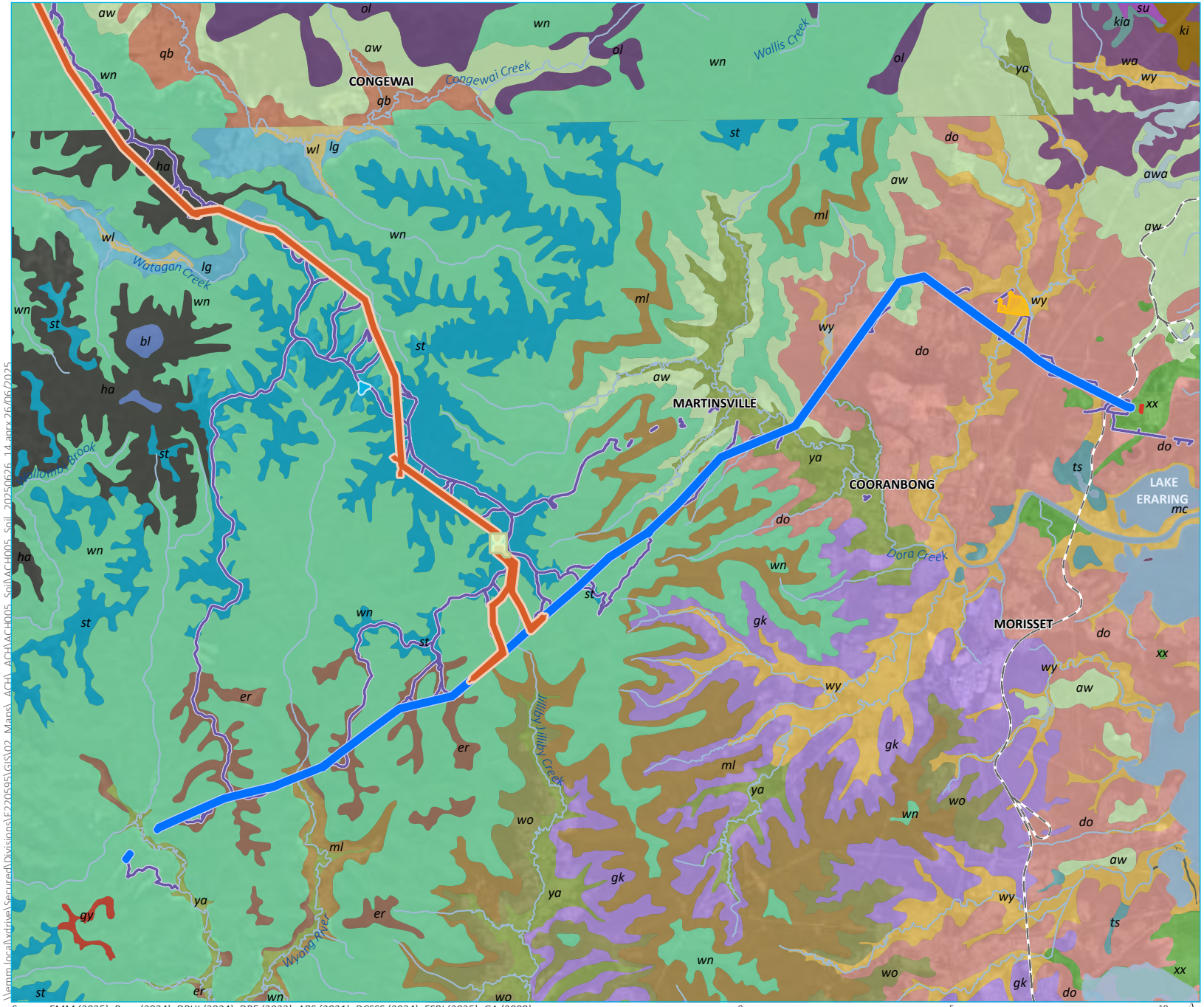

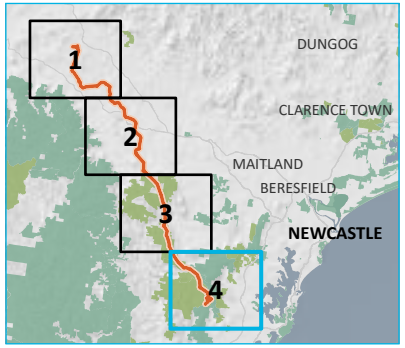

KEY

Project impact area
- HTP corridor
- Olney switching station
- Construction support site
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Soil landscape
- Aw | Awaba
- Awa | Awaba Variant A
- Bl | Bar Lookout
- Do | Doyalson
- Er | Erina
- Gk | Gorokan
- Gy | Gymea
- Ha | Hawkesbury
- Ki | Killingworth
- Kia | Killingworth Variant A
- Lg | Laguna
- Mc | Mangrove Creek
- Ml | Mandalong
- Ol | Ogilvie
- Qb | Quarrabolong
- St | Sydney Town
- Su | Sugarloaf
- Ts | Tacoma Swamp
- Wa | Warners Bay
- Wl | Wollombi Brook
- Wn | Watagan
- Wo | Woodburys Bridge
- Wy | Wyong
- Xx | Disturbed Terrain
- Ya | Yarramalong

Existing environment
- Rail line
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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Soil landscapes of the project impact area
Map 4 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.3

EMM
creating opportunities

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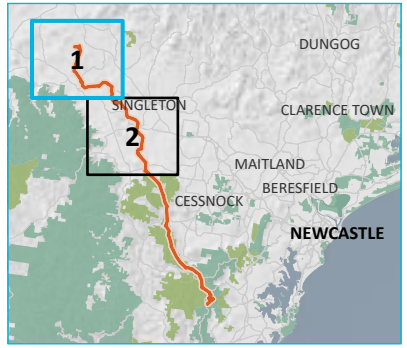

KEY

- Potential Warkworth Sand (Gippel 2023)
- Potential Warkworth Sand (Umwelt 2023)

Project impact area

- HTP corridor
- Switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line
- Upgrades to existing transmission line
- Access track

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009); DRNSW (2020); Umwelt (2023)

0 5 10 km

GDA2020 MGA Zone 56

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Predicted distribution of the Warkworth sand system within and/or near the project impact area Map 1 of 2

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.4

EMM creating opportunities

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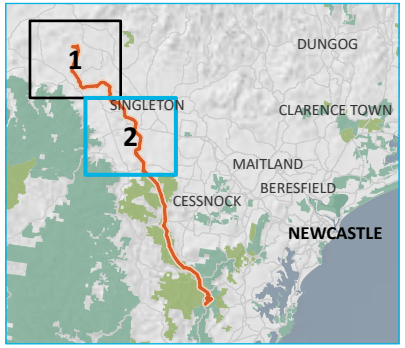

KEY

- Potential Warkworth Sand (Gippel 2023)
- Potential Warkworth Sand (Umwelt 2023)

Project impact area

- HTP corridor
- Construction support site
- Adjustment to existing transmission line
- Access track

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Predicted distribution of the Warkworth sand system within and/or near the project impact area
Map 2 of 2

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.4

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009); DRNSW (2020); Umwelt (2023)

0 5 10 km

GDA2020 MGA Zone 56

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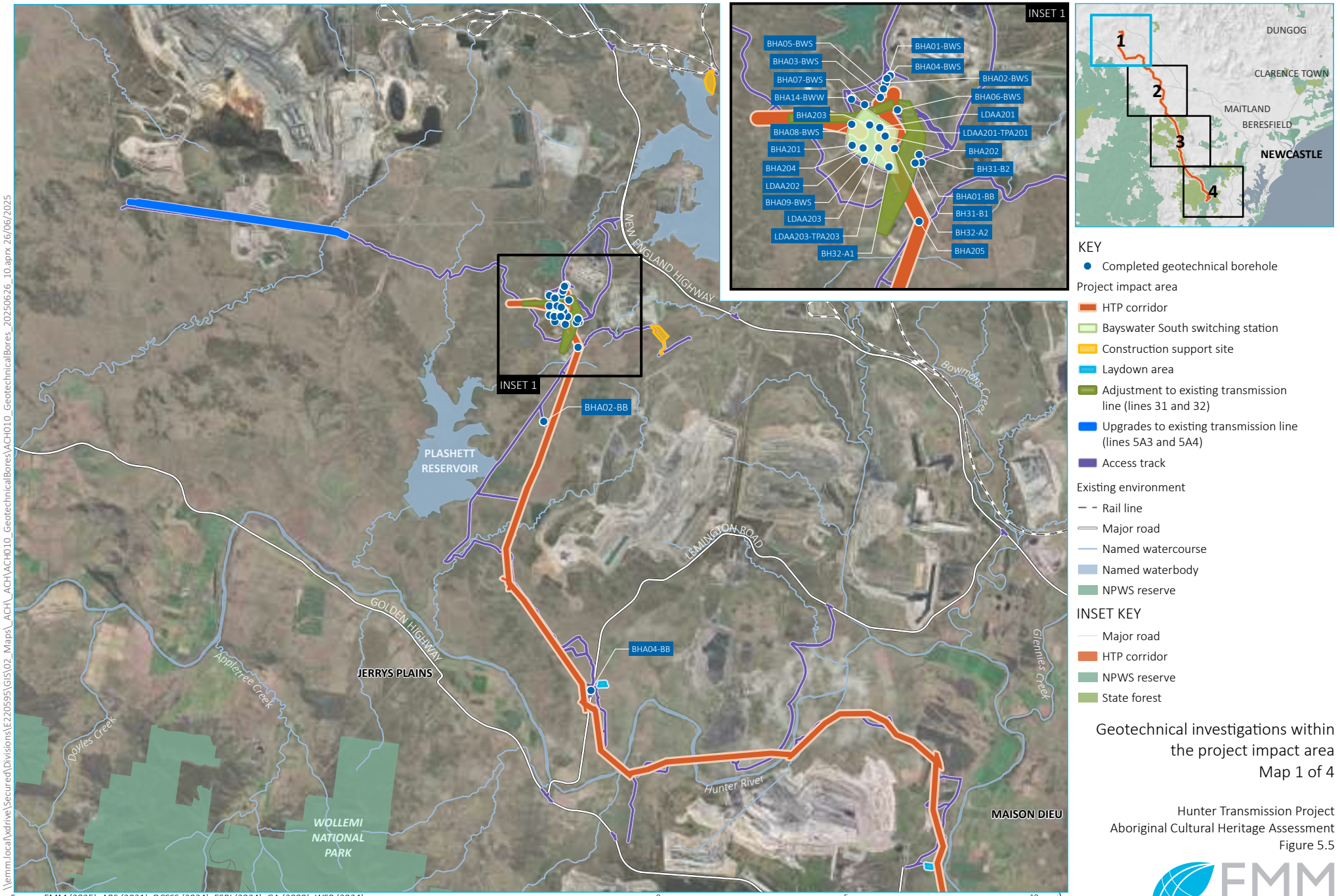
creating opportunities



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Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009); WSP (2024)

0 5 10 km

GDA2020 MGA Zone 56

N

KEY

- Completed geotechnical borehole

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

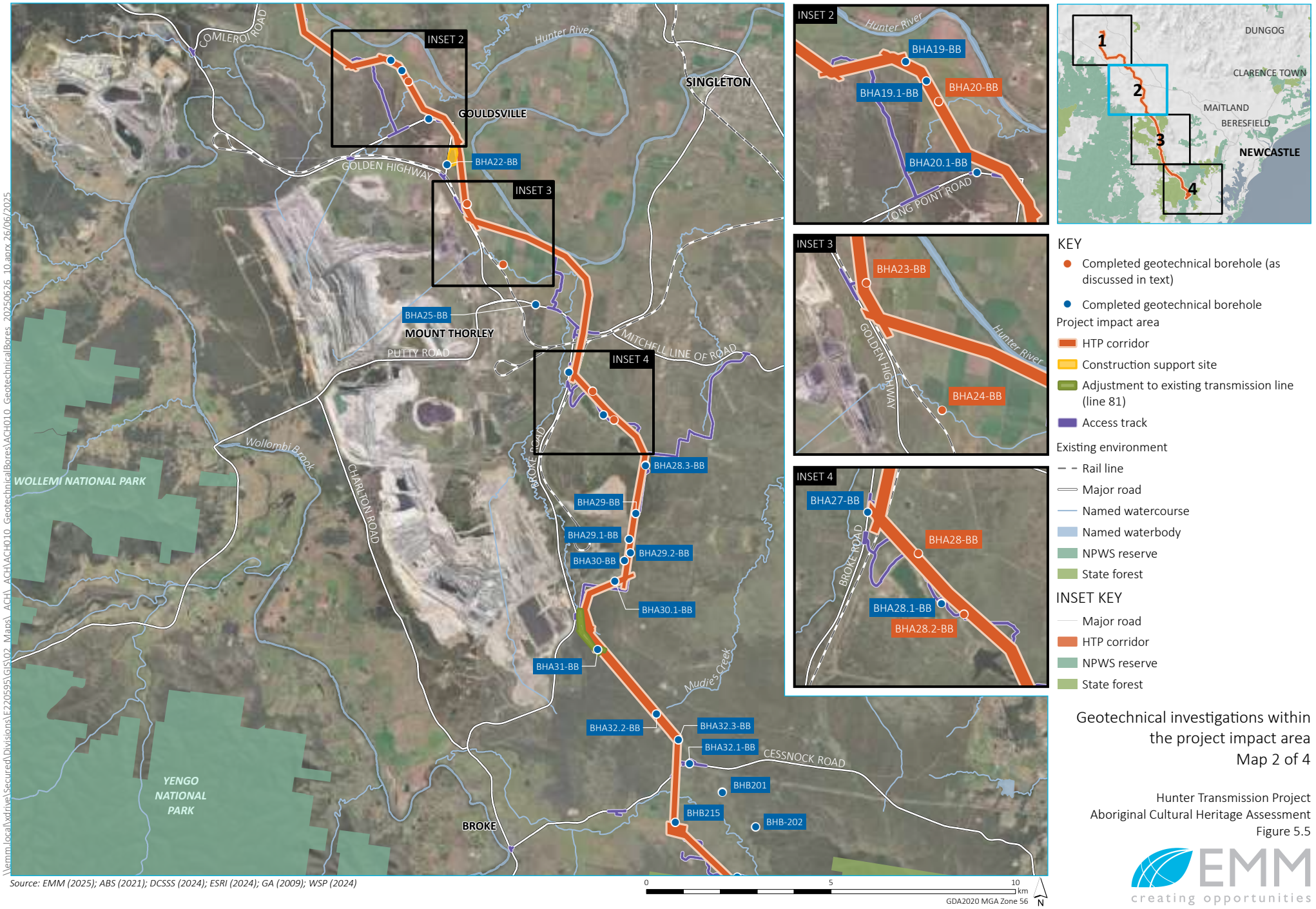
INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Geotechnical investigations within the project impact area
Map 1 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.5

EMM
creating opportunities



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Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009); WSP (2024)

KEY

- Completed geotechnical borehole (as discussed in text)
- Completed geotechnical borehole

Project impact area

- HTP corridor
- Construction support site
- Adjustment to existing transmission line (line 81)
- Access track

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

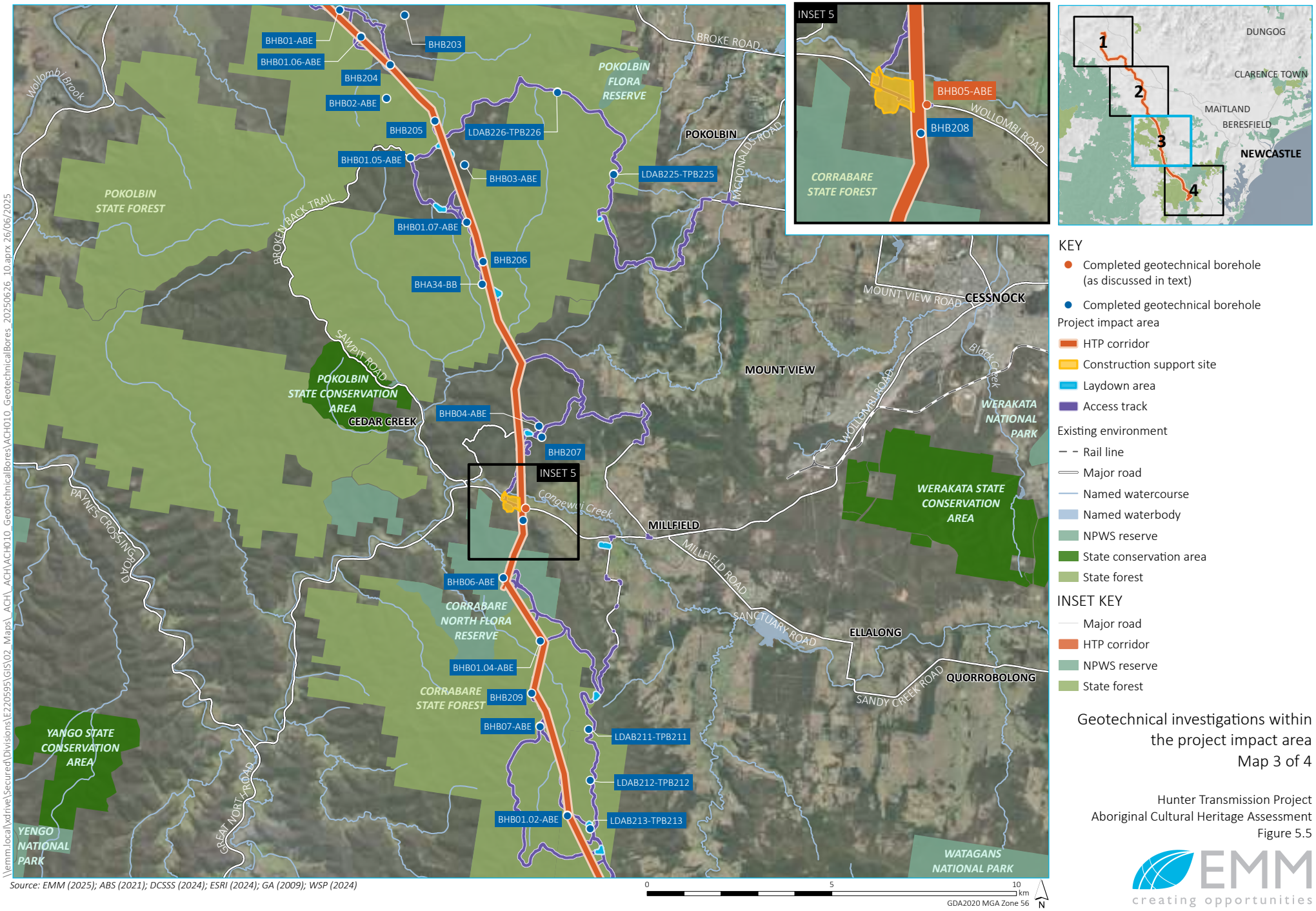
INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Geotechnical investigations within the project impact area
Map 2 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.5

EMM
creating opportunities



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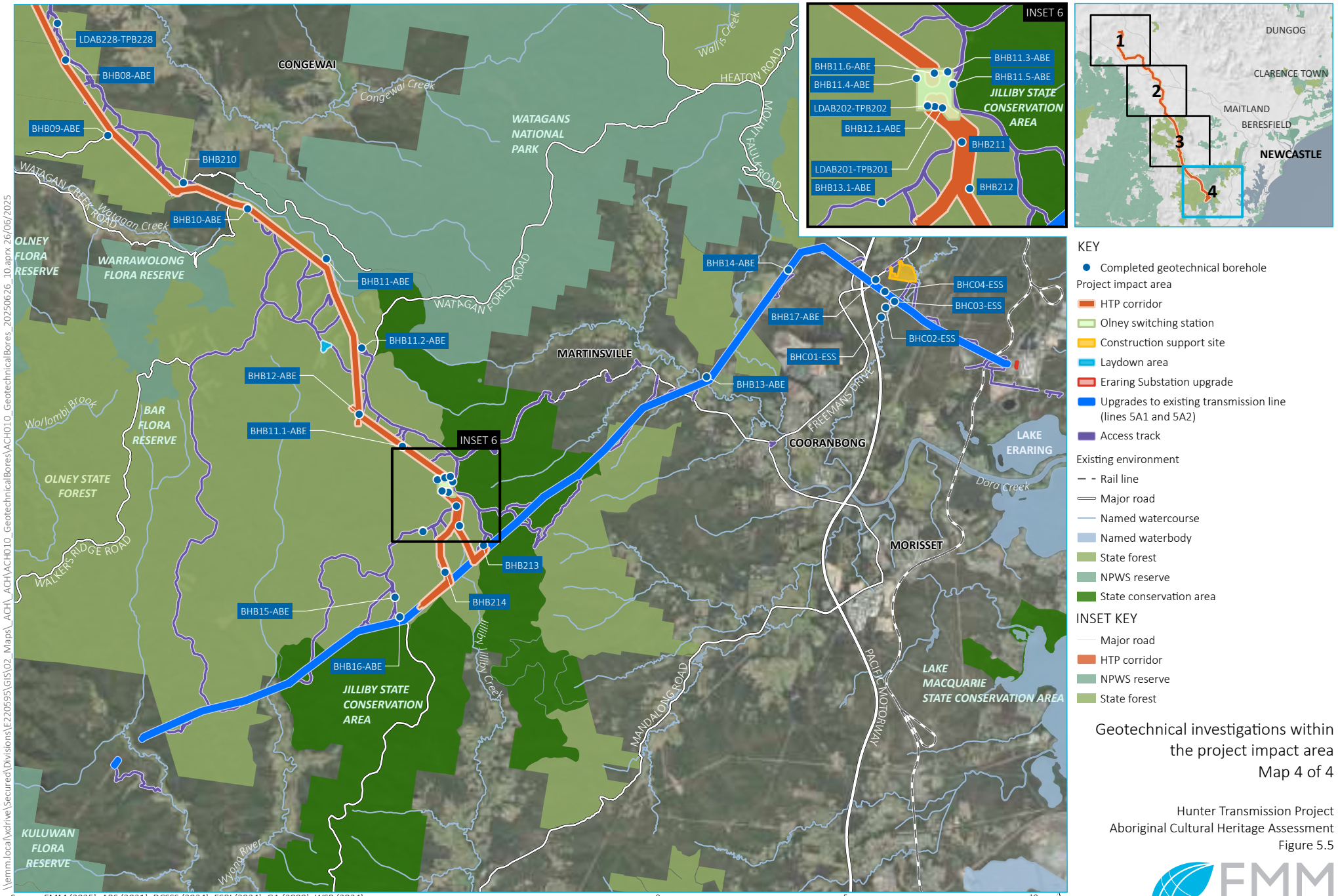
Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009); WSP (2024)

Geotechnical investigations within the project impact area
Map 3 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.5

EMM
creating opportunities



KEY

- Completed geotechnical borehole

Project impact area

- HTP corridor
- Olney switching station
- Construction support site
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- State forest
- NPWS reserve
- State conservation area

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Geotechnical investigations within the project impact area
Map 4 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.5

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009); WSP (2024)

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creating opportunities

5.3 Hydrology

Hydrological features are the most likely to indicate areas of higher archaeological potential within the ACHA study area. Access to water and the natural resources associated with it would have influenced how Aboriginal people occupied the land and used the resources in the locations near watercourses. Landforms in close proximity to major and/or perennial watercourses would have supported prolonged habitation and hence more substantial archaeological material. This is corroborated by previous archaeological works in the area and ethnographic accounts of the area (see Appendices E.1 and E.2).

Watercourses, aggregated by Strahler stream order, and the number of occurrences within the project impact area are listed in Table 5.4 and shown on Figure 5.6. There are 45 occurrences of named watercourses (3rd order and above) intersecting with the project impact area. The project impact area interacts and/or is in close proximity with the two major watercourses for the region, the Hunter River and Wollombi Brook, as well as significant local watercourses, such as Loder Creek, Jigadee Creek, Cedar Creek, Congewai Creek, Lords Creek, Dora Creek, Deep Creek and Monkey Place Creek. Terraces, sand deposits (associated with the Warkworth sandy system) and flats associated with these major watercourses may feature deep alluvial soil profiles and hence have the potential to retain subsurface deposits of significant quantity and antiquity. There are also a large number of occurrences of named 1st and 2nd order watercourses within the project impact area, two of which are named watercourses (see Table 5.4).

Previous archaeological investigations within, and in proximity to, the project impact area have demonstrated a significant concentration of cultural materials associated with the Hunter River and Wollombi Brook, and Loder Creek. Heritage NSW guidelines assign a typical buffer of 200 metres to the edges of these watercourses as areas of higher archaeological potential; although, given the potential flooding of the Hunter River, more distant elevated locations may also exhibit similar potential. Cultural materials representative of short term or opportunistic activities is more often associated with ephemeral watercourses, drainage lines or other features such as Gilgai or rock outcropping which can retain water following rainfall events.

A predictive model developed for the project's original route selection aligns with the findings above, and notably highlights the following characteristics where cultural materials may be expected (Umwelt 2023b):

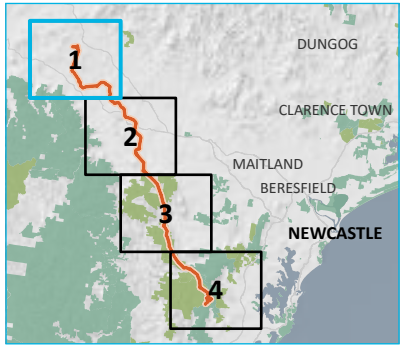
- riverbanks and slightly elevated land (e.g. levees) around backswamps may provide valuable camping sites with access to water and food resources
- the floodplain of the Hunter River will have a very limited detectable archaeological signature, since these areas are subject to regular flooding, including major flood events which deposit sand and silt onto the floodplain. Sedimentation from large flood events would bury any surface occupation (open campsite) evidence and likely remove surface evidence of occupation. The same scour and deposition processes affect the floodplain and natural levees of other major tributaries
- high archaeological potential (for detectable sites) will be associated with tributary catchments just upstream of main floodplain areas, particularly where there are slightly elevated features such as low terraces or spurs at creek junctions. This landform is prevalent in HTP North, on the elevated terraces adjacent to the Hunter River, though is not limited to this part of the project.

Notably, this predictive model has been updated and refined based on this assesment (see Section 8.4).

Table 5.4 Named watercourses intersecting the project impact area

Strahler order	Crossings (#) within the project impact area	Watercourse names
9	3	Hunter River
8	2	Wollombi Brook
6	3	Jigadee Creek, Congewai Creek
5	10	Black Creek, Cedar Creek, Deep Creek, Dora Creek, Jigadee Creek, Monkey Place Creek, Wyong Creek
4	10	Felled Timber Creek, Loder Creek, Maidswater Creek, Monkey Place Creek, Peach Tree Creek, Saddlers Creek, Sweetmans Creek, Watagan Creek
3	16	Farrells Creek, Loder Creek, Merchants Creek, Monkey Place Creek, Parnells Creek, Pokolbin Creek, Potholes Gully, Saltwater Creek, Sandy Hollow Creek, Sweetmans Creek
2	7	Doctors Creek, Hobden Gully, Nine Mile Creek, Wisemans Creek
1	2	Monkey Place Creek, Pikes Creek

Note: Several watercourses appear in more than one category. This reflects the multiple intersection of the creek line with the project impact area, and where in some locations the creek may be of a different size (or Strahler order)



KEY

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Strahler stream order

- 1st order
- 2nd order
- 3rd order
- 4th order
- 5th order
- 6th order
- 7th order
- 9th order

Existing environment

- Rail line
- Major road
- Named waterbody
- NPWS reserve

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Main water courses within and near the project impact area
Map 1 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.6

EMM
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Source: EMM (2025); Beca (2025); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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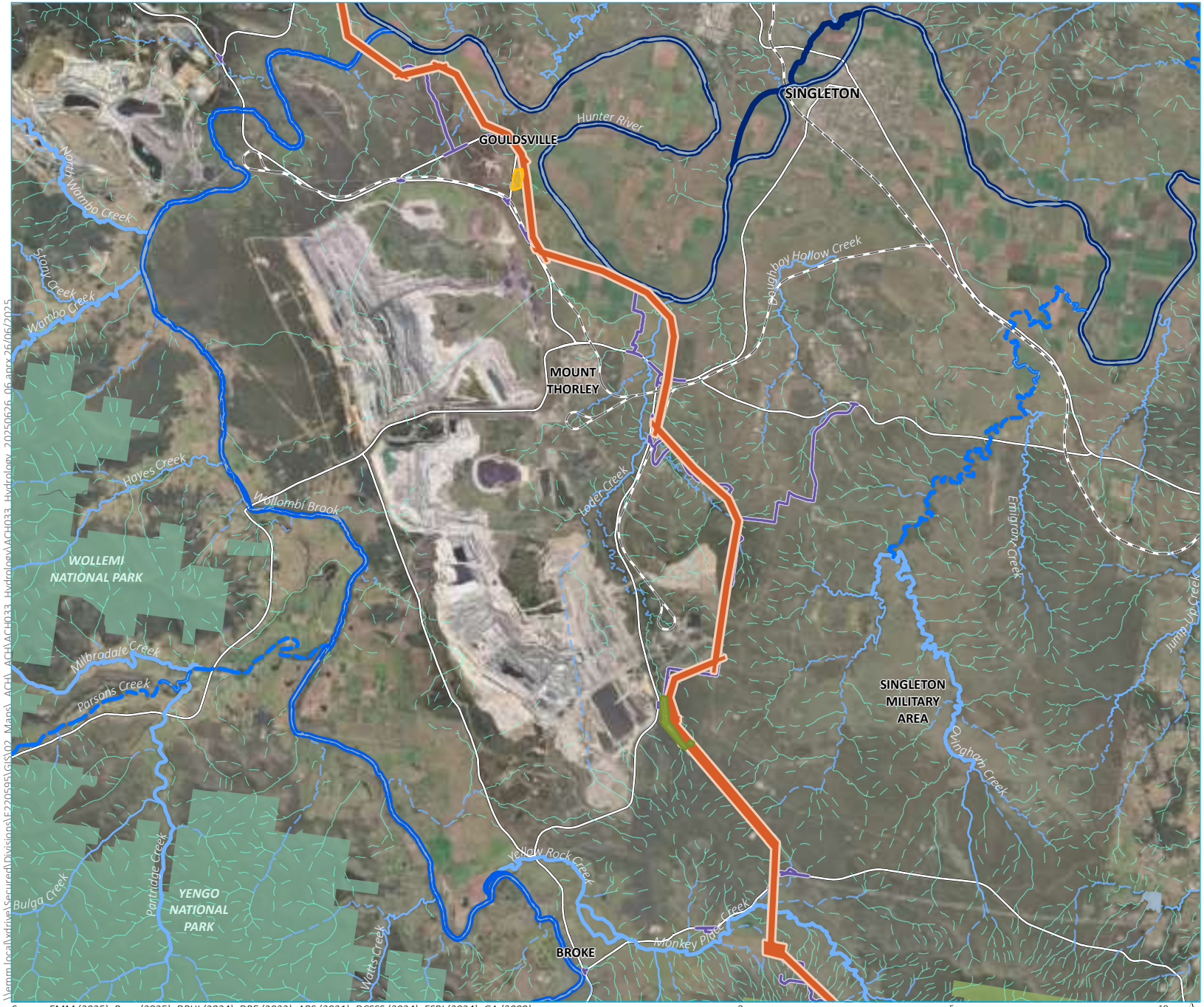

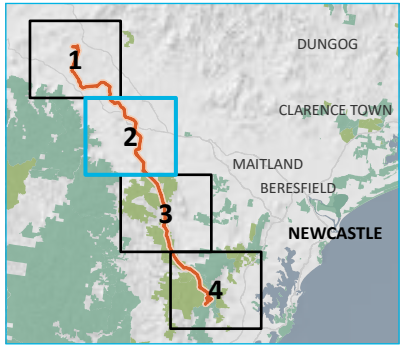

KEY

Project impact area
- HTP corridor
- Construction support site
- Adjustment to existing transmission line (line 81)
- Access track

Strahler stream order
- 1st order
- 2nd order
- 3rd order
- 4th order
- 5th order
- 6th order
- 8th order
- 9th order

Existing environment
- Rail line
- Major road
- Named waterbody
- NPWS reserve
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2025); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

0 5 10 km

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Main water courses within and near the project impact area
Map 2 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.6

EMM
creating opportunities

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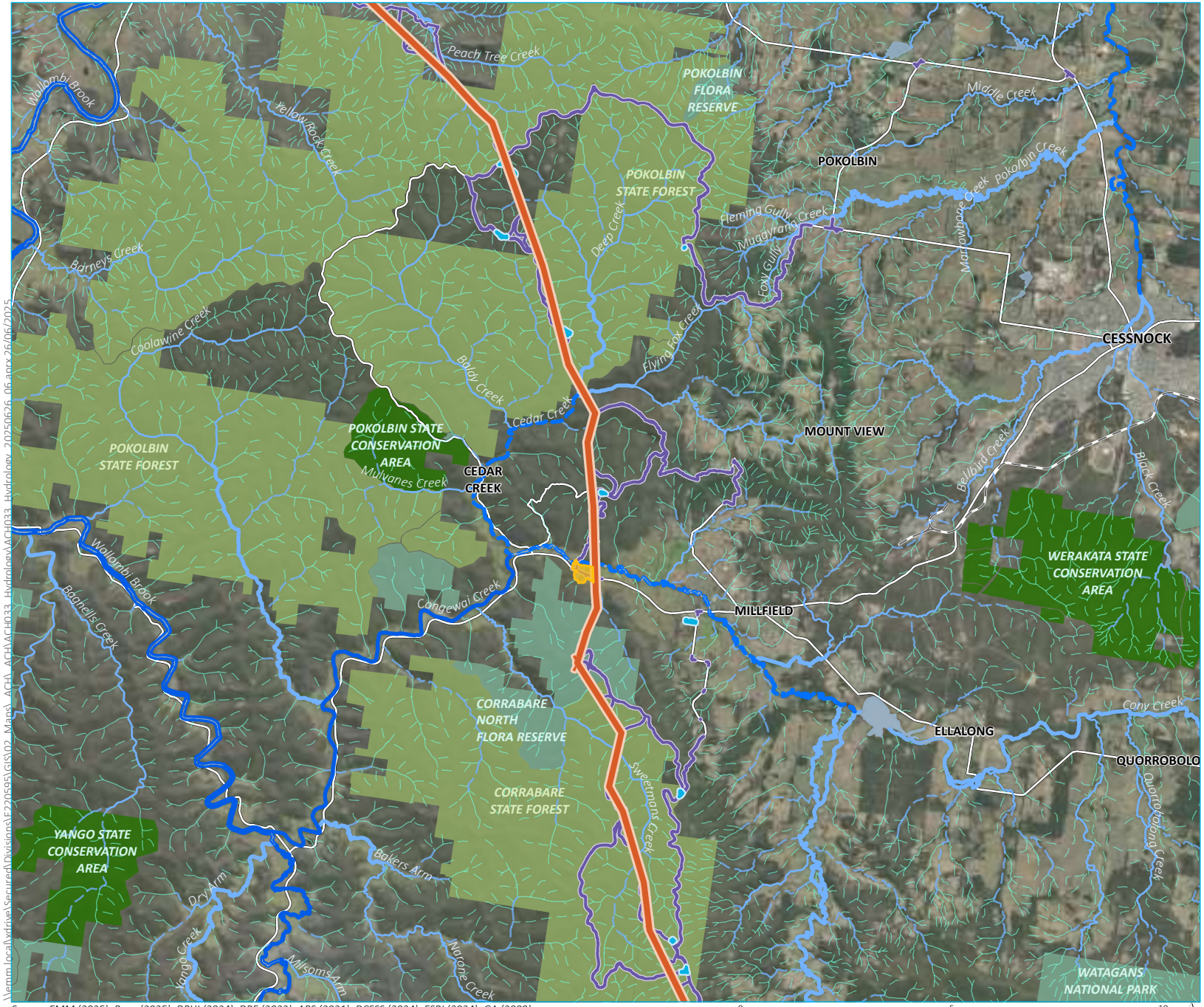

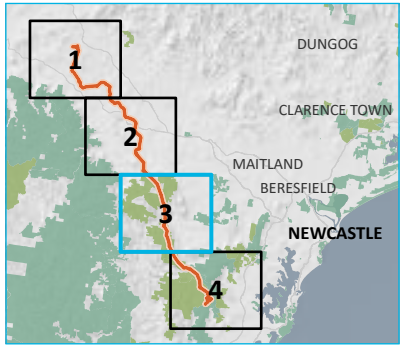

KEY

Project impact area
- HTP corridor
- Construction support site
- Laydown area
- Access track

Strahler stream order
- 1st order
- 2nd order
- 3rd order
- 4th order
- 5th order
- 6th order
- 7th order
- 8th order

Existing environment
- Rail line
- Major road
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2025); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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Main water courses within and near the project impact area
Map 3 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.6

EMM creating opportunities

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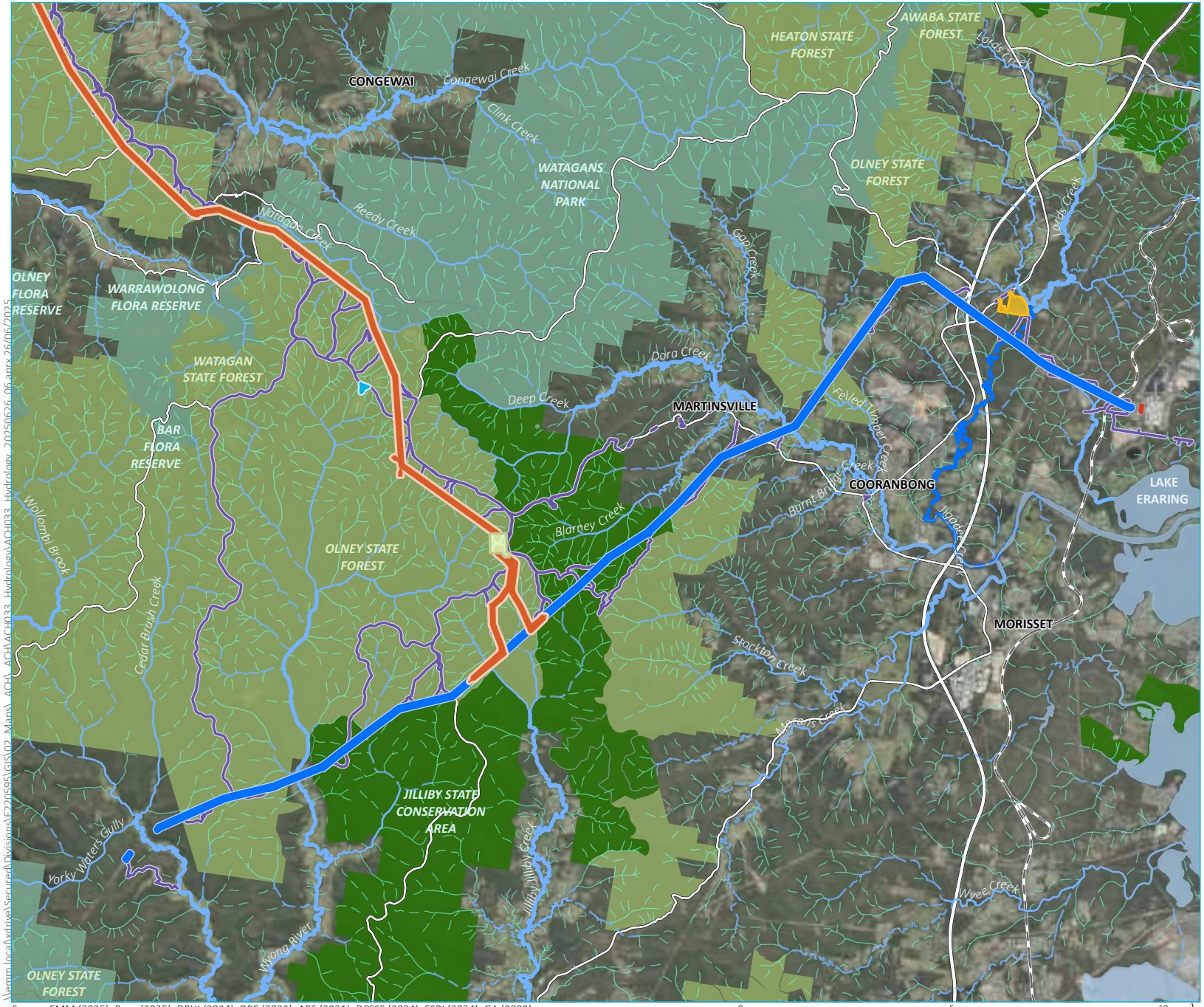

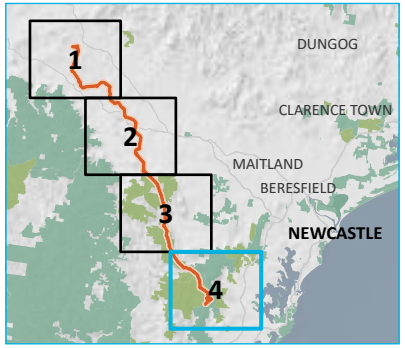

KEY

Project impact area

- HTP corridor
- Olney switching station
- Construction support site
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Strahler stream order

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

Existing environment

- Rail line
- Major road
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2025); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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Main water courses within and near the project impact area
Map 4 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 5.6

EMM
creating opportunities

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5.4 Flora and fauna

The use of animals, plants and minerals within NSW provided Aboriginal people with essential sources for food, medicine, and materials. Food sources included freshwater aquatic foods, such as fish (codfish was a well-documented species), yabbies, mussels, tortoises and birds, found in rivers, creeks and floodplains (Greenwood 2013). Semiarid resources included possum fur for clothing, baskets, and bags, quail and other bird species and predominant game animals. Flora such as native grasses were used for woven baskets and bags, sow-thistle was a common green used across semiarid Australia, the nardoo seeds which were ground for cake and porridge and sugar lerp derived from eucalypt leaves. Aboriginal people adopted useful native flora and fauna into their diets and habits where beneficial to do so.

The ACHA study area contains 17 main vegetation communities (see Figure 5.7), with 5 prevalent throughout more than 90 hectares of the project impact area. The northern portion of the project impact area commonly includes the Hunter-Macleay Dry Sclerophyll Forest throughout much of the low slopes and flats and Inland Riverine Forests, the latter only found around rivers in <6 hectares of the project impact area. This includes river red gums (*E. camaldulensis*) along the banks of larger streams and river oak (*Casuarina cunninghamiana*) around smaller tributaries. The central portion is mostly made up of the Hunter-Macleay and Sydney Hinterland Dry Sclerophyll Forest with sections of Northern Hinterland Wet Sclerophyll Forest. These vegetation communities are typically characterised by open canopies including a variety of eucalypt species, specifically spotted gum (*Corymbia maculata*), grey box (*E. moluccana*), grey gum (*E. propinqua*), ironbark (*E. crebra*), narrow-leaved stringybark (*E. sparsifolia*), blackbutt (*E. pilularis*), that persist on exposed slopes, hillslopes, hillcrests and gullies. Other species include the narrow leaved apple (*Angophora bakeri*), red bloodwood (*Corymbia eximia, C. gummifera*), sunshine wattle (*Acacia terminalis*) and flaky barked teatree (*Leptospermum trinervium*). The southern portion of the project impact area across the flats and plains is dominated by the North Coast Wet Sclerophyll Forest and Coastal Floodplain Wetlands, which mainly includes grey box (*E. moluccana)* and grey gum *(E. propinqua)* with lesser occurrences of grey ironbark *(E. siderophloia)* and hoop pine *(Araucaria cunninghamii)*.

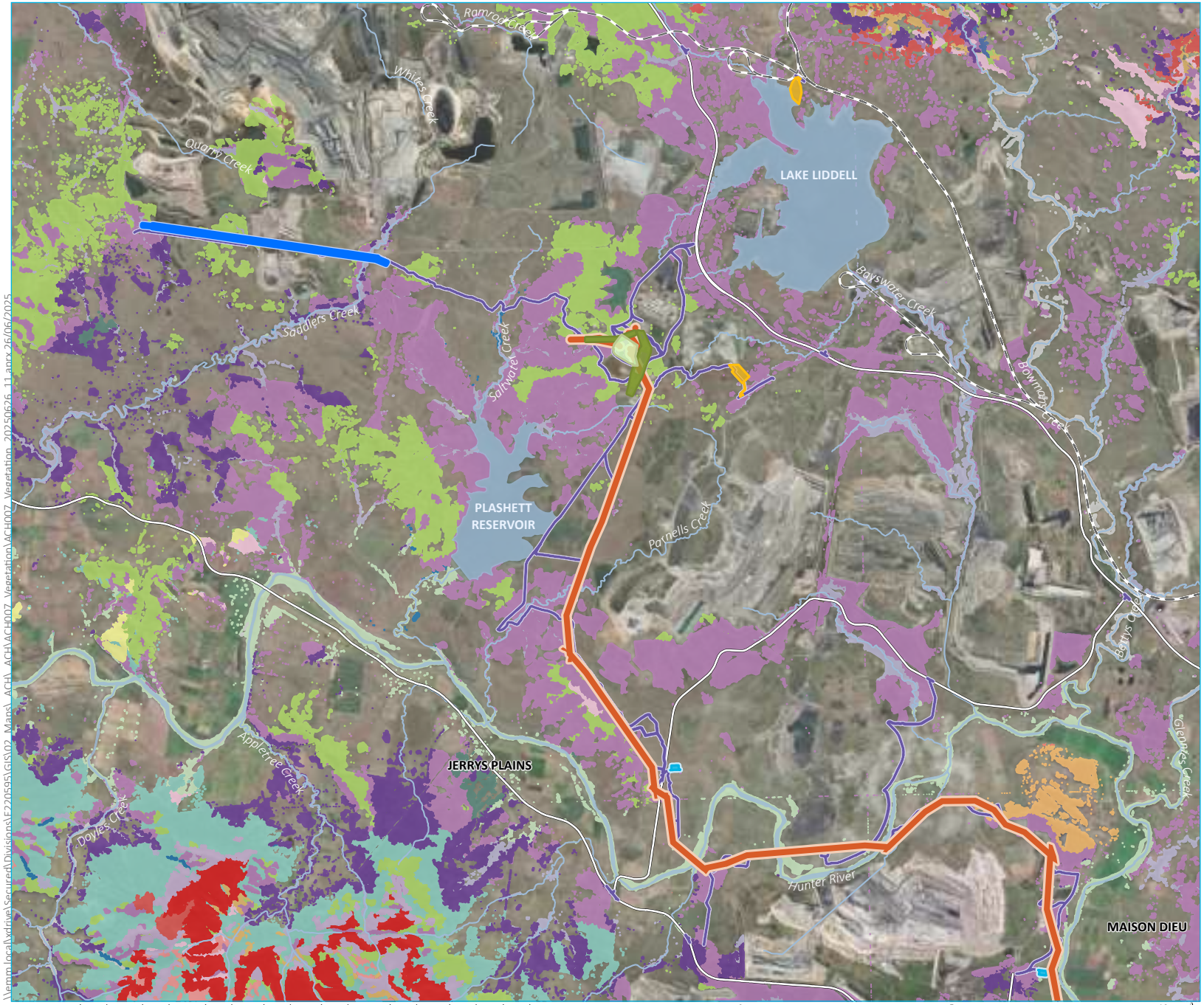
Of note is the presence of the Warkworth Sands Woodland within and/or in close proximity to the project impact area (see Figure 5.4). This ecological community is dominated by rough-barked apple (*Angophora floribunda*) and coastal banksia (*Banksia integrifolia*) and is known to occur on the Warkworth sand system – an important soil profile for deep time cultural materials (see *section 5.2.2*).

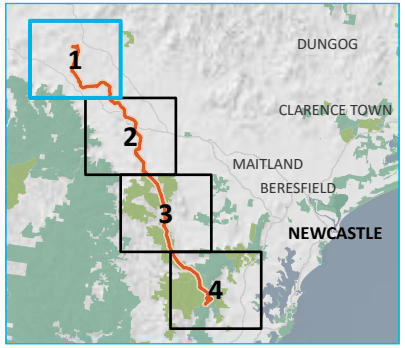
The remaining vegetation within the project impact area is non-native, or generally extensively cleared due to agricultural and mining uses post 1788 (see *section 5.5*). In the northern portion of the project impact area, remnant native vegetation is typically in small pockets where extensive clearing has not occurred. Larger areas of vegetation persist in the central and southern portions of the project impact area through state forests and nature reserves.

A number of observed flora species are of value to the Aboriginal communities were also identified as part of the cultural mapping investigations of the ACHA study area (see Table 5.5, *Appendix D (Supplementary cultural values information)*). Plants provided food and medicine as well as served other uses, such as in the production and maintenance of tools and equipment. Importantly, a number of the species are non-endemic to Australia (having been introduced in the last 230 years) and demonstrate the readiness that Aboriginal people would adopt useful resources wherever found.

Table 5.5 Plants used as food and medicines by the Aboriginal communities as documented by early ethnographers

Common name (species)	Awabakal name	Recorded Aboriginal use
Bulrush (Typha species)	Baaliyan	Edible rhizome
Emu bush (*Eremophila longifolia*)	Diigawu, Yadhandah	Edible nectar & medicinal foliage
Eucalypts (Eucalyptus species)	Maranggaal (River Red Gum, *E. Camaldulensis*)	Medicinal foliage
False sarsaparilla (*Hardenbergia violacea*)	Ngawang	Medicinal foliage
Fig tree (Ficus species)	Digimdhuna	Edible fruit
Geebung (Persoonia species)	Dyiibang, Bumbadula	Medicinal wood & fruit
Grey grasstree (*Xanthorrhoea glauca*)	Binda, Maybal, Marrady, Babang	Edible young shoots and leaf bases, medicinal foliage
Kangaroo grass (*Themeda triandra*)	Gaymaan	Edible seed
Kurrajong (*Brachychiton populneus*)	Yama, Garradyang, Yamagan, Bandhaany	Edible seed
Milk thistle (Sonchus species)	Yulung	Edible foliage
Mistletoe (Amyema and Lysiana species)	Wilburgil	Edible fruit
Nardoo (Marsilea species)	Ngardu	Edible sporocarp
Native cherry (*Exocarpos cupressiformis*)	Mamadya, Mambarra, Wambariga	Edible fruit
Native orange (*Capparis mitchellii*)	Mugilmugil	Edible fruit
Pigface (*Sarcozona praecox*)	Biradur	Edible foliage and thirst quencher foliage
Pituri (*Duboisia hopwoodii*)	Bidyuri	Narcotic foliage
Quandong (*Santalum acuminatum*)	Guwandang	Edible fruit and medicinal kernel oil
Ruby saltbush (*Enchylaena tomentosa*)	Barrinan	Edible fruit
Silver wattle (*Acacia dealbata*)	Giigandul	Edible seed & gum, medicinal gum
Teatree (Leptospermum species)	Bimbun, Gumarr, Mudha	Medicinal foliage and cones
Weeping myall (*Acacia pendula*)	Burri, Buuri	Edible gum
Wild lemon (*Canthium oleifolium*)	Mugilbang	Edible fruit
Wild onion (*Bulbine bulbosa* and *B. semibarbata*)	Galagang	Edible tubers
Yam daisy (*Microseris lanceolata*)	Murnang, Bading	Edible tubers
Yellow box (*Eucalyptus melliodora*)	Magalang, Baagan, Yurana, Yuwaadhuray	Medicinal foliage





KEY

Project impact area
- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Remnant vegetation
- Central Gorge Dry Sclerophyll Forests
- Coastal Floodplain Wetlands
- Coastal Freshwater Lagoons
- Coastal Valley Grassy Woodlands
- Dry Rainforests
- Eastern Riverine Forests
- Hunter-Macleay Dry Sclerophyll Forests
- Inland Riverine Forests
- Montane Lakes
- North-west Slopes Dry Sclerophyll Woodlands
- Northern Hinterland Wet Sclerophyll Forests
- Northern Tableland Wet Sclerophyll Forests
- Riverine Plain Woodlands
- Subtropical Rainforests
- Sydney Hinterland Dry Sclerophyll Forests
- Sydney Montane Heaths
- Sydney Sand Flats Dry Sclerophyll Forests
- Western Slopes Dry Sclerophyll Forests
- Western Slopes Grassy Woodlands
- Western Vine Thickets

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Potential remnant vegetation within the project impact area
Map 1 of 4

Hunter Transmission Project
Aboriginal cultural heritage assessment
Figure 5.7

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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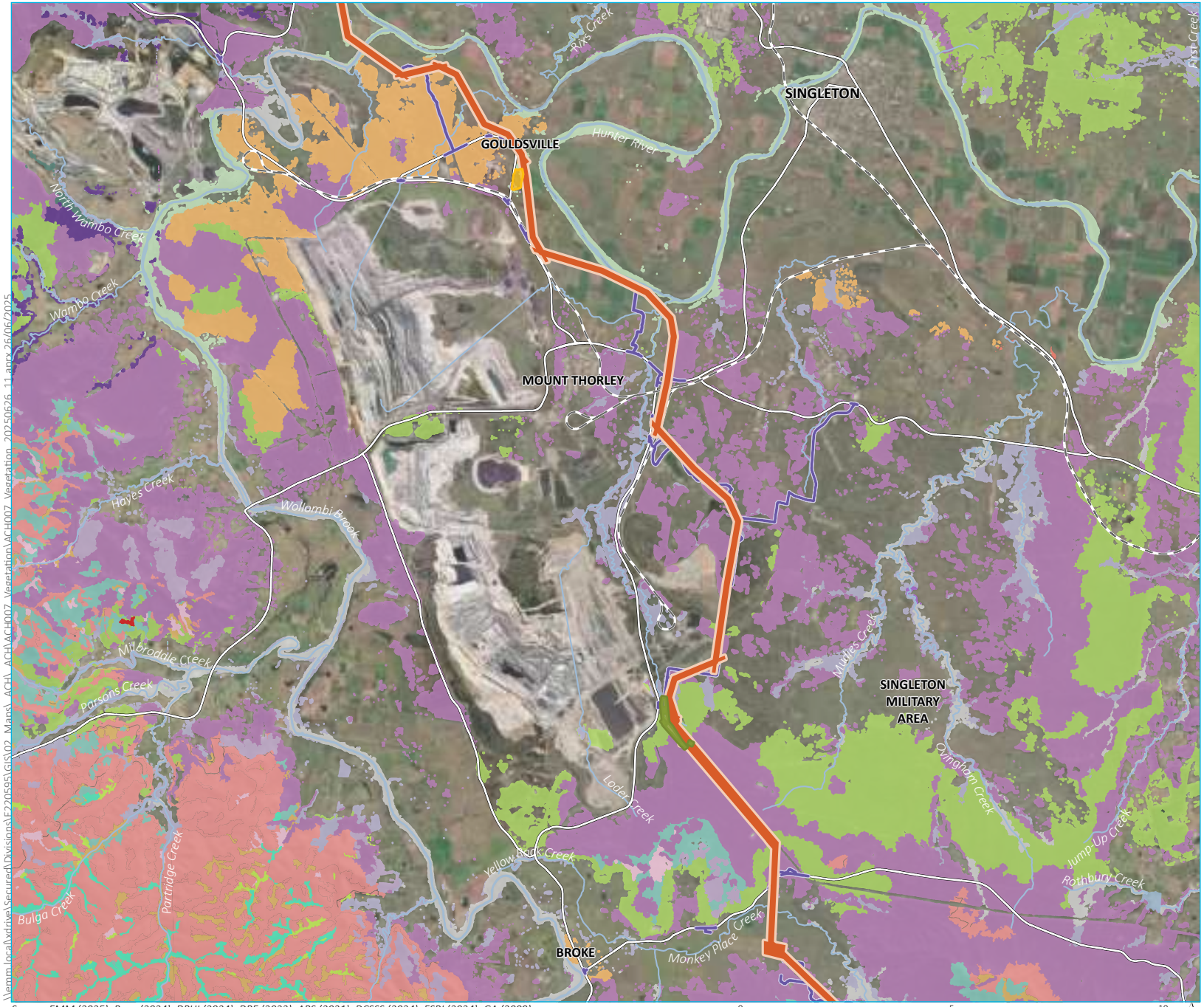

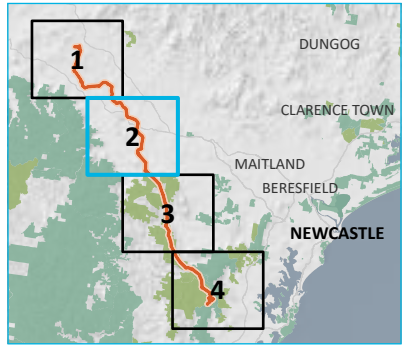

KEY

Project impact area
- HTP corridor
- Construction support site
- Adjustment to existing transmission line (line 81)
- Access track

Remnant vegetation
- Central Gorge Dry Sclerophyll Forests
- Coastal Floodplain Wetlands
- Coastal Freshwater Lagoons
- Coastal Valley Grassy Woodlands
- Dry Rainforests
- Eastern Riverine Forests
- Hunter-Macleay Dry Sclerophyll Forests
- Inland Riverine Forests
- Montane Lakes
- Northern Hinterland Wet Sclerophyll Forests
- Northern Warm Temperate Rainforests
- Riverine Plain Woodlands
- South Coast Wet Sclerophyll Forests
- Sydney Hinterland Dry Sclerophyll Forests
- Sydney Montane Heaths
- Sydney Sand Flats Dry Sclerophyll Forests
- Western Slopes Dry Sclerophyll Forests
- Western Slopes Grassy Woodlands

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Potential remnant vegetation within the project impact area
Map 2 of 4

Hunter Transmission Project
Aboriginal cultural heritage assessment
Figure 5.7

EMM creating opportunities

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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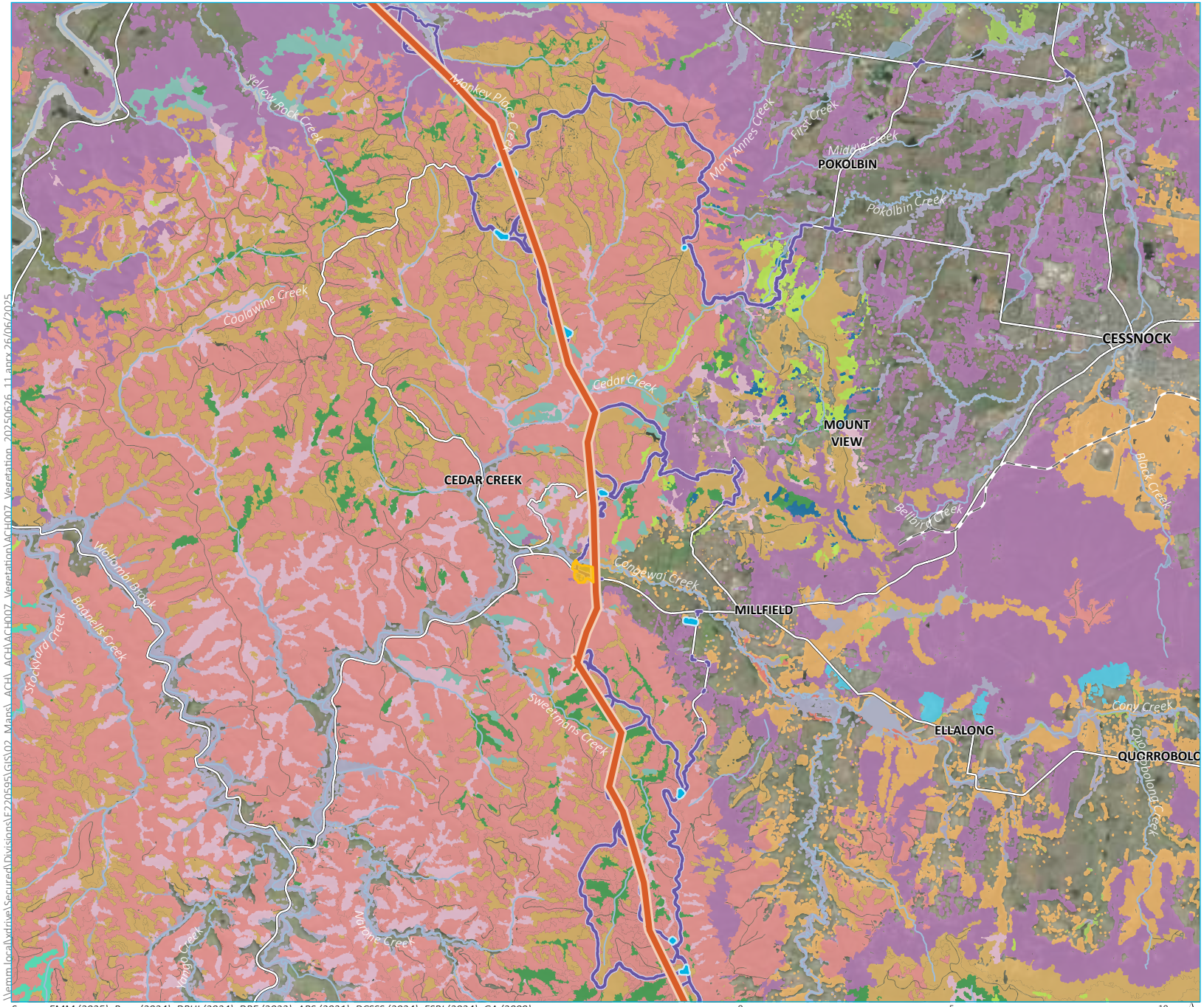

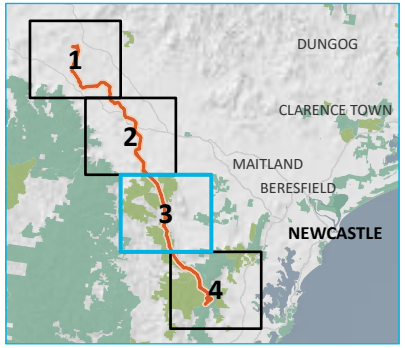

KEY

Project impact area
- HTP corridor
- Construction support site
- Laydown area
- Access track

Remnant vegetation
- Central Gorge Dry Sclerophyll Forests
- Coastal Floodplain Wetlands
- Coastal Freshwater Lagoons
- Coastal Swamp Forests
- Coastal Valley Grassy Woodlands
- Dry Rainforests
- Eastern Riverine Forests
- Hunter-Macleay Dry Sclerophyll Forests
- North Coast Wet Sclerophyll Forests
- Northern Gorge Dry Sclerophyll Forests
- Northern Hinterland Wet Sclerophyll Forests
- Northern Warm Temperate Rainforests
- South Coast Wet Sclerophyll Forests
- Subtropical Rainforests
- Sydney Coastal Heaths
- Sydney Hinterland Dry Sclerophyll Forests
- Sydney Sand Flats Dry Sclerophyll Forests
- Western Slopes Dry Sclerophyll Forests

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

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Potential remnant vegetation within the project impact area
Map 3 of 4

Hunter Transmission Project
Aboriginal cultural heritage assessment
Figure 5.7

EMM creating opportunities

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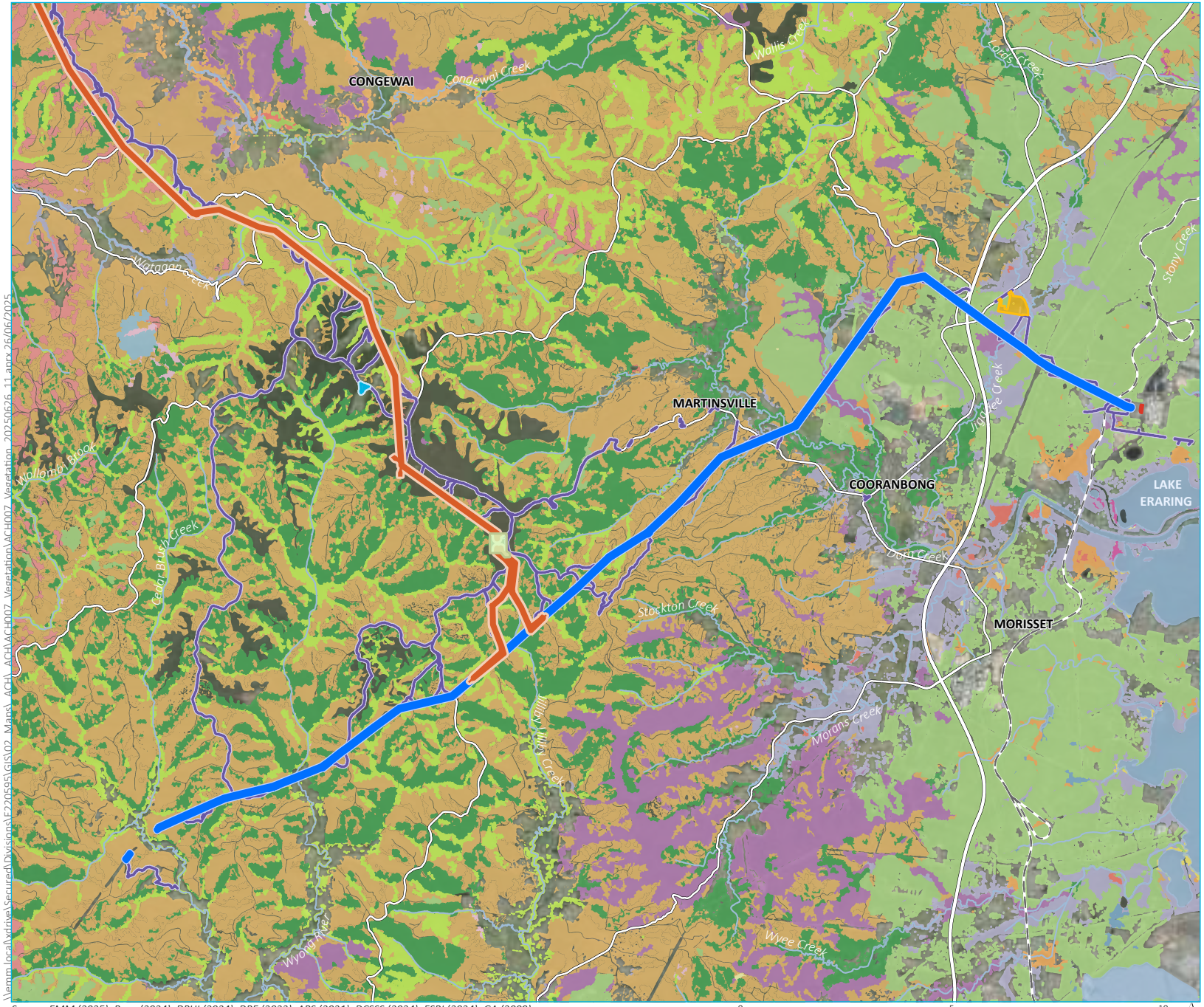

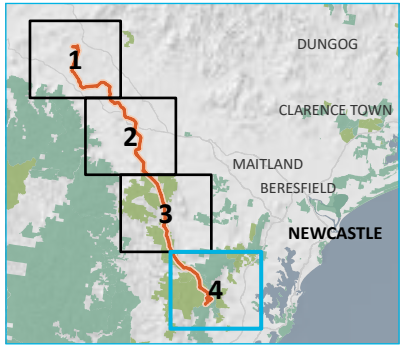

KEY

Project impact area
- HTP corridor
- Olney switching station
- Construction support site
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Remnant vegetation
- Coastal Dune Dry Sclerophyll Forests
- Coastal Floodplain Wetlands
- Coastal Freshwater Lagoons
- Coastal Heath Swamps
- Coastal Swamp Forests
- Coastal Valley Grassy Woodlands
- Dry Rainforests
- Hunter-Macleay Dry Sclerophyll Forests
- Mangrove Swamps
- North Coast Wet Sclerophyll Forests
- Northern Hinterland Wet Sclerophyll Forests
- Northern Warm Temperate Rainforests
- Saltmarshes
- Southern Escarpment Wet Sclerophyll Forests
- Sydney Coastal Dry Sclerophyll Forests
- Sydney Hinterland Dry Sclerophyll Forests
- Sydney Sand Flats Dry Sclerophyll Forests
- Wallum Sand Heaths

Existing environment
- Rail line
- Major road
- Named watercourse
- Named waterbody

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

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Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2024); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

N

Potential remnant vegetation within the project impact area
Map 4 of 4

Hunter Transmission Project
Aboriginal cultural heritage assessment
Figure 5.7

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5.5 Previous disturbance and land use

Previous land disturbance can significantly affect the preservation and survivability of cultural materials. While natural processes that can disturb and/or destroy cultural materials, changing land use practices and increasing urbanisation over the last 200 years that has resulted in the most significant impacts. The history and land use of the project impact area is summarised below. Historical aerial photographs of the project impact area are presented in Appendix C.2.

A significant portion of the project impact area has been disturbed by anthropogenic activities stemming from colonial settlement and occupation of the Hunter Valley in the early 18th century. This largely includes landscape modification in the form of extensive logging and clearing, agricultural cultivation, pastoral grazing, residential developments, military exercises, mining and recreational activities. Such activities are likely to have resulted in localised impacts to cultural materials that may be present on site. Most notably, the potential loss of any culturally modified trees, with pre-contact vegetation limited to remnant growth in most of HTP North and a few areas of HTP Central and HTP South, and the potential reworking of surface and sub surface cultural materials from destabilisation and thinning of the soil profiles as a result of these activities.

5.5.1 HTP North

Following European settlement of the Hunter Valley in the 1820s, the landscape has been subjected to a range of different modifying activities including extensive logging and clearing, agricultural cultivation, pastoral grazing, residential developments, military activities and mining (Turner 1985).

Land uses within and immediately surrounding the northern portion of the project impact area primarily include mining operations, agricultural land, and rural residential land holdings. Land clearance for grazing sheep and cattle from the 1860s has resulted in erosion gullies and sheet erosion on slopes and crests. This can potentially reveal cultural materials that were previously buried but may also disturb them. Historical aerial photography (see Appendix C.2) shows the extent to which the landscape of the ACHA study area had been cleared since the 1970s with only very small patches of vegetation, most of which has subsequently been mined. Riparian corridors are intermittent and narrow.

Although pastoralism is a comparatively low impact activity compared to mining, it does result in disturbances due to vegetation clearance and the trampling and/or compaction of grazed areas. These factors accelerate the natural processes of sheet and gully erosion, which in turn can cause the horizontal and vertical displacement of artefacts. Furthermore, grazing by hoofed animals can affect the archaeological record due to the displacement and breakage of artefacts (Yorston, Gaffney and Reynolds 1990). Pastoral land uses are also closely linked to alterations in the landscape due to the construction of dams, fence lines and associated structures. As a sub-set of agricultural land use, ploughing typically disturbs the top 10 to 12 centimetres of topsoil Koettig, 1986) depending on the method and machinery used during the process. Ploughing that typically occurred along the banks of the Hunter River and its tributaries, increases the occurrence of erosion and can also result in the direct horizontal and vertical movement of artefacts, thus causing artificial changes in artefact densities and distributions.

The Singleton Military Area was established in 1940 as a response to World War II. Prior to this, the area was primarily used for pastoralism and agriculture from at least the 1830s (Umwelt 2023a). At the time the base was opened, the ground quality was documented as being in poor condition as a result of unsustainable clearing to accommodate the previous land use, with an estimate 68% of vegetation having been previously cleared through these activities (Gourlay and Tunstall 1995). Since then, various stages of development have occurred within the Singleton Military Area; however, these largely fall outside the project impact area. Impacts along the project alignment would largely be the result of the agro-pastoral activities and the construction of roads to facilitate training exercises.

Mining of the Hunter Valley coal fields within the Permian Coal Measures started in the 19th century. At Hunter Valley Operations mining complex and Bulga mining complex, operations commenced in 1949 and 1982, respectively, and have continued to the present day in the landscape adjacent to the Hunter River floodplains valley. Through time, previously mined areas have been backfilled and progressively rehabilitated.

Extensive land clearance and the resulting changes to hydrological activity across the region have likely accelerated erosion and/or increased alluvial deposition throughout the ACHA study area. Further, as discussed in *section 5.5*, destabilisation of landforms resulting from vegetation clearance in addition to frequent flood events has likely been a major source of morphological change within the HTP North. This can make it difficult to identify pre-colonial watercourse-adjacent landforms within which cultural material may be expected.

Disturbance of cultural materials can also be a result of natural processes. The patterns of deposition and erosion within a locality can influence the formation and/or destruction of archaeological sites. Within an environment where the rate of sediment accumulation is generally very high, artefacts deposited in such an environment will be buried shortly after being abandoned. Frequent and lengthy depositional events will also increase the likelihood of the presence of well-stratified cultural deposits (Waters 2000). Landforms within the HTP North are prone to erosion which may broadly reveal previously buried archaeological evidence.

Overall, the HTP North area has been subject to a range of past disturbances, varying from low to high impacts. Impacts are generally associated with mining, farming activities and service corridors (i.e. roads and transmission) and are considered to have resulted in both tangible and intangible harm to cultural materials. These impacts include the damage/destabilisation of the soil profile, the removal of vegetation and any associated loss of cultural materials through environment loss.

5.5.2 HTP Central and South

Like HTP North, the HTP Central and HTP South areas have undergone disturbances since the early 1800s in the form of agro-pastoralism, residential development, recreational activities (e.g. 4-wheel driving, camping and biking), and to a lesser extent mining. Additionally, an extensive logging industry starting from the early 19th century has impacted the state forest areas significantly.

Government control of timber cutting and forest management occurred since European settlement in 1788 (Bickford, Brayshaw, and Proudfoot 1998). Land clearing as property 'improvement' was a key feature of the various lands acts that controlled settlement over the 19th century (Bickford, Brayshaw and Proudfoot 1998). As settlement advanced throughout NSW and forested areas decreased, the recognition that timber resources needed to be preserved for future development led to the proclamation of the first forest reserves in 1871 (FCNSW 2024). In 1876, forest reserves were divided into two classes— Class A State forests, large portions of land designated for the removal of mature timber generally within 30 kilometres of a railway line or watercourse; and Class B timber reserves for small-scale local timber needs (Bickford, Brayshaw and Proudfoot 1998). Timber getting in the reserves were regulated by licences and were associated with local timber mills. By 1905, 3 million hectares of land had been proclaimed as timber reserves in NSW (FCNSW 2024). Pine plantations were established in timber reserves from 1912 followed by Eucalypts plantations in 1938 to 1940 (FCNSW 2024).

Four State forests are within or adjacent to the project impact area: Corrabare, Watagan, Olney and Pokolbin. These State forests supplied native timber for the mines of the South Maitland Coalfield over the 20th century and, as a result, the forests were replanted regularly (Newcastle Morning Herald and Miners' Advocate 1947). Timbers used in the mine works included spotted gum, ironbark, bloodwood, stringy bark, white mahogany (*Eucalyptus acmenoides*), red mahogany (*Eucalyptus resinifera*), grey gum, blue gum (*Eucalyptus globulus*), and grey box (Newcastle Morning Herald and Miners' Advocate 1947). Appendix C.3 provides a brief history of land-use in each of these reserves.

6 Ethnographic context

6.1 Summary of this chapter

The following provides a summary of the ethnographic context for the Hunter Transmission Project (HTP, the project):

- Traditionally, the country in which the project impact area is located was occupied by people known as the Wonnarua, Awabakal and Darkinjung (north to south). All spoke related languages and shared many cultural attributes, and their descendants are still based in the region today. Neighbouring groups include the Gomeroi, Darug and Worimi, although the documented boundaries are all some distance away from the project impact area.

- The main mythologies of the Wonnarua, Awabakal and Darkinjung people during this time involved supreme beings, such as Baiame and Daramulan, with totemic ancestors being of lesser importance. Numerous creation stories and spiritual sites are documented within the region, as well as early ethnographic observations of male initiation ceremonies and important places.

- A review of historical records for the region shows an extensive interaction with Europeans over the last 200 years, including numerous instances of frontier violence. Of note was the close relationship between Reverend Lancelot Edward Threlkeld and the Awabakal people, which have provided some of the earliest and most extensive observations of Aboriginal people across this region in the early 19th Century.

6.2 Documentary ethnography

The Aboriginal cultural heritage assessment (ACHA) study area is primarily associated with the Wonnarua people of Hunter Valley and the Awabakal and Darkinjung people of the Lake Macquarie and Newcastle coastal regions (see Plate 6.1). Exploration parties and early colonialists noted differences in the lifeways of the Indigenous occupants over the geography of the Hunter and Hunter Valley, but it is likely that language group boundaries were far more diffuse and complex than the arbitrary demarcations drawn by colonial observers (Brayshaw 1987:38–41). As such, this section discusses all traditional groups in the vicinity of the ACHA study area.[2]

Evidently, the Wonnarua, Awabakal, and Darkinjung people lived in connection with this landscape for millennia (Brayshaw 1987:90–102; Dunn 2015:53–59; Moore 1981). Contemporary traditional owners have maintained close cultural and spiritual connections to Country (Clarke 2021). As cultural custodians of Country, traditional owners continue to exercise cultural responsibility to care for, manage and speak about Country and its cultural and natural heritage values.

This section provides a summary of the Aboriginal ethnohistorical record of Aboriginal life on the land prior to, at first contact, and during the contact period when their land was invaded and occupied by European colonists.

[2] It is important to note that information about the socio-cultural structure of Aboriginal society prior to European contact largely comes from ethno-historical accounts made by colonialists. Most ethnographical accounts of Aboriginal life during contact were written in the context of a period of immense change through death and disease, displacement, and a loss of culture, country and knowledge. As a result, this information is often limited and can be contentious.

Source: AIATSIS 1996

Plate 6.1 The AIATSIS Map of Indigenous Australia

The project is situated across the traditional boundaries of the Wonnarua, Awabakal, and Darkinjung peoples, as indicated approximately by the blue outline

6.3 The Wonnarua People

6.3.1 General overview

Colonist Robert Miller settled in the Hunter Valley from 1841 and noted at that time Wonnarua Country included "the Hunter and all its tributaries from within 10 miles [16 kilometres] of Maitland to the apex of the Liverpool Ranges" (Miller 1887:352). Norman Tindale (1974) collected data and genealogies of over 50,000 Aboriginal people from numerous expeditions around Australia with the aim of understanding tribal boundaries. He used the term 'tribe' with relation to Australian Aboriginal people to describe a group of people that share a common language (Tindale 1974:30). In accordance with the research compiled by Tindale (1974: 201), the traditional country of the Wonnarua people (also Won:arua, Wonarua, alternative Wannerawa) covered 5200 square kilometres from Maitland through the Upper Hunter to the Great Dividing Range in the west.

It is likely that many Wonnarua clans cared for the study area, but for the most part clan groups are not identified or detailed in available published literature (Brayshaw 1987:36). Each clan comprised 50-plus men, women and children, and clans were often further subdivided into smaller familial hearth groups, who shared a cooking fire (Brayshaw 1987:36). Clans shared language, social custom, and territory but their daily practices were often situated in a specific geographical unit of the larger Wonnarua Country (Brayshaw 1987:36). Wonnarua clans moved seasonally through their territory and came together for ceremony and ritual animals hunts (Brayshaw 1987:82).

Ethnographic accounts indicate the Wonnarua had close social and trading connections with the Gamilaraay groups (also Kamilaroi, Kamillaroi), who inhabited the Liverpool Plains to the west (Miller 1887:352). Wonnarua and Gamilaraay groups travelled between Country via Cassilis Gap, near Sandy Hollow (Brayshaw 1987:38). The encounters between the groups, however, were not always friendly with the abduction of women and trespassing on country without permission considered serious offences (Clarke 2021:11). Early colonialists also noted language similarities and trade relationships with groups of the Goulburn Valley, Port Macquarie, Port Stephens, the Lower Hunter, Hawkesbury River, Sydney and the Wiradjuri further west (Brayshaw 1987:31; Clarke 2021:10).

No native title claim has been finalised for the Hunter Valley, but today, there are over 100 Aboriginal individuals and/or organisations that identify as Wonnarua and/or from neighbouring groups that have contemporary connections to the Hunter Valley.

6.3.2 Local beliefs and ceremonial practices

Ethnographic accounts record few details of the Wonnarua belief systems at the time of contact and descriptions of ceremonial practices generally focus on male initiation and corrobboree. Robert Miller noted the "Wonnarua had some idea of a Great Spirit" but that he was not aware of further details (Miller 1887:353). It is likely this 'Great Spirit' was Baiame (also Baiamai, Bayme) recorded as central importance in the Dreaming of neighbouring groups, such as the Gamilaraay (Clarke 2021:12). Tradition holds that during the Creation (Dreamtime) the god-like male Ancestor, Baiame, created the rivers, mountains and forests on earth and gave the people their laws and practices (Clarke 2021:12). An image of a winged humanoid figure interpreted as Baiame is painted in a rockshelter in Milbrodale in the southwest of the Hunter Valley, near Singleton. 'Ka-wul' is the Wonnarua wedge-tailed eagle totem and enduring oral histories tell of Baiame travelling in the form of a wedge-tailed eagle to watch over the people (Clarke 2021: 36–37; Wonnarua Nation Aboriginal Corporation 2014). Further documented Creation Period/Dreaming stories associated with the Wonnarua include the creation of the Hunter Valley and Hunter River by sky spirits; a version of Tiddalik the Frog, whereby Tiddalik drinks up all the water from Wollombi Brook, which is only released after the other ancestors had made him laugh; and the story of the giant lizard, who carved out the valley before coming to rest forming mountains with the geological formation known as Yellow Rock, near Broke (Clarke 2021:12; Dunn 2015:60).

Baiame also made the first initiation site, known as a bora, where teenage boys were made into men. Groups from the surrounding region would gather to perform the Bora ceremony (Clarke 2021:12, 14). The senior/head men of the hosting group would prepare the Bora ground, which comprised 'a large public circle … carved into the flat ground' surrounded by representations of ancestors, including Baiame and his wife Gooberangalnga, and other important figures carved on trees, drawn on bark sheets, made from raised earth and or drawn/dug into the ground (Brayshaw 1987:83; Clarke 2021; (Fawcett 1898:154). Brenton (1835) recorded the types of imagery seen at a ceremonial site, not a Bora ground, during their travels in the vicinity of Wollombi Brook:

> …trees for some distance around, to the height of fifteen or twenty feet, are carved over with grotesque figures meant to represent kangaroos, emus, opossums, snakes, etc., with rude representations also of the different weapons they use (Brenton 1835).

Body modification including scarification and piercing of the nose also occurred during the initiation ceremonies, however, 19th century ethnographic accounts vary on whether the Wonnarua practiced tooth evulsion (Clarke 2021:14; Miller 1887:353). The last recorded Bora ceremony on Wonnarua Country occurred in 1852 at Wollombi Brook near Bulga, west of Singleton (Clarke 2021:14). A song trail through the Hunter Valley from the Great Dividing Range is known to pass a Bora ground in this area, which is known as the Wallaby Scrub Bora Ground (Clarke 2021:39). Historical accounts also note a ceremonial ground was on the Allyn River, northeast of Singleton (Clarke 2021:14).

Corrobborees were also performed on Wonnarua Country well into the post-contact period. Brenton (1835) observed men and women adorned in feathers performing a dance together in 1830, though it is unclear if this was a corroboree or a different ceremony. The Singleton Argus (29 February 1888:2) reported on a corroboree held in 1888 whereby:

> about a dozen men and boys— nearly all practically naked—look part in it; the music being furnished by the striking together of bamboo sticks, and the beating of tambourines, as accompaniments to the crooning of an aboriginal tune (Singleton Argus, 29 February 1888:2).

The last recorded corroboree in the region was performed in a paddock near Kent Street Singleton in 1902 (Clarke 2021:15).

Laws and customs laid down by ancestors during creation guided the daily lives of the Wonnarua people (Clarke 2021:11). Kinship was determined through physical relationships and system of moieties evolved during the Dreaming (Miller 1985:3). Moreover, cultural activities, such as hunting, fishing and the consumption of certain foods, were guided by these laws (Clarke 2021:13). Although, burial sites are not common through the Upper Hunter, sources suggest the dead were generally buried in a sitting position and the bodies covered with earth but the details of burial ritual varied (Brayshaw 1987:86; Brenton 1835; Fawcett 1898:180).

6.3.3 Tools, weapons and apparel

The Hunter Valley provided an abundance of aquatic and terrestrial food, medicinal, and material resources that were exploited and managed by the Wonnarua (Brayshaw 1987). JW Fawcett (1898:152) stated the Wonnarua chose their occupation sites for the proximity to fresh water and ready supply of food, and preferred a location with a good vantagepoint over the surrounding landscape. Historical accounts suggest the Wonnarua primarily lived in open camp sites and constructed shelters from heated and stretched bark sheets, which Miller (1887:352) called mia-miams (Brayshaw 1987:59). The presence of occupation deposits in rock shelters indicates overhangs were also used for shelter (Moore 1970). A camp site that was visited in the historical period was located on the bank of Wollombi Brook, near Broke (Brayshaw 1987:42).

The diet of the people of the Upper Hunter included kangaroo, emu, reptiles, fish, birds, bats, larvae and other animals (Brayshaw 1987:81–82; Fawcett 1898:152). Restrictions on consuming certain animal species were influenced by factors such as gender, initiation status, and other cultural considerations.(Miller 1887:353). The Wonnarua employed fire to manage grasslands and encourage macropods and other animals to graze on Country (Brayshaw 1987:20; Clarke 2021:27). The vegetable diet of the Wonnarua is not well recorded but it is likely roots/tubers, Kurrajong fruit and grass seeds were exploited seasonally (Brayshaw 1987:81-82; Fawcett 1898:152). The flora of the Hunter Valley was also employed as medicine. Tools utilised to hunt or collect food resources included nets of woven swamp grasses, wooden bowls, yam sticks (women), as well as spears, woomeras, boomerangs and ground stone axes made from local timbers and grass trees (*Xanthorrhoea*) (Brayshaw 1987: 60–67; Miller 1887:352). War boomerangs, wood and bark shields, and bark canoes also formed part of the Wonnarua material suite (Miller 1887).

Local geological resources were also readily exploited, as demonstrated through the predominant utilisation of locally available mudstone and silcrete in tool assemblages throughout the Upper Hunter (Baker 1992:7; Moore 1970). Ethnographic accounts also note the use of red and white ochre pigments, which were mixed with animal fat and used to paint the body for ritual or warfare as well as in the region's rock art tradition (Brenton 1835; Miller 1887:352).

Little clothing was worn prior to European contact (Miller 1887:352). Even so, men wore a strip of spun possum hair at the waist. Moreover, nautilus shell was fashioned into oval pendants and worn at the neck. Women wore possum skin cloaks throughout the year with men donning cloaks in the winter (Brenton 1835; Clarke 2021: 17; Miller 1887:352). Kangaroo skins were also used as protection from the elements (Brenton 1835). Possum skin cloaks and cord were a valuable trade product between the Wonnarua and coastal groups, often exchanged for spears (Brayshaw 1987:41, 65). Unfortunately, objects made from organic material, as well as clothing items such as animal skin cloaks, rarely survive in the archaeological record.

6.3.4 Aboriginals of the Hunter Valley (Brayshaw 1987)

In 1987, Brayshaw undertook archaeological research focusing on the Aboriginal people of the Hunter Valley. Owing to the growth of coal mining in the area this research was conducted to provide strategies for the preservation, protection and possible acquisition of sites following a detailed archaeological investigation funded by the National Parks and Wildlife Service (Brayshaw 1987). This study consolidated archaeological evidence, ethnographic research and colonial records to better understand the environment, diet, ritual life, and material culture of the people inhabiting this area through time. It was noted that colonial records focussed primarily on environmental features and did not provide detailed accounts of the Aboriginal people in the area until the mid-nineteenth century, with the exception that the use of fire was mentioned by European surveyors as a possible method of defence against European expansion.

Aboriginal occupation in the region was extensive with archaeological sites including burials, ceremonial areas, cave paintings, rock engravings, axe grinding grooves, quarries, wells, fish-traps, middens, and 'open site' occupation zones (see *Chapter 8 (Archaeological context)*). Despite the fast rate of soil erosion present in the region, the author noted a high probability for subsurface artefacts to be present. Lithics identified within the region consist of large cores, flakes, and backed blades, including geometric microliths, Bondi points, and Eloueras. Previous excavations in the region have identified 3 distinct stages in stone tool evolution based off radiocarbon dating. These phases consist of a 'pre-Bondian' stage, a 'Phase I Bondian' stage at ~1300 before present and a 'Phase II Bondian' stage from ~800 years before present. The latter of which included a significant drop in the use of backed artefacts and finely retouched lithics (Brayshaw 1986).

Social organisation was described by tribes/nations and hordes, to demonstrate that a regional 'tribe' could incorporate multi-lingual 'hordes' that connected peripheral tribes through kinship. For example, one nation of importance in the area includes the Kamilaroi/Gamilaroi, who's language was spoken throughout the Upper Hunter and Liverpool Plains. This research suggested that colonisation inhibited the potential expansion of the Kamilaroi nation due to their presence in ceremonial events along the coastline in Port Macquarie and Port Stephens, as well as the blanketed identification of 'earth figures' used in Kamilaroi initiations and burial contexts. The coastal areas of the Hunter Region were occupied by the Awabakal nation, in the vicinity of Lake Macquarie and the hinterland. As well as the Worimi in Port Stephens, Gringai in the Dungog area, Birpai to the north of the Gringai, and the Kuringgai in the vicinity of Broken Bay. There is little data on the demography of the area, which was conflated by a decrease in population starting in 1789 from the spread of smallpox, and the disposition of Aboriginal people in Singleton in the late 19th century, at which time less than 80 individuals were recorded (Brayshaw 1987; Butlin 1983).

Subsistence was seasonal throughout the Hunter Valley, with shellfish collection and fishing primarily occurring in the summer months, followed by terrestrial hunting and gathering in winter. Both mammals, such as kangaroo (e.g. *Macropus giganteus*), and fruit, including cycad (*Zamia spiralis*), were ritually and temporally collected. Initiations undertaken in this region for marriage included drawing 1 or 2 circles 8 feet in diameter next to one another where dental evulsion was practiced. Burials include deposition face-down, face-up, and side on positions. Burial mounds belonging to the Kamilaroi have been identified on the surface, in the shape of a cross for men, and in the shape of a cone for women. Red ochre painting and bark shrouds were often employed throughout the region, and while the documentation of cremations is sparse throughout the literature, radiocarbon dating suggests its continued use up to 2000 years ago.

Culturally modified trees with zoomorphic, anthropomorphic, and geometric imagery have been found in proximity to both ceremonial and burials sites, which may suggest cultural continuity throughout the Hunter Valley (Brayshaw 1983).

Habitation structures utilised throughout the area mainly include 'gunyers', which are huts supported by 3 forked sticks that incorporated bark from tea tree (*Melaleuca quinquenervia*) (Brayshaw 1983). This bark was sourced by using the end of a spear-thrower (*wommera*) with the same method used for the construction of bark canoes around Lake Macquarie from red gums, Kurrajong and the cabbage-tree (*Livistona australis)*. These canoes can hold up to 8 individuals with recorded accounts detailing the use of clay-based fires in the middle of the vessels. Material culture in the form of shields were usually carved from 2 types of trees including the buttress of nettle (*Celtis australis*) and giant fig trees (*Ficus* species). There were 7 variants of hardwood clubs that were recorded, including the 'waddy' which was usually made from ironbark. Boomerangs were also constructed from ironbark and myrtle (*Acacia Myrtifolia*), with 3 variants of spears made from the grass tree. Composite tools such as hatchets were formed using basalt or diorite then fastened onto green witches with adhesive gum or resin. Wooden resources and shell were utilised to craft string for nets and other fishing tools as well as drinking vessels. Additionally, the use of kangaroo bone awls was used to construct clothing, which consisted of possum and kangaroo hides/furs.

6.4 The Awabakal people

6.4.1 General overview

Much of the information regarding the culture and practices of the Awabakal people around the time of European contact comes from the observations of Reverend Lancelot E Threlkeld, who established a mission at Reid's Mistake on Lake Macquarie (modern Belmont) between 1825 and 1841 (Gunson 1967). Threlkeld's ethnographic work was guided by his assistant Biraban, an initiated Awabakal man (Gunson 1966). Threlkeld's work was published by the Australian Institute of Aboriginal Studies in 1974 (Threlkeld 1974).

Threlkeld states the name Awabakal to mean 'people of the plain (lake) surface', derived from the place name Awaba referring to Lake Macquarie, and describes their territory extending along the coast, estuaries, lakes, and wetlands as well as the Sugarloaf and Watagan ranges (Threlkeld 1974). In accordance with Tindale (1974:41, 65), the traditional country of the Awabakal people (also Awaba, Awabagal) covered 1800 square kilometres on the south side of the Hunter River in the vicinity of Lake Macquarie. The Newcastle region was occupied by 3 Awabakal clans— the Five Islands People of northern Lake Macquarie, the Pambalong occupying the western side of river, and Ash Island Clan (Suters Architects 2007:25). 'Coqunn' is documented by Dr JD Lang (1834:64) as one of the traditional Awabakal names for the Hunter River and the city of Newcastle sits on the fern gathering area of the Awabakal (Keary 2009:121).

The traditional country of the Awabakal people was bounded to the north by the Worimi, to the west by the Wonnarua, to the southwest by the Darkinjung and to the south along the coast by the Kuring-gai people (Suters Architects 2007:25). Ethnographic accounts indicate the Awabakal had close social and trading connections with groups across the region from the Hawkesbury to Port Stephens (Threlkeld 1974:3). It was also noted the Awabakal shared linguistic similarities with the Gamilaraay and Wiradjuri to the west (Threlkeld 1974:3).

6.4.2 Local beliefs and ceremonial practices

Threlkeld's accounts provide insight into the belief systems of the Awabakal at the time of contact, but the records have been interpreted through a Christian lens of understanding. Biraban told Threlkeld that the Awabakal were guided by a 'Great Spirit" known as Koun, Tippakál, or Por-rang, who was central to ceremonies and appeared in the form of a man painted with white clay and carrying a firestick (Threlkeld 1974:62). Koun was affiliated with the eaglehawk and was likely a version of the creator spirit known elsewhere as Baiame (also Baiamai, Bayme) (Threlkeld 1974: 3, 62). Koun's wife, known as Mailkan, Tippakalleen, or Bimpoin was more malevolent than her husband and was said to carry off people in her woven bag to her underground lair and kill children (Threlkeld 1974:62). Threlkeld published accounts of a number of other spirits including Puttikán a spirit who resided on Sugarloaf Mountain and would attack uninitiated men who passed into his territory (Threlkeld 1974:61). Creation stories were also recorded by Threlkeld. An Aboriginal man, known to Threlkeld as Jemmy, stated the sun, moon, and stars were created by a dreaming figure throwing the "vermin from his head into the fire which became the black fellow who made them" (Threlkeld 1974:46). Further documented Creation time/ Dreaming stories associated with the Awabakal include the creation of the Belmont Lagoon by the tears of the moon, women being turned into the 2 upright rock forms at Swansea Heads and becoming protectors of Lake Macquarie, and the eruption of a volcano at Redhead which resulted in the creation of coal (Awabakal Language Program n.d.).

As seen elsewhere, accounts of Awabakal ceremony generally focussed on the male initiation ceremony and corrobboree. In November 1825, Threlkeld attended a male initiation Bora ceremony (Brayshaw 1987:83; Threlkeld 1974:50). The ceremony took place in a c.12-metre-diameter circle, which had been cleared of vegetation and a hillock built in the centre (Threlkeld 1974:50–52). The circle was surrounded by carved trees and was called the Porrobung (Threlkeld 1974:50–52). The Porrobung was only allowed to be entered by initiated men and a second circle nearby, the Yu-lung, was where non-initiated group members camped during the ceremony (Brayshaw 1987:83). The initiation ceremony was performed over two to three nights and involved periods of dancing and ritualised hunting/fighting with miniature boomerangs (Threlkeld 1974:50–52). The male initiates were then gathered in the Yu-lung circle and the ceremonial leader drew a long bone, said to be placed in their belly by the 'Devil-devil in the bush', which was used to remove the initiates tooth (Threlkeld 1974:51, 63):

> The first is a mere rap, the second a harder rap, and the third rap sends the tooth out flying from its socket into the mouth of the thus initiated youth who may now seize a woman for his wife (Threlkeld 1974:51).

The ceremony concluded with setting the vegetation around the ring on fire (Threlkeld 1974:51–52). Likewise, Threlkeld witnessed a Corrobboree at the establishment of his Lake Macquarie mission (see Plate 6.2):

> About 40 natives were assembled and the music commenced, two sticks knocked together by one of the eldest of the men, which kept good time to the intonation of both male and female performers who chaunted the tune for the dancers… The first set too of the dance was indescribable, the second part consisted of the Kangaroo dance, in which the blacks place their waddies, so as to resemble the tail of a kangaroo, and stooping forward in a bending posture, as though they were on all fours, each one placed his hands on the one before him near the sham tail, when they all jumped together, going round in a circle, like kangaroos, making a peculiar noise to imitate the cry of the animal, grunting - "Wa! Wa! Wa!" and making the ground resound with the stamping of their feet (Threlkeld 1974:45).

Song and dances were transmitted between neighbouring groups as evidenced by the Worimi from the Port Stephens area coming to Newcastle around June of 1825 to teach a new song and dance to the Awabakal people residing there (Threlkeld 1974:191).

Aspects of female ceremony were also observed among the Awabakal at Newcastle and Threlkeld's mission. Women and girls from approximately 5-years of age that engaged in fishing were noted to have the tip of the little finger on the right hand removed at the second joint to facilitate the coiling of fishing line (Threlkeld 1974:44). In addition, a woman was observed with a large burn on her outer-right thigh, which were said to be self-inflicted as a sign of mourning (Threlkeld 1974:44).

Relating to ceremony, both burial and cremation were practiced by the Awabakal during the contact period (Threlkeld 1974:47–48). Threlkeld witnessed the burial of a girl on 3 June 1825 (Threlkeld 1974:190). Members of the girl's clan gathered at the burial site and women and close male relatives prepared and cried over the grave (Threlkeld 1974:190). Three women, including the mother of the child, had their bodies covered in white clay and the mother inflicted a wound on her head (Threlkeld 1974:47–48). The child was wrapped in tea tree bark and lowered into the grave by an older male of the clan (Threlkeld 1974: 47–48). The grave site was smoothed over, so it was not noticeable to passersby (Threlkeld 1974:48). Threlkeld was also taken to the site of a cremation (Threlkeld 1974:48). It is not clear if cremation was part of the regular burial practices of the Awabakal or whether the event was in response to the trading of Māori skulls by colonialists at that time (Threlkeld 1974:48).

Other sites of significance to the Awabakal included: Kintiirrabin, a small extinct volcano located south of Newcastle near Redhead; Kopurraba, another extinct volcano 'up the River Hunter', from where which red ochre-like pigment was sourced for 'elite' Aboriginal men and women; and Konakonaba, a mountain on the north side of Lake Macquarie, which was 1 source of yellow pigment (Threlkeld 1974:63–64). Threlkeld recorded the source of white clay; however, the location is not recorded. In addition, a fresh-water waterhole on Sugar-Loaf Mountain was said to contain a monster fish, and a deep section of Lake Macquarie was also said to harbour a similar creature that upturned canoes (Threlkeld 1974:65). A place below a cliff on Newcastle Beach was a sacred place where speaking was prohibited and a stone circle said to be created by eaglehawks was located on an unnamed hill (Threlkeld 1974:65–66).

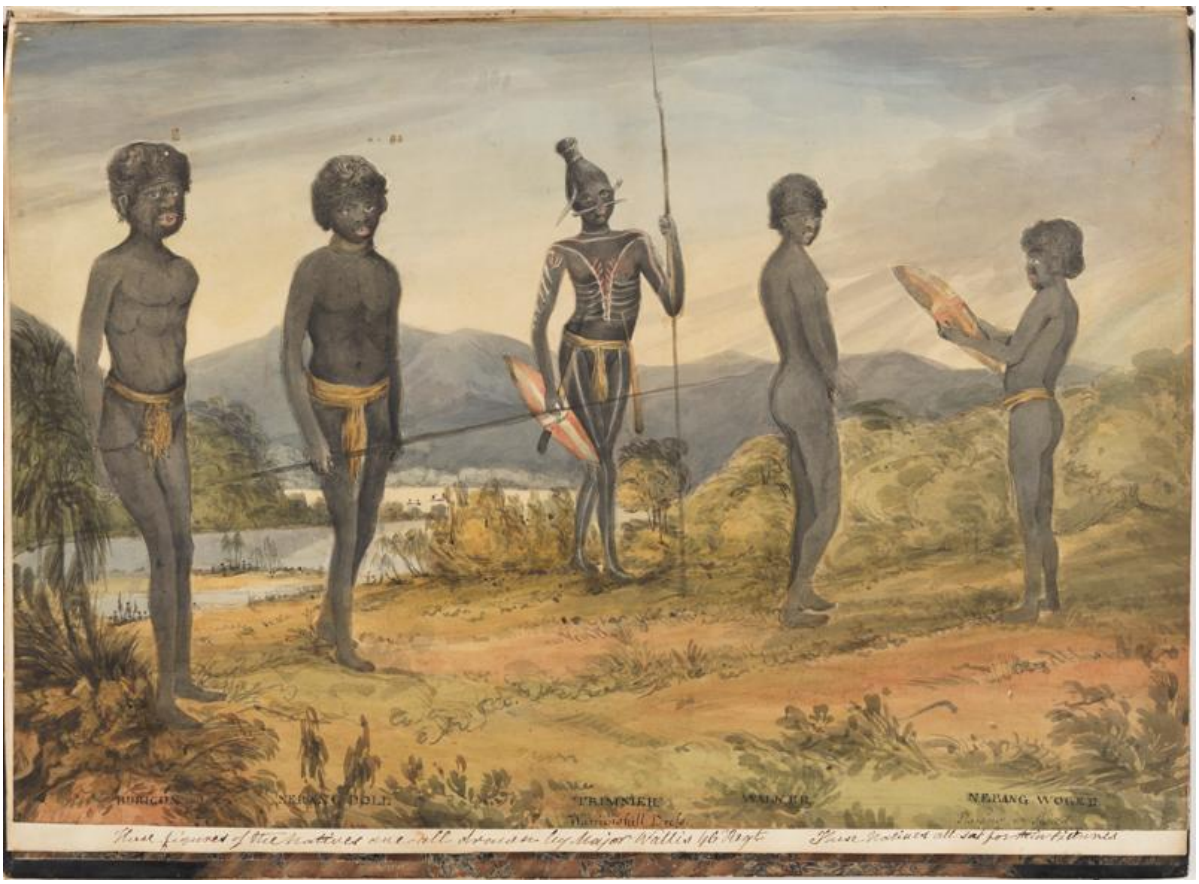
Source: State Library of NSW, call no. DG 228

Plate 6.2 ***Corroboree at Newcastle*, oil painting by Jospeh Lycett, 1818 - Tools, weapons and apparel**

The Awabakal exploited and managed the aquatic and terrestrial food, medicinal, and material resources around Newcastle and Lake Macquarie (Brayshaw 1987). Early colonial records indicate the Awabakal lived in open camps sites and constructed bark supported by wood stakes and/or trees (Brayshaw 1987:59). The Awabakal people would target resources when they were available, such as wild plums, cobra (maggots from grass trees), snakes, cockles, lizards, fish, flying-foxes, ducks, pigeons, kangaroo, possum, swans, wallaby, eels, crayfish, geese, oysters, honey, and goanna (Threlkeld 1974:54–67). Shellfish were a significant element of the Awabakal diet evidenced by the dense shell middens lining the foreshore at the time of European exploration (Brayshaw 1987:75; Grant 1803:155). Beached whales and dolphins were also consumed with groups within travelling distance invited to share the resource (Brayshaw 1987:77; Threlkeld 1974:55). The consumption of certain species however was banned or subject to limitation. For example, sperm whales (*berabakaan)* were not eaten and the consumption of Mutton birds was heavily regulated with eggs and young birds only eaten once a year (Miromaa Aboriginal Language and Technology Centre 2020:6; Threlkeld 1974).

Tools utilised to hunt, collect and process food resources included nets woven of grasses, wooden bowls, digging sticks, spear-throwers, boomerangs, bark and vine cords for traps, netted and woven dilly bags, shell hooks, stone axes, shell scrapers, and bark canoes (Brayshaw 1987:67; Grant 1803; Harris 1801; Paterson 1801a; Paterson 1801b; Threlkeld 1974:42, 54, 67). Threlkeld noted the Awabakal produced 3 different types of spears (Threlkeld 1974:67). The first was a fishing spear, known as *Kullára* or *Moting*, made of grass tree (*Xanthorrhoea*) stems and fire-hardened, hardwood sticks tipped with bone barbs. The sticks were fastened to the grass tree stem with bark cord and grass-tree gum to form prongs. The second, the hunting spear, was similarly constructed but with a single hard-wood end. The third spear, the battle spear, used the hunting spear as a base, but worked stone flakes were glued along one side to form a saw-like edge. Spears were traded west along the Hunter River and exchanged for possum fur products (Threlkeld 1974:42). War boomerangs, and wood and bark shields also formed part of the Awabakal material suite (Brayshaw 1987:22; (Threlkeld 1974:67–68).

Little clothing was worn but bodies were adorned. Men wore a headband of woven possum skin/hair on the forehead and a belt of possum skin/hair from which a pouch of woven possum hair was hung (Plate 6.3). (Threlkeld 1974:51). The pouch, which Threlkeld noted was called a *Múrramai*, held a stone (possibly quartz) talisman wrapped in possum skin that was crumbled and eaten to prevent sickness and which women were banned from looking upon (Threlkeld 1974:51). Portraits of Biraban suggest that feathers may have been woven into headbands, and armbands made from animal skin were also worn (see Plate 6.4 and Plate 6.5). Animal skin cloaks sewn together with sinew using bone awls were worn to protect from the elements (Brayshaw 1987:67; Threlkeld 1974:53).

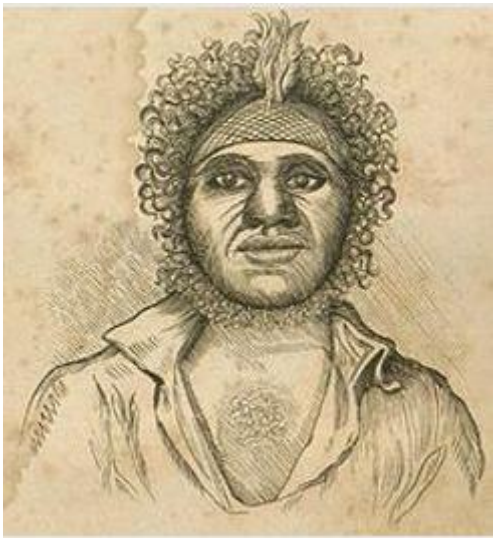


Source: State Library of NSW, call no. SAFE/PXE 1072

Plate 6.3 **Portraits of Aboriginal men from the Newcastle area, painted by James Wallis, from the *Album of original drawings by Captain James Wallis and Joseph Lycett*, ca. 1817-1818. The individual to the left is Burigon**

Source: State Library of NSW, call no. SV/147

Plate 6.4 ***Magil [Biraban], Corroboree dance*, attributed to R. Browne, c. 1819–20**



Source: Gunson 1966

Plate 6.5 ***Biraban*, Alfred Agate, c. 1846**

6.5 The Darkinjung people

6.5.1 General overview

The Darkinjung were known by early 19th century colonists as the 'Branch Tribe' due to their Country centring around tributaries of the Hawkesbury River (other than South Creek) (Ford 2010:67–68). Even so, members of the Darkinjung nation were often confused with neighbouring groups (Ford 2010). In 1897, ethnographer Robert Hamilton Mathews identified Darkinjung country covering the area from Jerry's Plains on the south side of the Hunter River, south to Putty, encompassing the Macdonald, Colo, and Hawkesbury Rivers (Mathews 1897:1). As such, Tindale (1974:193) describes the traditional country of the Darkinjung people (also Darginjang, Darkinung, and Darknung) covering 4700 square kilometres from south of Jerry's Plains, east towards Cessnock and south to Wisemans Ferry with the western boundary in the vicinity of Rylstone. The traditional country of the Darkinjung was bounded by the language and other groups identified by Tindale (1974) as Awabakal, Wonnarua, Geawegal, Wiradjuri, Gundungurra, Dharug and Kuring-gai (Tindale 1974).

By the time European settlement reached the Hunter River and northern boundary of Darkinjung Country a generation of Darkinjung had already experienced European settlement on the Hawkesbury (Ford 2010:77). It is likely the 'Wollombi tribe' identified by Brenton in 1835 were members of the Darkinjung, however, Wollombi Brook is described as a meeting place and fluid territory meaning it is possible the social structure of groups in this region were heavily impacted prior to the colonisation of the Hunter region (Brenton 1835; Ford 2010:77; Jones 2009:2-3). Therefore, Ford argues that Robert Miller's accounts of the Wonnarua may have also included lifeways and practices of the Darkinjung people (Ford 2010:325; Miller 1887).

6.5.2 Local beliefs and ceremonial practices

Ethnographic accounts record some information regarding the ceremonies and belief systems of the Darkinjung. The Darkinjung were among the language groups who held Baiame (also Baiamai, Bayme) as central to the Dreaming and Creation (Fuller 2020:94). Mathews (1897:94) account of the male initiation ceremony records Baiame was known as Daramulan at that time. Tradition tells that Baiame created the first people and handed down laws (Jones 2009:4). Following their creation, one of the first men ascended into the sky after he began to die from refusing to eat his totem, climbing a tree with notches (mundoes) that became the Southern Cross (Fuller 2020:96, 101; Jones 2009:4). Baiame himself stepped back into the sky from Mt Yengo, flattening its summit (Jones 2009:4). Mt Yengo and the surrounding area is significant for the Darkinjung containing men's and women's sites as well as teaching sites and occupation areas (Jones 2009:7). The Darkinjung also connected Baiame with the eaglehawk (Fuller 2020).

Laws and customs laid down by Baiame guided the daily lives of the Darkinjung (Jones 2009:3). Kinship was determined through a matrilineal system of moieties and totems evolved during the Dreaming, which guided relationships, ceremony, food consumption, and connections to Country (Jones 2009:3). The Darkinjung had a system of 2 moieties, which were further divided into four classes representing the sons of Daramulan (see Table 6.1). Ethnographer RH Mathews published a detailed account of the Darkinjung male initiation ceremony, the Burbung, the details of which he gathered from initiated men, Joe Gooburra and Charley Clark at the Government Reserve near Windsor (Mathews 1897:1). The hosting group would clear and prepare 2 circular areas of ground, including 1 for the initiation ceremony and the other camp site both of which were joined by a narrow path (Mathews 1897:1–2). Figural carvings were made in the ground and trees surrounding the site and a fire was kept burning on a hillock in the ceremonial circle (Mathews 1897:2–4). In addition, between 2 and 4 posts were embedded in the ground of the ceremonial circle, representing the clever men leading in the ceremony, which were connected by cord and rubbed with the blood of the clever men (Mathews 1897: 2–4). A quartz stone was placed at the base of the poles (Mathews 1897:2–4).

Three raised earth figures representing Dhurramoolun, a malevolent spirit named GhiJldarillg, and a third un-named figure were also constructed for the ceremony (Mathews 1897:2–4). The Burbung took place over 2 weeks and began with ceremonies in the cleared circle/s before the initiated boys were taken away and educated by men known as Koorillgal (Mathews 1897). The time away culminated with the initiates having their incisor tooth removed and hair cut off (Mathews 1897). Upon returning to the camp circle the boys would take up their mother's yam stick and the mother's would sit by their son and grieve the loss of their boy as the initiate was no longer permitted to return to their mother's camp (Mathews 1897:9–11). The Burbung was also used to settle civil issues between the groups in attendance (Mathews 1897:10).

Table 6.1 Totem system of the Darkinjung (from Darkinjung Aboriginal Land Council 2020; Paul Budde History, Philosophy n.d.)

Moiety	Class	Totem
Dilbi	Bya	Possum
	Kubi	Native bee Emu Bandicoot Eaglehawk Wallaroo
Kupathin	Kumbo	Grey Kangaroo
	Ipai	Diamond Python Wombat Black Snake Wallaby

6.5.3 Tools, weapons and apparel

Food, weapons, and material resource exploitation in the north of Darkinjung country likely parallels the Wonnarua and other surrounding groups (Brenton 1835; Ford 2010).

Ethnographic accounts, however, give insights into women's adornment not seen for the other groups. Brenton (1835) notes that the women of the Wollombi Tribe wore kangaroo teeth around their head and Mathews (1897:1) recorded that Darkinjung women wore headbands decorated with echidna feet, animal teeth and dingo tails.

6.6 Contact history

6.6.1 First contact and settlement of Newcastle

Captain James Cook (Lieutenant Cook at the time) noted the presence of the Hunter River during his expedition along the NSW coast in 1770 (Suters Architects 2007:1). Escaped convicts made forays into the areas surrounding Newcastle as early as 1791 but the first official European exploration of the area was undertaken by Lieutenant John Shortland in 1797 (Tuck 2003;Turner 1997). As Shortland was returning from his unsuccessful pursuit of a group of absconded convicts who had stolen the colony's largest vessel, the Cumberland, he noted the mouth of the Hunter River offered not only coal but also was rich in resources that could be exploited for salt production (necessary for preserving food), shell lime production, and the creation of salt fish (important colonial food source, especially for mariners) (Suters Architects 2007:1).

In 1801, Governor King sent troops and 16 convicts to Newcastle to establish a small post at Colliers Bay in 1801 to 'procure coal, timber and lime for the government' (Callen 1994:13). The success of the post led Governor King to establish the 'King's Town' penal settlement in 1804 (Suters Architects 2007:23). Due to the settlement's limited size, local Aboriginal people had more freedom than groups in Sydney (Dunn 2015:110). Cultural and ceremonial life remained largely undisturbed and both societies frequently interacted. Even so, expanding settlement in the Sydney region along with a smallpox epidemic in 1789 and other introduced diseases had significantly altered the social fabric and population of local groups (The Council of the City of Maitland 1983).

Convict teams as well as free merchants began to exploit the cedar and coal resources along the Hunter River soon after the establishment of the penal settlement (Suters Architects 2007:23). Both violent and friendly encounters between the colonists and local Aboriginal groups along the Hunter River were reported over the first 2 decades of the 19th century with violent encounters more frequently recorded among the heavily armed free merchants (Dunn 2015:77–98). Aboriginal groups were often involved in providing the settlement with food through hunting and fishing and Lieutenant Menzies aimed to maintain a friendly relationship and minimise violent encounters between the convicts and the Kings Town penal settlement and Aboriginal people (Dunn 2015:104–9). Even so, there were a high number of instances of convicts and bushrangers attacking and abducting Aboriginal girls and women (Dunn 2015). Moreover, the use of Aboriginal trackers to retrieve absconded conflicts led to a tense relationship and resentment in the colony's convicts (Dunn 2015:104–5). Despite several murders of Aboriginal people in the Newcastle region during the penal settlement phase, escaped convict John Kirby was the only colonialist prosecuted, and later executed, for the murder of an Aboriginal man in 1820 (Dunn 2015:110). The murdered man was named Burigon, also known as Jack, and was the friend of Commandant James Wallis (Plate 6.2) (Dunn 2015:109–10). In 1822, Governor Macquarie reclassified Newcastle as a free settlement and the convicts were moved to Port Macquarie (Suters Architects 2007:3).

In 1823, Government Surveyor Henry Dangar was commissioned to plan the free settlement on the site of the convict settlement (Suters Architects 2007:3–4). Developments in steam engine technology led to rising interests in coal resulting in London-based merchant firm the Australian Agricultural (AA) Company shifting focus from agriculture to the coal industry (State Library of NSW 2021). In the 1820s the AA Company selected 2000 acres of land on the west boundary of the Newcastle settlement for the exploitation of coal (State Library of NSW 2021). Aboriginal people continued to maintain traditional hunting and gathering methods in close proximity to Newcastle throughout the 1820s and 1830s (Threlkeld 1974), but interference, conflict, increasing alcohol abuse, and regional drought resulted in the deterioration of the relationship between Europeans and Aboriginal groups (Clouten 1967:31). Moreover, the commercial exploration of coal brought people to the region and the AA Company established the first suburbs of Newcastle (Suters Architects 2007:4). Settler and Aboriginal groups were forced to battle over diminishing resources, ensuring a cycle of violence both between colonialist and Aboriginals, as well as between neighbouring Aboriginal groups (Clouten 1967:31). Due to this, there was a large movement of Aboriginal groups away from the settlement area by 1840 (Clouten 1967:31).

In 1825, Reverend Lancelot Threlkeld established a mission, known as 'Bahtahbah', on Lake Macquarie at Belmont, south of the Newcastle settlement (Gunson 1967). The mission was officially inhabited in 1826 and aimed to educate the local Aboriginal people in Christianity and agriculture (Gunson 1967). The mission became a safe place for the Awabakal and surrounding groups during growing violence and dispossession (Threlkeld 1974). Around 1831, Threlkeld relocated the mission across the lake to Ebenezer (present day Toronto) (Gunson 1967). The mission was closed in 1841 due to low population numbers and lack of converts (Gunson 1967). This was a trend that was seen throughout New South Wales due to conflict between those living on the missions and surrounding communities (Tuck 2003).

6.6.2 Occupation of the Hunter Valley

The spread of colonialists from Sydney Cove was largely driven by the search of rich pastural lands. In 1818, Governor Macquarie sailed up the Hunter River and chose the site of Wallis Plains (Maitland) to be the first free township in the Hunter Valley and that the region should be surveyed for occupation (Wollombi Valley Progress Association 1981:14). In 1819, John Howe was charged with finding an overland route into the Valley from Windsor and by November Howe had reached Jerry's Plains (Brayshaw 1987:9). The following year Howe led an expedition party back into the Valley reaching Patrick's Plains (Singleton) via Bulga, before trekking to Wallis Plains (Wollombi Valley Progress Association 1981:14). A road was constructed along this route in 1823 opening the lower Valley to colonialists (Wollombi Valley Progress Association 1981:14). The upper Hunter Valley was reached in 1823 when Allan Cunningham led an expedition to Dartbrook from the west (Brayshaw 1987:9).

In 1822, Assistant Surveyor Henry Dangar was charged with surveying future land grants in the lower and upper Hunter Districts (Gray n.d.). The Hunter Valley expeditions recorded minimal interactions or sighting of Aboriginal people, however upon reaching Dartbrook in October 1824, Dangar was visited by a group of 15 Aboriginal people and later observed 8 to 10 fires within 20 kilometres, potentially representing campsites (Brayshaw 1987:9, 46). In 1825, botanist Allan Cunningham led a further exploration into the region around Jerry's Plains but colonialist s had already begun to establish farms in the area (Turner 1996:15). At the completion of Dangar's survey in 1826, 504,305 acres (2041 square kilometres) had been 'appropriated' to settlers, churches and schools (Brayshaw 1987:10). Occupation of the Hunter Valley was swift (Dunn 2015:15). By 1826, all river front land had been taken up and by 1827 cattle, horse, and sheep numbered in the tens of thousands (Australian Museum Business Services 2005:39; Dunn 2015:39). As a result, Aboriginal people were rapidly displaced from their Country and relationships between the incoming colonialists and local Aboriginal groups become a blend of friendly, resentful, and violent (Dunn 2015:12).

6.6.3 Frontier conflict

As the first colonialists moved into the Hunter Valley region enterprising Aboriginal people offered their services to guide grantees through the landscape to their land grants (Dunn 2015:191). Once arrived on the grant, however, colonialists staked their claim to the landscape through clearance and fencing, which reframed Aboriginal people as an unwelcome other (Dunn 2015:191). European occupation blocked local Aboriginal groups from accessing traditional food and water sources whilst also hindering movement though country. This, in-turn, led to a reliance on colonialists and European products (Dunn 2015:250). Some Aboriginal people chose to work on the estates and small farms of the Hunter from the first years of occupation, which gave access to European goods and allowed groups to retain some connection to their traditional Country (Dunn 2015:250–51). However, organised raids of corn and livestock theft in districts increased resentment of landholders and their farm labourers (Dunn 2015:191–95). In addition, fear garnered by the 'Wiradjuri Wars' in the Bathurst and rumours that Wiradjuri from the Mudgee had joined Hunter groups, who were responsible for raids around Wollombi, raised further tension leading to increasing Aboriginal/ colonialist violence in the Hunter Valley between 1825 and the 1830s (Dunn 2015:195).

Acts of violence and the massacre of Aboriginal people is reported to have occurred within and in proximity to the project impact area. The Aboriginal people of the Hunter Valley appeared to have targeted their attacks on individuals and properties that were antagonistic or had a previous history of violence, whereas killings perpetrated by Europeans were primarily acts of vengeance (Dunn 2015:200–210). The killing of Robert Greig and an unnamed convict shepherd at James Greig's Martindale Estate by a small group of Aboriginal men marked the beginning of 2 years of constant unrest in the Hunter (Clive Lucas 2013:44). In late 1825, Francis and Archibald Little's farm at Invermein and Peter McIntyre's farm at Segenhoe were raided and travellers were robbed on the road near George Bowman's Ravensworth Estate and McIntyre's farm (Dunn 2015:196). In these cases, the Aboriginal perpetrators escaped European retribution parties (Dunn 2015:196).

Between 15 and 30 November 1825 at least 6 Aboriginal people were killed at their camp in Garland Valley near Putty by a party of soldiers and constables, who mistook the group as the party that attacked two shepherds, killing 1, on the road from Windsor to the Hunter (Ryan et al. 2022 *Garland Valley, Putty*).

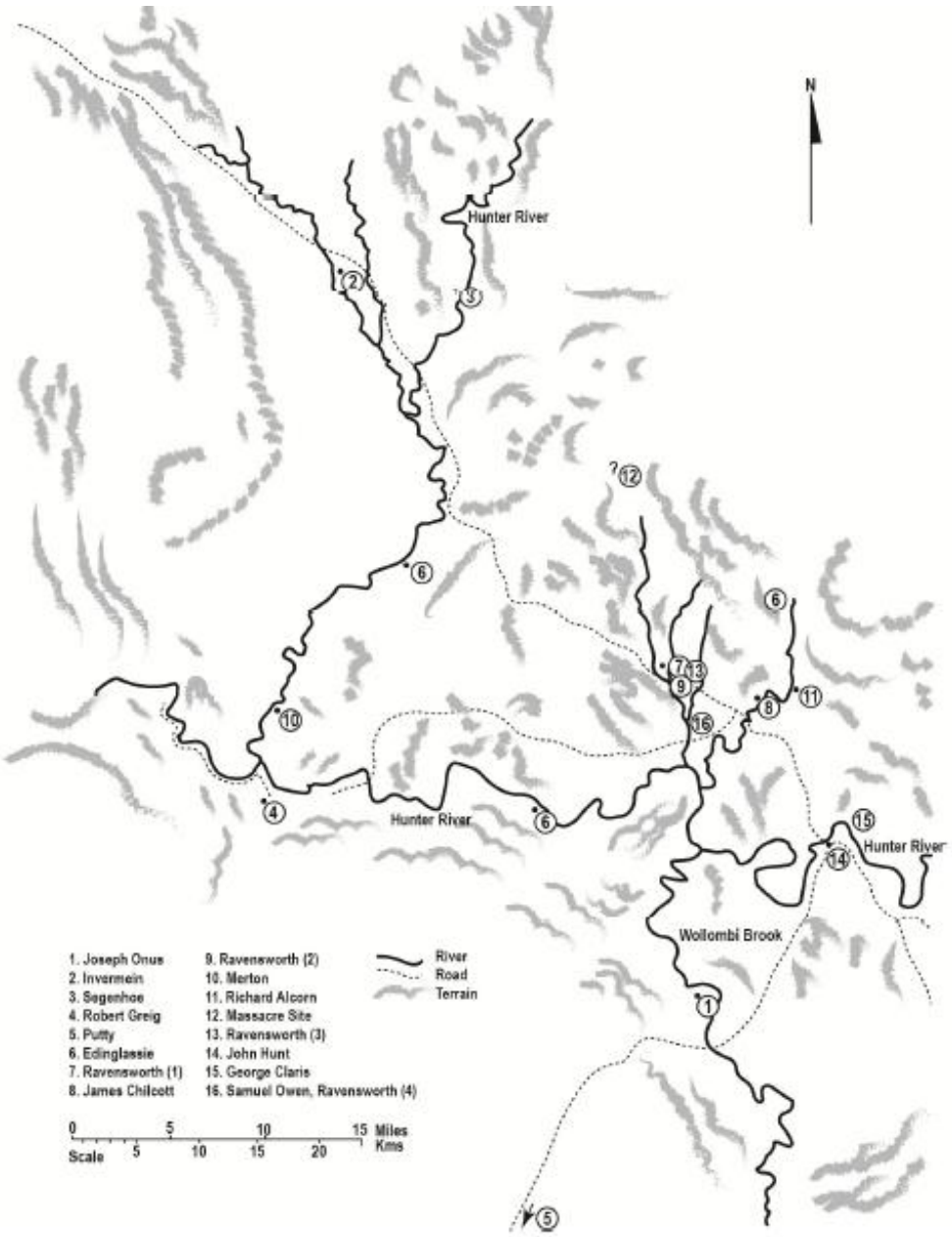
Violence continued into 1826 with the spearing of a shepherd and raiding of a hut on George Forbes' *Edinglassie* Estate and the attack and later killing of stockmen working on Ravensworth Estate (Dunn 2015:200). The magistrate William Ogilvie and an Aboriginal man negotiated the return of the property from *Edinglassie* hut and a man known as 'Billy' who was involved in the *Edinglassie* raid was taken to Newcastle gaol (Dunn 2015:200). The continued attacks prompted the deployment of soldiers and mounted police into the Hunter Valley in June 1826 (Dunn 2015:200). Nevertheless, raids continued, hitting James Chilcott's hut on Fal Brook and 2 labourers were speared on Ravensworth (Dunn 2015:201). Threlkeld records that colonialists were also perpetrating violent acts around this time with Biraban stating an Aboriginal man had been shot and hung in a tree with a corn cob in his mouth as warning to others planning raids (Dunn 2015:206). Over July and August of 1826, Threlkeld (1974:92–94) was told of Aboriginal people being mis-treated and killed by mounted police when taken into custody (Dunn 2015:201–8). Although witness statements varied, the reports included: the execution of a man known as Jackey Jackey, believed to be involved in the Ravensworth attacks at Wallis Plains gaol; the shooting of 1 of 3 Aboriginal prisoners near Lochinvar and the execution of an Aboriginal man at Ravensworth (Dunn 2015:205–6). In addition, on 12 August 1826, an Aboriginal man believed to be involved with the attacks at Ravensworth was tied to a tree and shot, his body left at the site (Dunn 2015:201–3). Similarly, at least 3 individuals from around 7 men and boys identified to be involved in earlier raids were shot and hung up by the mounted police after attempting escape on the route to Wallis Plains (Dunn 2015:203–4).

The anger of the Aboriginal people of the Hunter at their treatment at the hands of the military and mounted police led to a gathering of a large war party at Ogilvie's farm at Merton in the last week of August 1826 (Dunn 2015:208). Mary Ogilvie had prevented the arrest of the lead warrior 'Jerry', and the group came to question why she did not prevent the arrest in mid-August of two boys who had been working on the farm, Tolou and Mirroul, given her influence (Dunn 2015:208). Mary's son William told the group that she had tried to prevent the arrest, but the mounted police took the boys at night and the family could not get them released until William Ogilvie snr returned from Sydney (Dunn 2015:208). The group was appeased with the boy's answer and the 2 Aboriginal boys were released from Newcastle gaol upon his father's return (Dunn 2015:208).

On 28 August 1826, a group of 15 Aboriginal men came to the hut of Richard Alcorn, his family, and workers on the Bridgman Estate at Fal Brook (Dunn 2015:208). Despite friendly initial interactions between the Aboriginal group and the hut's occupants, the return of Richard Alcorn insighted the Aboriginal group to attack the hut killing and wounding a number of the hut's men (Dunn 2015:209–10). In reprisal for the attack, a Wonnarua camp was set upon on 1 September 1826 and at least 18 Wonnarua people were killed with more injured *(*Ryan et al. 202*2*). This massacre event is also known locally as the Ravensworth massacre, despite being noted as 'in the neighbourhood of Glennys (Glennies) Creek'. Another skirmish took place at Ravensworth in September 1826 when a group of labourers working on fencing were attacked, however dogs alerted the labourers to the incoming Aboriginal group allowing them to fire their guns injuring one of the attacking groups and fending off the attack (Dunn 2015:215). A few months later in November 1826, John Hint, a constable at Patricks Plains, reported his infant daughter had been abducted from the family's hut and the suspect was named as the warrior *Byirybyrry* (Bit-O-Bread), however the resolution to the case was not published (Dunn 2015:223).

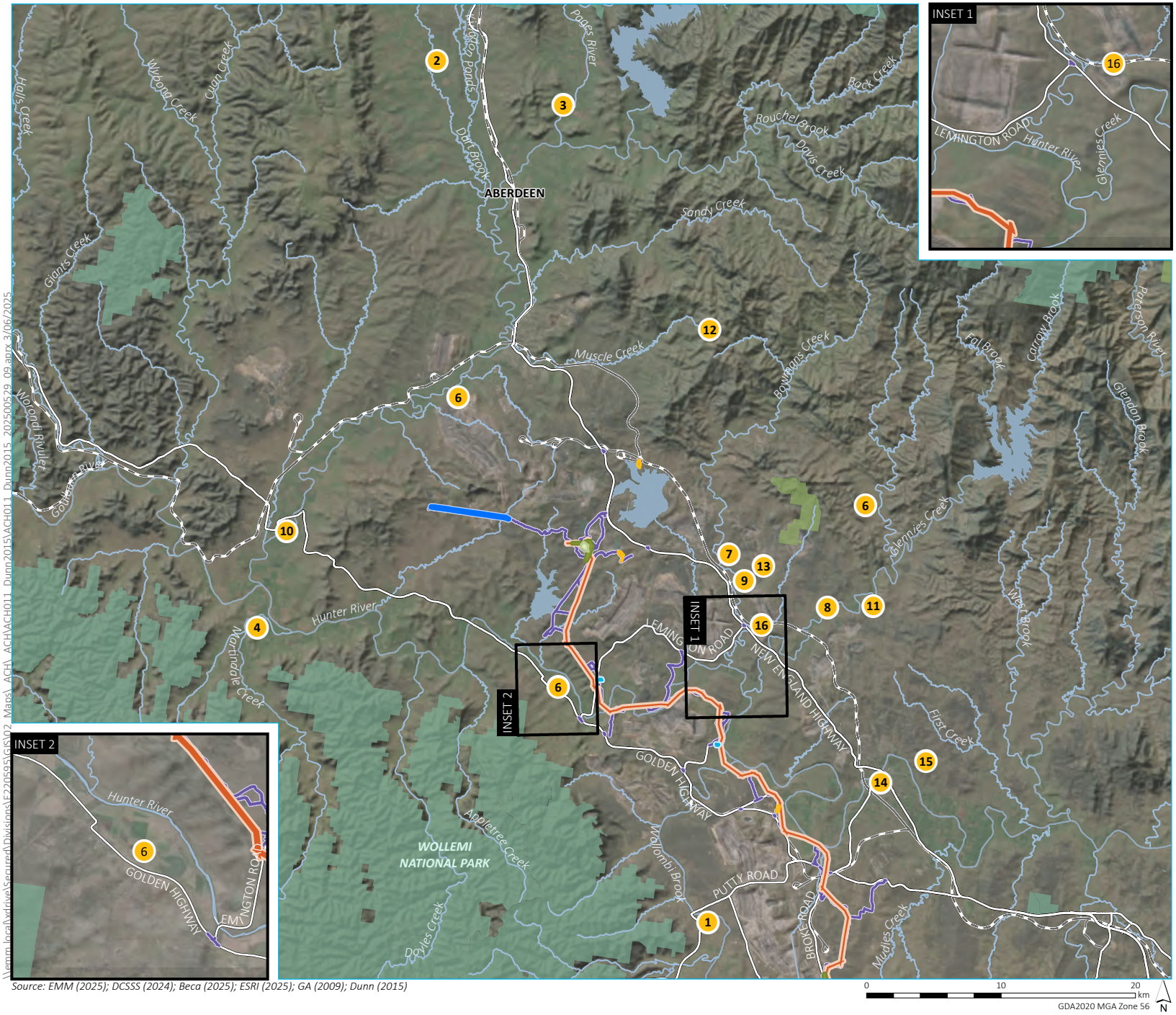
In an attempt to secure the safety of their property and labourers, 11 colonialists on properties from Lochinvar and Maitland to Merton and Segenhoe signed a petition requesting Governor Darling send additional troops to the Hunter (Dunn 2015: 216–17). Governor Darling rejected the request and argued that they were worried landholders should oversee their properties in person and take a united defence against the threat (Dunn 2015:216–18). Moreover, it was suggested the landholders should keep their labourers from assaulting Aboriginal women and inciting conflict with the Aboriginal people (Dunn 2015:216–18).

Violent encounters continued into 1827. Between 22 February 1827 and 25 February 1827, a shepherd on EG Cory's farm on the Paterson River was wounded for killing a dog belonging to the Wonnarua, which had been attacking sheep, and the farm's crops were set alight (Ryan et al. 2022 *Paterson River, Hunter Valley*). After an ineffective search conducted by the mounted police, colonialists formed a reprisal party and opened fire on an Aboriginal camp in the vicinity of McLeod's Estate, killing around a dozen of the group (Ryan et al. 2022). The party also pursued the retreating Aboriginal people into a waterbody resulting in a number drowning (Ryan et al. 2022 *Paterson River, Hunter Valley*). In March 1827, there were 2 instances of Aboriginal groups confronting and intimidating colonialists at the hut of George Clarison's *Redbournberry* Estate at Patricks Plains and Fal Brook but the encounters did not turn violent (Dunn 2015:223–24). Significantly, in May 1827, Lieutenant Lowe of the mounted police was brought to trial in the Supreme Court for the wilful murder of 'Jackey Jackey', the first time an officer had been brought to trial for the death of an Aboriginal person (Dunn 2015:218–21). Despite witness statements, Lowe was found not guilty (Dunn 2015: 218–21). Nevertheless, confrontations between European colonialists and Aboriginal people began to wane by the second half of 1827 and there are few reported events following this period (Dunn 2015:226). A massacre of all but 1 member of a Worimi camp did occur in the Hunter region in 1841 as a reprisal for the killing of 2 stockmen on *Walleroba* Station on the Williams River (Ryan et al. 2022*)*. It is also likely Aboriginal/ colonialist violence occurred beyond the above events but were not reported. For example, oral histories hold that a massacre of Wonnarua occurred at 'the pocket', Mount Arthur, south of Muswellbrook (Environmental Resources Management Australia Pty Ltd 2004:84), although the original references of this extend back only the 1980s. Dunn (2015:228) created a map showing the location of a number of the above events (see Plate 6.6; Figure 6.1).



Source: Dunn 2015: 228

Plate 6.6 **Map showing the reported incidents of frontier violence in the Hunter Valley, chronicalled between 1825–1827. Dunn (2015) indicates that the 'massacre site' (12) is speculative based on distance and contemporary reports of the incident**



KEY

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31, 32 and 81)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track
- Reported incidents of Aboriginal violence (Dunn 2015)

1. Joseph Onus
2. Invermein
3. Segenhoe
4. Robert Greig
6. Edinglassie
7. Ravensworth (1)
8. James Chilcott
9. Ravensworth (2)
10. Merton
11. Richard Alcorn
12. Massacre Site
13. Ravensworth (3)
14. John Hunt
15. George Claris
16. Samuel Owen, Ravensworth (4)

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

Reported incidents of frontier violence between 1825-1827 (Dunn 2015)

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 6.1

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); Beca (2025); ESRI (2025); GA (2009); Dunn (2015)

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6.6.4 Surviving dispossession and loss in a European-dominated society

The violent encounters between colonialists and Aboriginal people were occurring at the same Aboriginal people were working on farms and estates. Aboriginal people were an essential seasonal labour source for the Hunter River region, particularly for small farmers who were not eligible for convict assignment and who could not afford additional free European labour (Dunn 2015:251–53). Traditional skills such as bark-getting and forming, and tracking were highly valued by colonialists (see Plate 6.7) (Dunn 2015:254). Seasonal labour allowed groups to access European goods for consumption or trade whilst maintaining a traditional movement and ceremonial calendar (Dunn 2015:253). Aboriginal people also offered their services in towns such as boating, wood getting, water gathering, trading of traditional tool, and collecting scientific samples and other task work (Dunn 2015:259). Towns also offered protection from frontier violence and regular access to food and other European goods (Dunn 2015:259).

Source: State Library NSW, call no. 630.991/1A9

Plate 6.7 ***A party preparing to Bivouac,* from *An account of the state of agriculture & grazing in New South Wales,* by James Atkinson, 1826, p137**

In 1827, it was estimated that a little over 1700 Aboriginal individuals were living in the area from Lake Macquarie and Newcastle to Merton in the Upper Hunter Valley (Dunn 2015:68, 226). These numbers, however, only included Aboriginal people observed in settlement areas and on a selection of estates and farms (Dunn 2015:226). In 1830, an Aboriginal group of around 60 men, women and children was observed camping on Wollombi Brook near Broke, however a few years later visitors to Hunter region noted the 'the natives have almost all disappeared from the valley of the Hunter' (Brayshaw 1987:48; Dunn 2015:47). Starvation and disease, including a small-pox epidemic between 1829 and 1831, contributed to the falling population of the Hunter from the 1840s (Brayshaw 1987:48–49). Nevertheless, ceremonies continued around Bulga into the 1860s and Aboriginal people continued to come into towns and stations for work, food and blankets into the 1890s (Dunn 2015:260).

In 1893, the Board for the Protection of Aborigines was established to provide recommendations concerning the welfare of Aboriginal people and to manage Aboriginal Reserves in NSW (Find and Connect 2023). As part of this program, Aboriginal children were taken from their families and placed on missions and reserves where they learned skills that the Board hoped would help them integrate into European society (Archives Authority of NSW 1998). Between 1890 to 1891, 2 reserves were created in Singleton, one at Glennies Creek, known as St Clair, and the other at Redbourneberry Hill on the banks of the Hunter (Nolan 2012:23). Both missions were established on the site or in the vicinity of seasonal camps (Clarke 2021:24–25). Other missions included Swansea mission, established in 1887 and St Heliers, on the outskirts of Muswellbrook, which housed Aboriginal children taken from their parents from 1945 until its closure in 1986 (Biosis Pty Ltd 2011; Colonial Secretary 1883). While the missions aimed to make Aboriginal people productive through European farming practices and religion, families continued to practice language in secret and supported themselves through the sale of traditional artefacts (Nolan 2012:33, 55). Moreover, Daniel Morrison helped the occupants of St Clair to organise a corroboree performance in 1888 (Nolan 2012:33). Missions were closed in the early 20th century and St Clair was converted to a children's home known as Mount Olive (Nolan 2012:33). Members of the mission communities moved to Redbourneberry Hill common in Singleton, residing in homes built from kerosene tins and hessian bags, or Walhollow Station/Caroona Mission near Quirindi (Clarke 2021:25; Nolan 2012:25).

By the mid-20th century, Aboriginal people begun to move to Newcastle and Lake Macquarie to escape the oppression of the Aborigines Protection Board and to gain employment (Kuskie 1997). The main sources of local employment during this time were Broken Hill Propriety Limited and the Department of Railways, with Aboriginal people living in shanty settlements or in tent villages near the railway lines (Kuskie 1997; Maynard 1999). In the 1930s, a new policy of assimilation was created to try and absorb Aboriginal people into the wider community and, by the 1940s, the Newcastle Area under the Aboriginal Resettlement Scheme encouraged further migration to the region, however the Board's program of removing children remained in place under the newly established Aborigines Welfare Board (Find and Connect 2023).

The detrimental effect of European settlement on traditional lifestyles cannot be overstated. What had been a thriving and diverse local Aboriginal community was, in the span of several years, decimated by European colonisation. Colonisation brought disease and dispossession, which in turn engendered State-sanctioned acts of violence. Colonial retributions and the forceful removal of Aboriginal men, women and children from their traditional homes are still remembered in the local Aboriginal community, and these events have come to symbolise the violent nature of the European invasion of their lands, and of attempts to destroy the Aboriginal identity, and assimilate into the white community. These events also demonstrate the strength of the local Aboriginal community in surviving and retaining their identity in the face of systematic attempts to remove them from their lands. Today, the contemporary traditional custodians of the ACHA study area maintain their cultural links to Wonnarua and Darkinjung people of Hunter Valley and the Awabakal country, family and aspects of traditional life including language revival (Ford 2010; Nolan 2012). Custodians fulfil their cultural responsibilities to care for country and for their cultural heritage places across Newcastle and the Hunter Valley.

6.7 Synthesis of the ethnohistorical record and contemporary connections

The ethnohistorical record demonstrates a rich history of Aboriginal occupation and tradition in the project impact area. A review of this literature helps inform a contemporary understanding of precolonial social and cultural life, which for the purposes of this assessment can be summarised as:

- the key groups with traditional responsibility for the project impact area include the Wonnarua, Darkinjung and Awabakal
- ethnographic and archaeological records indicate that, prior to and during early phases of colonial settlement, Aboriginal modes of occupation and economic activity were quite typical of societies local to the region. Traditional beliefs and ceremonial practices focused on regionally significant ancestral-mythological entities and Creation figures such as Baiame and Koign. The male ritual domain (including initiation or *bora/burbung* and ceremonial travel) were the subject of ethnographic attention, as well as larger, more public ceremonial gatherings and cultural protocols for mortuary, hunting and other practices
- systems of totemic affiliation were documented, and several specific sites of totemic significance are identified in the ethnographic record. Places of broader traditional significance (association with mythical or malevolent entities; sources of ochre and other ceremonial material) are identified throughout the region
- the archaeological record indicates that the ACHA study area was subject to Aboriginal occupation for at least 20,000 years prior to colonial settlement, which imposed dramatic impacts upon Aboriginal people, societies and their ways of life
- the history of occupation was marked by varying levels of hostility and cooperation, while frontier violence, massacres and more gradual, systemic structures of elimination and control feature prominently in literature and Aboriginal oral histories.

Contemporary custodians of the ACHA study area demonstrate connections and responsibilities with varying levels of continuity to those documented in early literature. Two centuries of colonial settlement and occupation have heavily altered and impacted the ways Aboriginal people live in relation to their ancestral terrains, and many features of Aboriginal life documented in early records are no longer observable today. However, also apparent are ongoing projects of cultural and linguistic maintenance and revitalisation. Some of the records cited in this section directly inform such efforts, while more recent scholarship seeks to rectify or reassert local Aboriginal connections to and ownership of Country (Maynard 2013; see for example Wafer 2014; Wafer and Howie 2023).

Dynamics of contemporary custodianship in the ACHA study area are comparable to those observed in neighbouring Aboriginal groups with similar geographies, cultures and historical experiences. In the broader region, particularly in relation to development proposals, it is common for the responsibility to care for ancestral Country to be framed as a cornerstone of contemporary Aboriginal identity. Elders and knowledge holders often refer to such responsibilities in terms of totemic relationships with native species; spiritual connections with particular sites or areas of cultural significance; belief in Creation or Dreaming narratives as well as experiences with mythological entities; and the need to preserve or otherwise care for sites of archaeological and cultural significance.

7 Cultural values mapping

7.1 Summary of this chapter

This chapter focuses on cultural and/or intangible values associated with the Hunter Transmission Project (HTP, the project) impact area. This includes a review of previous studies that explored these values, along with specific activities undertaken for the project. The latter included liaison with Elders and key knowledge-holders and a range of on-Country meetings and investigations to further understand such values and how they intersect with the project.

In summary:

- Early co-design workshops undertaken at the start of the Aboriginal cultural heritage assessment (ACHA) process identified a number of potential cultural values, Dreaming places and stories within the ACHA study area. Predominantly these referred to large promontories, notably Mount Yengo, Mount Warrawalong and Mount Sugarloaf, and views to and from these features. Ceremonial activities in the vicinity of Martinsville and a Dreaming story associated with Lizard Rock were also noted. Project refinement was undertaken throughout 2024, and as a result, several places have now been avoided, most notably the relocation of the project impact area to the west of Martinsville.

- Detailed cultural mapping was subsequently undertaken by an anthropologist, Elders and key knowledge-holders for the project impact area. This study built on previous studies and ultimately identified 32 places of archaeological, traditional, historical and/or contemporary value to the Aboriginal community. These reiterated the importance of major promontories and several water sources in the region, as well as focusing on a number of archaeological sites either known and/or identified through the field program. Eight of these are within or intersect the project impact area, primarily through the broader cultural landscapes and/or view-lines associated with these places.

- Key view-lines to and from major promontories were also discussed and further explored to determine the values associated with them and how the project would affect them. The visual impact assessment (see *section 7.3.3*.) demonstrated that the project would result in limited impacts, but perceptions of some participants were that 'connections' between sites and opportunities to teach future generations would be disrupted.

- Mitigation measures and activities that may offset perceived harm to cultural places and values identified as part of the cultural values mapping study were explored and are outlined. These include additional Aboriginal-led cultural awareness training and inductions for all construction personnel; monitoring of activities during the construction to ensure they are being undertaken in a culturally-appropriate manner implementation of detailed archaeological investigation of sites near the project impact area, notably within the Flat Rock Lookout cultural landscape; and ongoing engagement during the project.

7.2 Previous investigations

The following sections provide an outline of previous studies, typically in HTP North, where efforts have been made to specifically investigate cultural values. Several of them intersect and/or are within close proximity to the project impact area.

7.2.1 Hunter Valley Operations mining complex continuation project cultural values mapping study

As part of the proposed Hunter Valley Operations mining complex continuation project, a cultural values mapping study was undertaken by Dr Philip Clarke in 2021 (Clarke 2021). This study focussed on the Hunter Valley Operations mining complex continuation project area and its immediate surrounds, which encompasses portions of HTP North.

The project included interviews and/or participation of 6 Wonnarua Elders and/or knowledge-holders, several of whom are involved in this project. It included a workshop and interviews with these individuals to identify places of contemporary, traditional and/or historical value to the Aboriginal community. While much of the report is publicly redacted, it outlines 7 places in the vicinity of the project (see Figure 7.1):

- Baiame Cave (story place and archaeological site)
- Broke Cemetery (historic place)
- Loder/s Creek (archaeological place)
- Lookout Point (story place)
- Redbournberry Hill (historic place)
- St Clair Mission (historic place)
- Wallaby Scrub Bora ground (story place and archaeological site).

Of these, several were also identified as part of the project (see *section 7.3.2* and *section 7.3.3*). Only 1 site, 'Loder Creek', was identified for its archaeological values lies within the construction impact area. The archaeological values of this creekline are addressed in *section 7.3.3* and *Chapter 8 (Archaeological context)*, and reflect significant cultural materials encountered during the establishment of Bulga coal mine. The remaining 6 places are all a considerable distance, generally several kilometres, from the project.

Acknowledging that information may be confidential and not shared where it is not necessary to do so, the data presented in Clarke (2021) did not indicate that any cultural places or values are present within the Hunter Valley Operations project area, and certainly not within the boundaries of Hunter Valley Operations mining complex.

This figure has been redacted from this report due to culturally sensitive information.

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7.2.2 Glencore United Collieries ACHA (Tocomwall 2015)

In 2015, Tocomwall was engaged by Glencore to undertake an independent cultural heritage assessment from the perspective of the Aboriginal community to accompany a forthcoming ACHA for an expansion of United Collieries (now part of the Mount Thorley Warkworth mining complex) (Australian Cultural Heritage Management 2016). This report outlined the history of the Wonnarua people associated with a former native title claim, as well as ethnographic accounts of contact and post-contact settlement throughout the Hunter Valley. It also highlighted that, in the view of Tocomowall, the investigation and/or protection of places of archaeological significance are disproportionately tied to tangible sites without recognition of intangible cultural values (Tocomwall 2015). This was further explored through the review of predictive models used throughout archaeological research and how it is utilised to form hypotheses and testing methodologies. The information provided in this report has informed the ACHA and the cultural values mapping investigations, although attempts to engage participants in that study were not successful.

A desktop review identified and mapped the intangible (n=12) values associated with the study area (see Plate 7.1). This included Dreaming stories, significant places and/or people that were linked to the wider landscape (Tocomwall 2015:81):

> If we traverse the cultural landscape from Mt Yengo in a northerly direction we find that the culturally significant sites are linked both by song lines and travel routes of the Wonnarua People, namely:
>
> - Mt Yengo – Tiddilick the Frog - Yellow Rock – Lizard Mountain - Sentinel Mountain – Baiame Cave – Bora Ground at Bulga – Bora Ground at Warkworth – Dural region – continuing north towards Burning Mountain
>
> - East of the Bora ground at Bulga we also have the Gold Ochre Quarry, which coincides with the initiation song line that flows through PCWP Country between Lake St Clair and Jerry's Plain
>
> - Additionally there is the fire song line that connects with the initiation song line and ceremony at Dural, which has been described as an important ceremonial area – and is also associated with the Hunter River – and flows northward to sacred site of Burning Mountain and westwards towards Putty where it eventually joins up with sites associated with the Sydney Aboriginal clans.

Of these, only the Gold Ochre quarry is in the proximity to the project and/or not captured through activities in *section 7.3*. The spatial description of this site is poor (and not within the Heritage NSW Aboriginal Heritage Information Management System (AHIMS) database), but is described as (Tocomwall 2015:80):

> The gold ochre site is a site with spiritual values that derive both from its important association with traditional ceremonial practice and its contemporary rediscovery as a result of the intervention of ancestral spirits. The site is known to many members of the PCWP [Plains Clans of the Wonnarua People native title applicant –withdrawn at the time of this report] because of their participation in a smoking ceremony that occurred at its location upon its rediscovery in the early 1990s. This location is in the vicinity of the Mt Thorley Rail Loop and Loading Pad, to the north of the [Bulga Coal Mine], and adjacent to Loders Creek.

Additionally, archaeological values in relation to the Glencore United Collieries project were viewed in a scientific light to demonstrate the cultural remains of everyday life left by their ancestors. The report emphasised that little to no attention was given to separating the archaeology between men and/or women's business. Likewise, the report detailed that the cultural landscape as a whole should not be accessed or weighted in terms of individual finds or places and that significance should be drawn from a more complete picture. Overall, the study area contained historical, social, aesthetic and scientific values relevant to Tocomwall and the cultural landscape from which they originated.

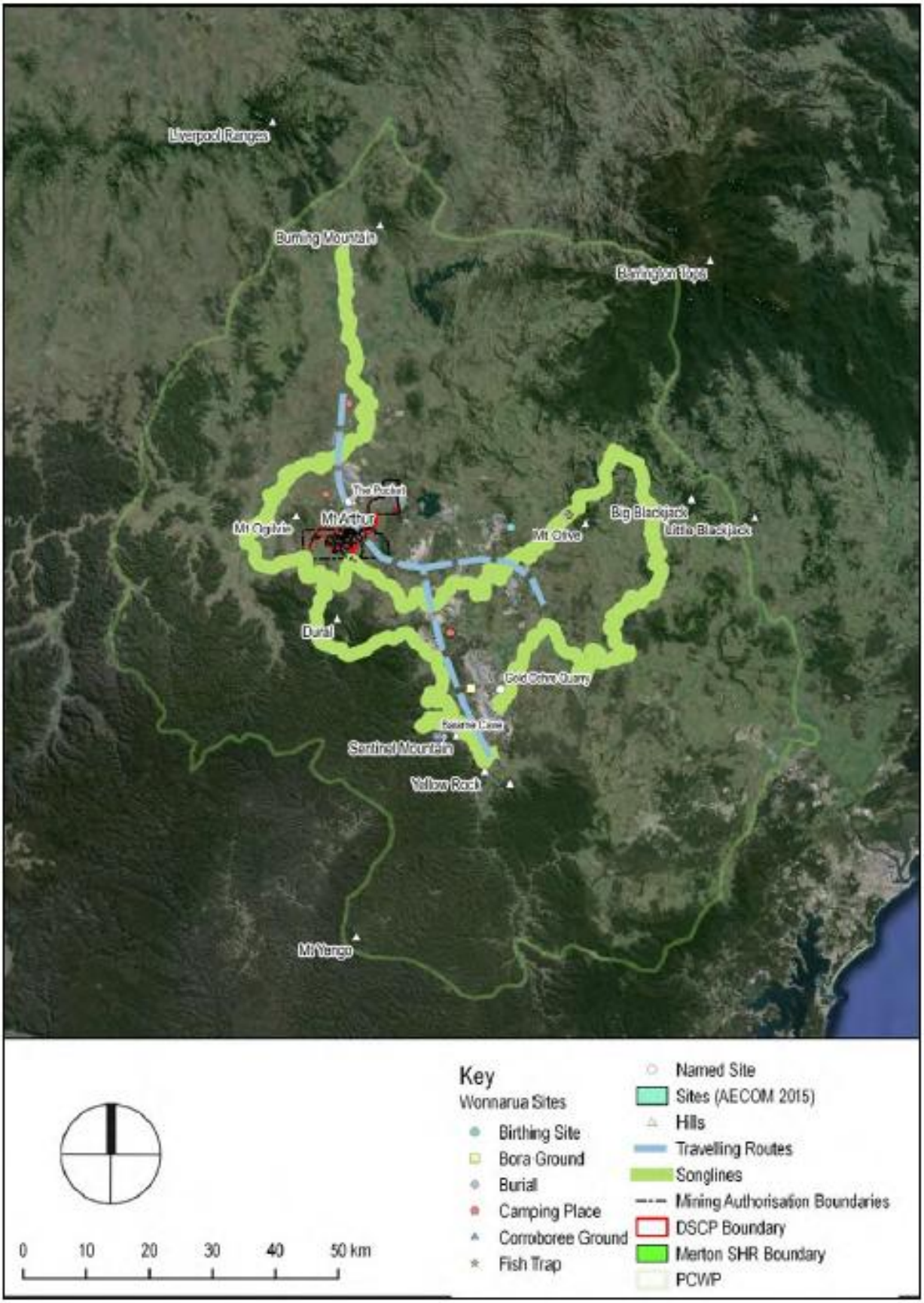


Plate 7.1 A map of cultural places and songlines as presented in Tocomwall (2015)

7.2.3 United Wambo Open Cut Coal Project ACHA (ACHM 2016)

Australian Cultural Heritage Management (ACHM) completed an ACHA for the United Wambo Coal Project (now part of the Mount Thorley Warkworth mining complex) to accompany an existing Aboriginal cultural heritage management plan (ACHMP) for the site (ACHM 2016). This report included a cultural values mapping study undertaken by the Wonnarua Nation Aboriginal Corporation in 2015 (see *section 7.2.2*).

Key findings included discussions surrounding the harm of coal mining throughout Wonnarua Country and the need for more emphasis and responsibility to be placed on Aboriginal participants, rather than solely on archaeological endeavours. The report concluded there remained/s a strong cultural connection to the landscape and ancestors who originated from Wonnarua Country across the region but not specifically in regard to the relevant study area. No other myths, creation stories, song lines or other mythological associations were connected with the United Wambo Coal Project or its immediate environs, which would extend to parts of the project impact area near Loder Creek.

Archaeologically, the majority of sites identified throughout the ACHM ACHA[3] were assessed as having low scientific significance due to historic disturbance throughout the study area. There would be direct impacts to a total of 127 sites if works were approved. These sites include 80 artefact scatters, 45 isolated finds and 2 potential archaeological deposits (PADs). One site, Wambo 202 (#37-5-0343), would be partially impacted by works.

Indirect impacts were difficult to ascertain due to difficulty in remembering the landscape as it was prior to mining, however the works were considered to contribute to the cumulative loss in cultural heritage throughout the Hunter Valley.

7.3 Cultural values investigations for this project

From the inception of the project, it was understood that cultural and intangible places and values may be present within or near the project impact area. As such, from the earliest initial engagement of the project, activities and opportunities have been undertaken to ensure they have been robustly investigated, assessed and discussed with the Aboriginal community.

Activities initially included early consultation with key locally based Wonnarua, Darkinjung and Awabakal traditional owners identified within the project-specific consultation strategy (see Appendix B.4). During these early engagements, discussion was undertaken on cultural values and how best it would be to understand, capture and assess them for the project. This resulted in a range of co-designed activities developed with those participants to provide early advice and information into the ongoing project design and refinement process. Initial activities sought and implemented by the Aboriginal participants, included small group workshops populated by people invited by the participants themselves (and few that ultimately became registered Aboriginal parties (RAPs) to the project), and a brief site inspection to present key places and locations to the project team. These are further outlined in *section 7.3.1*.

Following these initial engagements, a more detailed investigation was undertaken by an anthropologist. This included the broader identification of Elders and knowledge-holders from all RAPs, and then working with these individuals on how best to receive their information and knowledge. This typically involved a series of 1-on-1 conversational interviews either on-Country or at an appropriate location nominated by participants (such as café or private residence). A careful process of finalising the report with these individuals and ensuring they provided permission to use their Indigenous cultural intellectual property was then undertaken. The report and its findings are further outlined in *section 7.3.2*.

[3] A desktop assessment based on fieldwork completed by OzArk (2015), see Attachment E.1 and E.2 for a summary.

Finally, following the identification of important view-scapes and view-lines intersecting the project impact area, a further on-Country activity was undertaken with several Awabakal traditional owners to provide further understanding of the location and potential visual impacts of the project, and to discuss possible mitigation requirements should impacts be identified. These activities are further outlined in *section 7.3.3*.

7.3.1 Early co-design workshops and initial view-line summary

During initial briefings of identified key Aboriginal individuals and organisations (see *Chapter 4 (Aboriginal consultation)*), information on cultural and intangible values was sought. This resulted in a co-designed approach with these individuals and organisations who advised EMM Consulting Pty Limited (EMM) of specific methods and attendees that they wanted involved in these activities to further understand these issues.[4] This included both workshops with large groups of participants at the request of several of the Local Aboriginal Land Councils (LALCs) and a smaller targeted site inspection requested by the Awabakal traditional owners. The investigation of cultural values included 3 discrete workshops, and a brief on-site investigation. Overall, around 20 Elders and/or key knowledge-holders along the alignment attended and provided information. Appendices B.1 and B.8 provide the minutes of these activities.

The activities included:

- Cultural values workshops in which small groups of participants were provided large maps of the preliminary corridor for the project, and asked questions about areas of traditional and/or contemporary value. The workshop included an initial presentation of the project and some of its potential physical characteristics (e.g. large transmission towers, vegetation clearance, etc.), discussion over intellectual property of the data and its subsequent management and use. It was then followed by an iterative process typically led by participants in discussing various aspects of the alignment and their knowledge of relevant sites, places, stories, and so on. This was typically followed by general discussion on potential development options that could be explored by the project to limit or avoid interaction with these values where it was felt that was preferred.

- A brief site inspection of portions of the Watagan, Olney and Corrabare State forests with Awabakal traditional owners to define and validate places of value identified in the HTP South workshop and determine their relationship with the project. These investigations were primarily vehicular based, with pedestrian observation and inspection of key locales and places over a 4-day period between 5 to 8 December 2023.[5]

- A brief site inspection of Lizard Rock (also known as Yellow Rock) was undertaken with Culturally Aware and Kiray Putjung Aboriginal Corporation on 8 February 2024 to validate the location and extent of the site, and to further understand its proximity in relation to the preliminary project corridor. It was determined that the site was a substantial distance from the preliminary project corridor, and the participants had no concerns over impacts to this site.

Overall, 3 workshops were undertaken, each focussed on a discrete portion of the alignment:

- HTP North - at the Wanaruah LALC on 20 November 2023, and including Wonnarua traditional owners from the Singleton and Muswellbrook regions

[4] Co-design is a participatory approach in which Aboriginal organisations and individuals are treated as equal collaborators in the design process to achieve eventual Project goals.

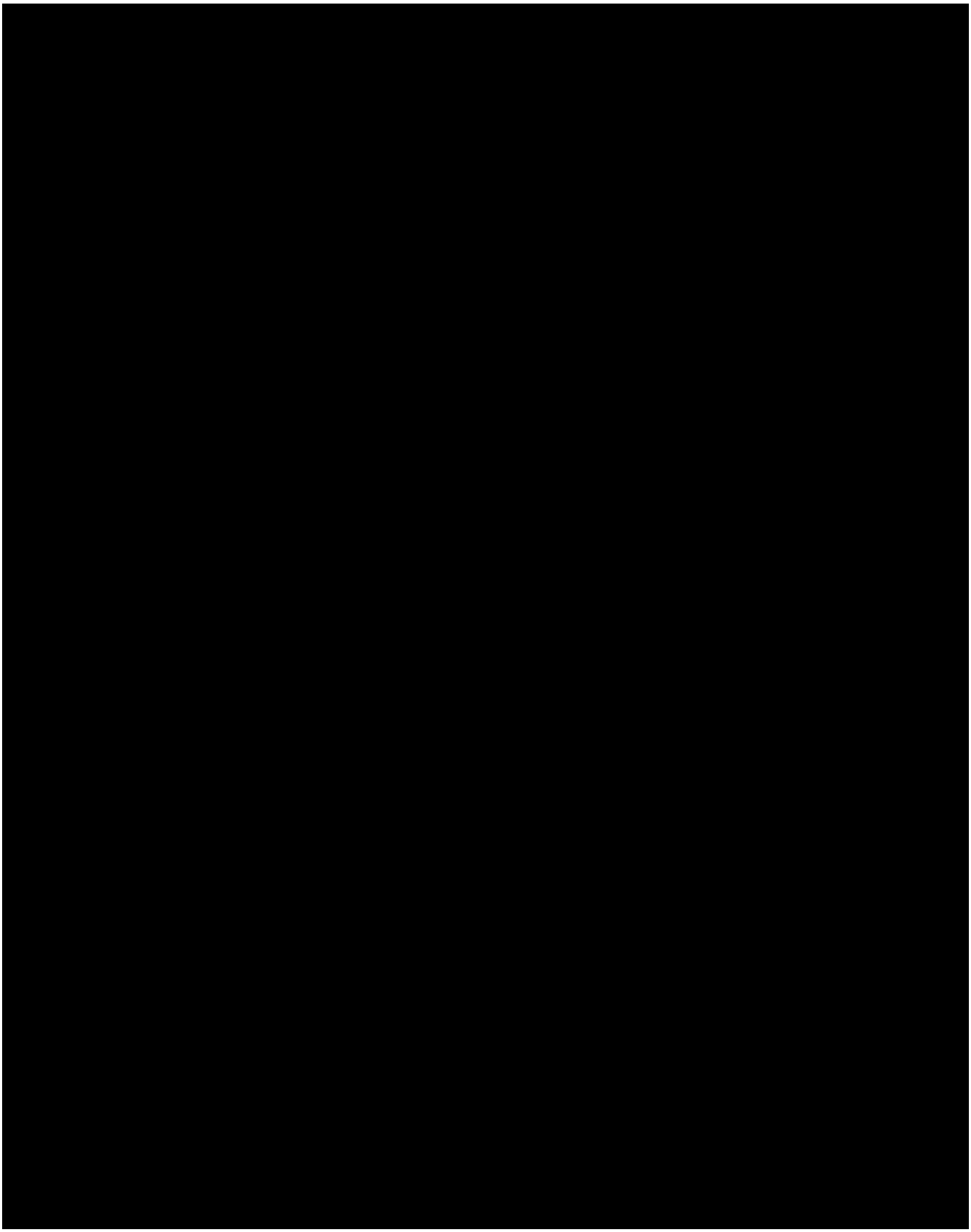
[5] This activity has been variously labelled as 'rapid surveys' in some project documentation.

- HTP Central – at the Mindaribba LALC on 10 January 2024, and including locally based Aboriginal individuals generally with a historical connection to the Cessnock region
- HTP South – at the Biraban LALC on 30 November 2023, and including Awabakal traditional owners from the Newcastle, Lake Macquarie and Martinsville regions.

Table 7.1 summarises the findings from workshops and site inspections. It includes advice on modifying the project impact area (previously presented as a broader preliminary corridor) to reduce perceived impacts and, where available, the preferences expressed by Aboriginal participants. Further details of the site inspection are provided in preliminary reporting in Appendix D.1.

The findings of these activities were integrated into the initial project design processes, and opportunities to avoid or minimise impact to places and areas of value were undertaken wherever feasible (see *section 12.2* for further discussion). This is most evident in the vicinity of Martinsville - identified as being important and connected to Mount Sugarloaf – where the alignment shifted a considerable distance south from earlier proposals. The minimisation of visual impacts to key view-lines between major promontories also resulted in refinement to the project in several locations. The results were also used as a foundation for the subsequent cultural values mapping study undertaken (see *section 7.3.2*).

Table 7.1 Summary of findings from early co-design workshops and the recommended refinements explored and/or implemented as a result



7.3.2 Cultural values mapping study

i Rationale and methods

Cultural values mapping is described more fully as cultural resource mapping or cultural landscape mapping, and it refers to an eclectic range of research techniques and scholarly tools that are employed to 'map' the tangible and intangible cultural assets of people within the local landscape. It involves the application of a wide variety of techniques and activities, from community-based participatory data collection and management to the use of sophisticated mapping based on geographic information systems (GIS), in order to accurately map cultural resources for communities and places. Proponents of cultural mapping as cultural inquiry have claimed that:

> From this perspective, cultural mapping is regarded as a systematic tool to involve communities in the identification and recording of local cultural assets, with the implication that this knowledge will then be used to inform collective strategies, planning processes, or other initiatives. These assets are both tangible, or quantitative (e.g. physical spaces, cultural organizations, public forms of promotion and self representation, public art, cultural industries, natural and cultural heritage, architecture, people, artifacts, and other material resources) and intangible, or qualitative (e.g. values and norms, beliefs and philosophies, language, community narratives, histories and memories, relationships, rituals, traditions, identities, and shared sense of place). Together, these assets help define communities (and help communities define themselves) in terms of cultural identity, vitality, sense of place, and quality of life (Duxbury et al. 2015, 2).

ii Cultural values mapping and on-Country activities

Building on the initial co-design activities, the cultural values mapping study explored these concepts further, to improve understanding of traditional and contemporary cultural values associated with the project impact area. A detailed cultural mapping study was undertaken by anthropologist Dr Patrick Horton with the participation of key knowledge holders and/or Elders identified through discussions with RAPs. Elders and/or key knowledge-holders included [redacted], and [redacted]. The interviews and fieldwork for the study were undertaken between May and August 2024.

A detailed report of the cultural mapping prepared by Dr Horton is included in Appendix D.2. The report includes a review of desktop ethnographic information with a focus on Dreaming places and stories, as well as historical and contemporary values where described. It uses this information combined with commentary from the Aboriginal participants to reach conclusions on cultural/intangible places and values within or near the project impact area. The method undertaken in the current cultural mapping exercise was to record all places that the Aboriginal participants declared to have some significance to them, and to determine whether there exists any sense of spatial boundaries. Through documenting the proposed sites, an attempt would be made to determine the extent to which the stated importance is based on existing experience and knowledge of the Aboriginal informant, and to ascertain whether this is likely to be a shared opinion with other Aboriginal participants.

Table 7.2 and Figure 7.2 presents a summary of the sites and places identified through this process, and includes numerous sites identified in earlier activities (see Table 7.1). These are ratified to remove duplication in *Chapter 10 (The archaeological assemblage of the project impact area)*. While few of these sites and/or places are within or near the project impact area, a number of cultural landscapes, 'view-lines' and/or 'view-scapes' were identified by participants. In several instances, while a particular location or site itself would be unaffected, these visual components would intersect with the project impact area.

Discussions indicated that there was a range of perceptions at to what defined a view-line and/or view-scape to the participants, but that they typically all related to views from, to, or between major promontories. The following summarises the statements of participants in the study in relation to cultural lines of sight, which include:

- high points in the landscape, including culturally significant mountains, functioned as 'lookout points' or 'defence outposts' from which Aboriginal people would stand guard, watching over and protecting their country from invading neighbouring groups
- high points in the landscape were associated with activities or events relating to Dreaming stories, and/or were related to ritual activities
- mountaintops facilitated forms of communication between distanced groups of Aboriginal people, particularly through the observation and use of fire and smoke
- culturally significant mountains functioned as 'markers in the landscape' or as 'navigation aids' for Aboriginal people traveling from one location to another
- particular peaks are important in the context of traditional 'teaching' practices which require unobstructed views in order to observe a given vantage and impart location-specific cultural knowledge
- culturally significant sites are understood to be 'connected to' or to 'line up with' one another in a way that might be described as metaphysical, and a way of understanding, experiencing or articulating such connection is with reference to lines of sight while situated at particular locations.

While the ethnographic data was limited in the validation of the above descriptions, it was nonetheless concluded that the Aboriginal participants felt that the project would result in cultural harm to these view-lines/view-scapes and localised cultural landscapes. These impacts were found to primarily relate to either reducing participants' ability to undertake cultural education practices (i.e. by blocking or obstructing the views across Country from the top of one or more of these promontories), or by impacting a 'connection' between Dreaming places found primarily in the vicinity of HTP Central and HTP South.

To mitigate those harms perceived or described, mitigation measures were explored with the participants and have been integrated into *Chapter 6 (Ethnographic context)*. Some felt that there was no suitable mitigation for such impacts. Others proposed the need for Aboriginal-led cultural awareness training and inductions for all construction personnel; monitoring of activities during the construction to ensure they are being undertaken in a culturally-appropriate manner; implementation of detailed archaeological investigation of sites near the project impact area, and notably within the Flat Rock cultural landscape; and ongoing engagement during the project.

Table 7.2 Cultural places and values identified within or near the construction impact area

Site	AHIMS #/Site identifiers	Description	Value	Proximity to construction impact area
HTP North				
Baiame Cave	37-5-0013	[redacted]	Traditional	>12 km
Hunter River crossings	-	[redacted]	Archaeological, contemporary	Within construction impact area

Site	AHIMS #/Site identifiers	Description	Value	Proximity to construction impact area
Gold Ochre Quarry	-	[redacted]	Archaeological, contemporary	~300 m
Kowul Rock (HTP-N-CVM02)	-	[redacted]	Traditional	>9 km
Lizard Rock Dreaming places and tracks	37-6-0001, 37-6-4112, 37-6-4113	[redacted]	Historical, contemporary	~12 km
Minimbah Teaching Place	-	[redacted]	Historical, contemporary	~6 km
Ravensworth Homestead Estate complex	37-3-0390	[redacted]	Historical, contemporary	The site itself is >7 km from the project impact area. The proposed buffer for the listing is within 500 m in some locations and an intersection upgrade at Lemington Road would be within the buffer
Spring (HTP-N-CVM03)	-	[redacted]	Contemporary	~3.5 km
'Three Warriors' site (HTP-N-CVM04)	-	[redacted]	Contemporary	~500 m
Wallaby Scrub Bora ground	37-6-0056	[redacted]	Traditional, historical	~5 km
HTP Central				
Flat Rock cultural landscape	45-3-2140, 45-3-3582, 45-3-3583, HTP-C-RS14, HTP-C-CVM08, HTP-C-CP01	[redacted]	Archaeological, contemporary	Adjacent and within the construction impact area
Freeman's Waterhole	HTP-C-CVM06	[redacted]	Traditional	~4 km

Site	AHIMS #/Site identifiers	Description	Value	Proximity to construction impact area
HTP-C-AR01	37-6-4486	[redacted]	Contemporary	Within construction impact area
HTP-C-AR02	37-6-4485	[redacted]	Contemporary	Within construction impact area
HTP-C-CMT05	37-6-4483	[redacted]	Contemporary	Within construction impact area
HTP-C-SA03	-	[redacted]	Archaeological	Within 200 m of ancillary activities
Laguna ceremony ground	HTP-C-CVM07	[redacted]	Historical, contemporary	~8.5 km
Mount Finchley	HTP-C-CVM02	[redacted]	Traditional	~18 km
Mount Sugarloaf	HTP-C-CVM05	[redacted]	Traditional	~28 km
Mount Vincent	HTP-C-CVM01-	[redacted]	Traditional	~25 km
Mount Wareng	HTP-C-CVM04-	[redacted]	Traditional	~65 km
Mount Yengo	HTP-C-CVM03	[redacted]	Traditional	~25 km
Tiddalick The Frog	37-6-4144	[redacted]	Contemporary	~5 km
Trig Road cultural landscape	HTP-C-SA01, HTP-C-SA02, HTP-C-SA04, 37-6-3787, 37-6-0604, 37-6-3790, 37-6-3786, 37-6-3782, 37-6-3789	[redacted]	Archaeological, contemporary	Adjacent and within the construction impact area

Site	AHIMS #/Site identifiers	Description	Value	Proximity to construction impact area
Watagan Creek ACD	45-3-4623	[redacted]	Contemporary	Within construction impact area
HTP South				
Abbots Falls cultural landscape	45-3-1934, 45-3-4563, 45-3-4564, 45-3-0972	[redacted]	Archaeological, contemporary	~500 m
Burragurra (also known as Devil's Rock)	HTP-S-CVM03-	[redacted]	Traditional	~25 km
Dora Creek	-	[redacted]	Traditional	Generally >500 m from the HTP corridor, may intersect with ancillary activities near Alton Road
Dora pinnacles	-	[redacted]	Traditional, contemporary	Outside construction impact area, but within 200 m of ancillary activities
Pulbah Island	HTP-S-CVM02	[redacted]	Traditional	~7 km
Mount Warrawolong	HTP-S-CVM01	[redacted]	Traditional	~3 km
Wishing well	HTP-S-CS01-	[redacted]	Contemporary	Within construction impact area

Notes: Values classifications include 'traditional', 'historical' and/or 'contemporary'. These reflect a value associated with pre-colonial activities; values associated with activities in the early Contact period, nominally between 1788-1950CE; and values associated with recent views of the local Aboriginal community, respectively. Archaeological reflects sites that are archaeological in composition and generally encountered during the field program outlined in Chapter 9 (Field investigations). A site or place may hold one, several or all of these values.

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7.3.3 Additional visual impact investigations

Following meetings in August 2024 where the cultural values mapping study and broader field survey findings were discussed, a number of the HTP Central Aboriginal participants sought further investigation of the view-lines/view-scapes that may be adversely affected. Subsequently, an additional field program was implemented in November 2024 to further explore, investigate and discuss specific views from Mount Sugarloaf, Mount Yengo and Mount Warrawalong with the Awabakal traditional owners. This program involved attending locations identified by key participants and assessing their viewsheds through empirical observation and technical analysis carried out by EMM's visual assessment team. It is noted that high/dense vegetation and access issues prevented a completely exhaustive assessment.

During the site inspection, a total of 11 locations were visited that intersected broader view-lines within the ACHA study area, as identified in *section 7.3.2ii* (see Figure 7.2; and for more detail, including a table summarising the findings of the assessment, see Appendix D.2). Of those 11 locations, 2 were assessed as being subject to significant impacts; 5 as being subject to partial impacts; and 4 as being subject to no impacts (see Plate 7.2). The 2 'significant impact' locations were:

- SL5, a location associated with site HTP-C-CVM08 (see Plate 7.3; Table 7.2) and the view-lines between Mount Warrawalong and Mount Vincent, and between Mount Warrawalong and Mount Sugarloaf (see Figure 7.3). This location offers unobstructed views of the valley to the north, and partial views to the southwest towards Mount Warrawalong, somewhat obstructed by vegetation. The HTP corridor would encroach within 500 metres of this location.

- SL8, a promontory at the northern extent of Burma Road and the view-line between Mount Warrawalong and Mount Vincent/Mount Sugarloaf (see Plate 7.4; Figure 7.3). This location offers a full and unobscured view of Mount Warrawolong, approximately 3.5 kilometres to the southwest; an unnamed ridgeline straddled by the Harris Trail to the northeast, north and northwest; and the Watagan Creek ACD (#45-3-4623; see Table 7.2) to the west, north and east. The HTP corridor would encroach within 100 metres of this location.

Overall, the view of the participants is that the project would significantly impact at least 2 areas associated with cultural lines of sight. Some 6 view-lines may further be subject to partial impacts, but it was not possible to offer a more complete assessment due to the density of forestry obscuring them from view – acknowledging the vegetation in this area may have been less dense in the past as a result of cultural land management. The 'partial impacts' identified during the visual assessment are therefore considered to be low impact. However, participants have emphasised that, based on those practices outline above, obscuring or otherwise impacting these sightlines poses a substantial impact on place-based cultural Aboriginal identity. Further, the participants associate this threat with the concept of 'visual desecration', particularly at the 2 locations identified as 'high impact'.

Plate 7.2 View-line SL3, looking northeast towards Mount Sugarloaf

Plate 7.3 View-line SL5, looking north towards Mount Sugarloaf

Plate 7.4 View-line SL8, looking southwest towards Mount Warrawalong

Plate 7.5 View-line SL9, looking west

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8 Archaeological context

8.1 Summary of this chapter

This chapter focuses on previous archaeological research and/or assessment undertaken in relation to the Aboriginal cultural heritage assessment (ACHA) study area, with a specific focus on the Hunter Transmission Project (HTP, the project) impact area. In summary:

- Significant parts of the project impact area have been extensively investigated for over 30 years, initially for several major coal mines, as part of the Singleton Military Area, and more recently for renewable energy projects. While data remains spatially constrained, these studies provide a robust model of cultural materials that may be expected across the project impact area. In summary:
    - HTP North: There are substantial previous investigations associated with coal mine establishment and expansions. These document a significant amount of cultural materials and show them to be dominated by isolated or low densities of stone artefacts, typically near watercourses. The confluence of Hunter River and Wollombi Brook, Bayswater Creek, Parnells Creek, Moorlands Creek and Loder Creek are all noted to contain significant or more extensive cultural materials. Recent investigations as part of the Hunter Valley Operations mining complex continuation project have identified several significant Aboriginal sites, and found they typically exhibited either high densities of stone artefacts (n=>30 per square metre), cultural materials stratified in aeolian/colluvial units, and/or were culturally modified trees
    - HTP Central and South: Information within the State forests and reserves is limited, and mostly constrained to opportunistic documentation of encountered Aboriginal objects and sites. The cultural assemblage is dominated by rockshelters with various amount of art and/or cultural deposits, grinding grooves, and culturally modified trees.
- A review of Heritage New South Wales (NSW) Aboriginal Heritage Information Management System (AHIMS) database identified 4070 previously documented sites within the ACHA study area (~1748 square kilometres) (see Appendix E.4). This total is reduced to 3956 when removing duplicates or other errors in the database. The most common site types registered included stone artefactual sites (~92%), followed by rockshelters (~4%), grinding grooves (~1%), and culturally modified trees (~1%). Spatially, the data are primarily in HTP North where extensive cultural heritage management has occurred in the last several decades. The cultural assemblage suggest surface and shallowly buried stone artefact scatters are more prevalent in HTP North, with rockshelters, grinding grooves and culturally modified trees more characteristic of HTP Central and HTP South.
- Of the 3956 previously documented sites, there are 132 within the project impact area. These are dominated by various stone artefact sites, including high density artefact scatters (n=6), moderate artefact scatters (n=2) and low-density artefact scatters or isolated objects (n=121). The assemblage also included a significant rockshelter in Pokolbin State Forest (#37-6-3714) and 2 culturally modified trees. Of these, 18 have been previously destroyed through development activities. In addition, around 439 previously documented sites are within 200 metres of the project impact area, of which 114 have been previously destroyed (wholly or in part). These are similarly dominated by stone artefactual materials (n=407), with some occurrences of grinding grooves (n=10), culturally modified trees (n=6), hearths (n=2), potential archaeological deposit (n=2), resource and gathering sites (n=1) and rockshelters with art (n=9).

- A predictive model has been developed for the project impact area, which suggests the presence of stone artefactual materials would be prevalent in HTP North, and rockshelters and grinding grooves in HTP Central and HTP South. Culturally modified trees, burials, cultural places and post-Contact materials were also considered probable across the project impact area given the regional record. A series of criteria to determine whether a rockshelter should be considered an archaeological site (i.e. was used by Aboriginal people in the past) or a natural geological feature is also outlined.

8.2 Previous local studies

This section provides a short summary of the main archaeological site types documented and predicted to occur within the project impact area. It is based on a regional understanding (see Appendix E.1) and an extensive review of 33 previous assessments in the ACHA study area presented in detail in Appendix E.2.

8.2.1 HTP North

In HTP North, there have been numerous Aboriginal heritage investigations associated with the mining activities (e.g. AMBS (2002); Brayshaw (1981); Brayshaw and Haglund (1981; 1993); CQCHM (2014, 2016); EMM (2022); ERM (1995, 1997, 1999a, 1999b); Haglund (1982, 1993); Hiscock et al (2000); Hughes (2000); Hughes and Hiscock (2000); Jacobs (2019, 2021); OzArk Environment and Heritage (2013, 2016, 2019); Rich (1990, 1993); Scarp Archaeology (2009) (see Figure 8.1).

Of relevance to the project is the previous investigations of the Warkworth sand system within the Mount Thorley Warkworth mining complex by AMBS (2002) and Scarp Archaeology (2009). Formally identified as W14 Sandsheet (#37-6-0946), the deposit was subject to major archaeological excavation by both firms and identified cultural materials to depths of up to 1.5 metres below surface. The sand units themselves extending to depths of up to 4 metres below surface. Excavations recovered relatively few stone artefacts but indicated at least two phases of past use. Initial age estimates suggest that the lower occupation may be as old as 47,000 years ago, however more robust excavation and analysis suggest an age of 10,000 to 20,000 years is more likely. It was concluded that cultural materials found at depth within the Warkworth sand system had the potential to be the earliest evidence of people in the Hunter Valley.

Also of note was a desktop risk assessment of the project as part of initial route selection by Umwelt (2023b), which found:

- that significant investigation has occurred primarily since the 1970s in HTP North, and included key themes such as initial peopling, occupation models, site patterning and typology
- initial peopling of HTP North based on a small number of excavations at Glennies Creek, Wollombi Brook, Warkworth, Lemington, and Jerrys Plains, suggests late Pleistocene to early Holocene (>7500 years ago) activity. While HTP Central had limited data, with Bobadeen 1 rockshelter near Cassilis dating to ~7700 years ago. Along the coast in HTP South, dates from Moffats Swamp and Swansea inlet range from ~14,000 years ago to the last ~2000 years ago
- that the majority of cultural assemblages dated to the mid-to late Holocene (i.e. <5000 years ago)
- a discussion on cultural heritage management, including the need to consider avoidance of high value sites and places, cultural offsets, and an increasing importance of management of cultural landscape and ongoing connection to Country for the local Aboriginal community. They suggest that the level of cumulative loss in the HTP North will result in increasingly rare classifications for the remaining cultural assemblage within the region.

An extensive assessment and subsequent addendum were also undertaken for the Hunter Valley Operations mining complex continuation project through which the project impact area extends. These investigations found the following:

- Much of the Hunter Valley Operations mining complex continuation project area was disturbed and/or rehabilitated (reshaped and revegetated) as a result of previous farming and approved mining, which has occurred in the locality for over 70 years. Remnant areas of natural topography within the study area were predominantly low to moderate gradient slopes with very occasional steep gradients, substantial flats and floodplains, specifically adjacent to the Hunter River and its associated tributaries or drainage lines. The majority of the soil landscapes were found to be characterised by duplex soils, which consisted of an upper A1 horizon and underlying B2 horizon.

- The most common site type in the region were artefactual sites (95%), comprising isolated finds or artefact scatters, with lesser occurrences of rarer site types such as culturally modified trees (1%). Site distribution shows a strong correlation with proximity to water as well as elevated landforms such as ridgelines, spurs or terraces.

- Improved understanding of previously recorded AHIMS Site #37-2-1877 Carrington Mine Colluvial Deposit 1 (CM-CD1) -a significant colluvial deposit. Optically Stimulate Luminescence (OSL) dating focusing on a unit identified as the 'Older Stratum' (unit 5) was undertaken. Results from OSL dating confirmed the 'Older Stratum' of CM-CD1 was of significant age relating to the early Holocene and late Pleistocene periods (10 to 12 kilo annum), and the site was of high scientific (archaeological) and cultural significance. As a result, Hunter Valley Operations mining complex changed the mine plan to avoid the site.

- The majority (84%) of identified sites were considered of low scientific significance, 7% were considered of low to moderate, 4% moderate, 4% moderate to high, and 2% high. Site types of low scientific significance included isolated finds (46%) and low density (<10) artefact scatters (43%). Sites of high scientific significance included high density artefact scatters with or without potential archaeological deposits (67%) and culturally modified trees (33%).

- The Warkworth sand system may be present and was generally found south of the project in the vicinity of Wollombi Brook and Hunter River. It highlighted 2 sites, Malabar Burnham Wood Site I (#37-6-0166) and Hunter Valley 1: Maryville Malabar Site N (#37-5-0063) that were in the Hunter Valley Operations project area and had characteristics consistent with the Warkworth sand system. A newly identified area, HVOCP TR213-AS1 (#37-3-1626) was also documented. All 3 sites are in the vicinity of the HTP project impact area.

- While the Warkworth sand system and colluvial units of CM-CD1 (#37-2-1877) have been identified as Pleistocene, cultural assemblages recovered within them often have Holocene (<5000 years ago) typology and characteristics. The ability to disentangle the mixing of older and younger cultural assemblages within these types of deposits was typically achieved on a project specific basis and in some instances was not always proven possible.

- Determined that of the 315 Aboriginal sites documented within the Hunter Valley Operations mining complex continuation project area, ~27 were considered to contain high densities of stone artefacts (n=>30 per square metre), cultural materials stratified in aeolian/colluvial units, and/or culturally modified trees, and indicative of more intense visitation and occupation in the past. Such sites were typically assigned higher levels of significance in previous and regional assessments. A further 4 sites that have been destroyed by development activities were also noted as having met these criteria. Ultimately, 11 sites were considered of high significance, including 5 culturally modified trees, 3 sites containing stratified and potential or demonstrated Pleistocene cultural deposits, and 3 high density artefact scatters with some potential for stratified cultural deposits. Sixteen sites were assigned a moderate significance and typically characterised as moderate to high density stone artefact scatters constrained to shallow texture contrast soil profiles. The remaining 288 sites typically reflect isolated or low-density stone artefacts that are consistent with the broader background scatter found across the Hunter Valley. The report ultimately combined these latter sites into a single cultural assemblage encompassing the project area.

In summary, these studies all develop a similar model of past occupation and use. Specifically, past studies and previously documented sites indicate that cultural materials within the regional context are generally dominated by stone artefact sites, most frequently isolated stone artefacts or low density (<20) artefact scatters. Relatively few sites feature subsurface deposits, and this reflects the nature of shallow duplex soils throughout the Hunter Valley as well as high susceptibility to erosional impacts due to natural and historical disturbances. Archaeological material is scattered almost continuously across the Hunter Region in all contexts, disturbed and undisturbed, across all landforms. These sites have generally been attributed low scientific significance. Distribution of higher density artefact sites shows a strong correlation with elevated landforms such as ridgelines, spurs or terraces in proximity to water with archaeological evidence in the Hunter Valley primarily contained within a corridor approximately 100 metres wide on either side of a watercourse. While these types of sites can demonstrate higher densities of artefacts, they still usually reflect disturbed contexts or lack discernible stratification and, therefore, are usually assigned moderate scientific significance.

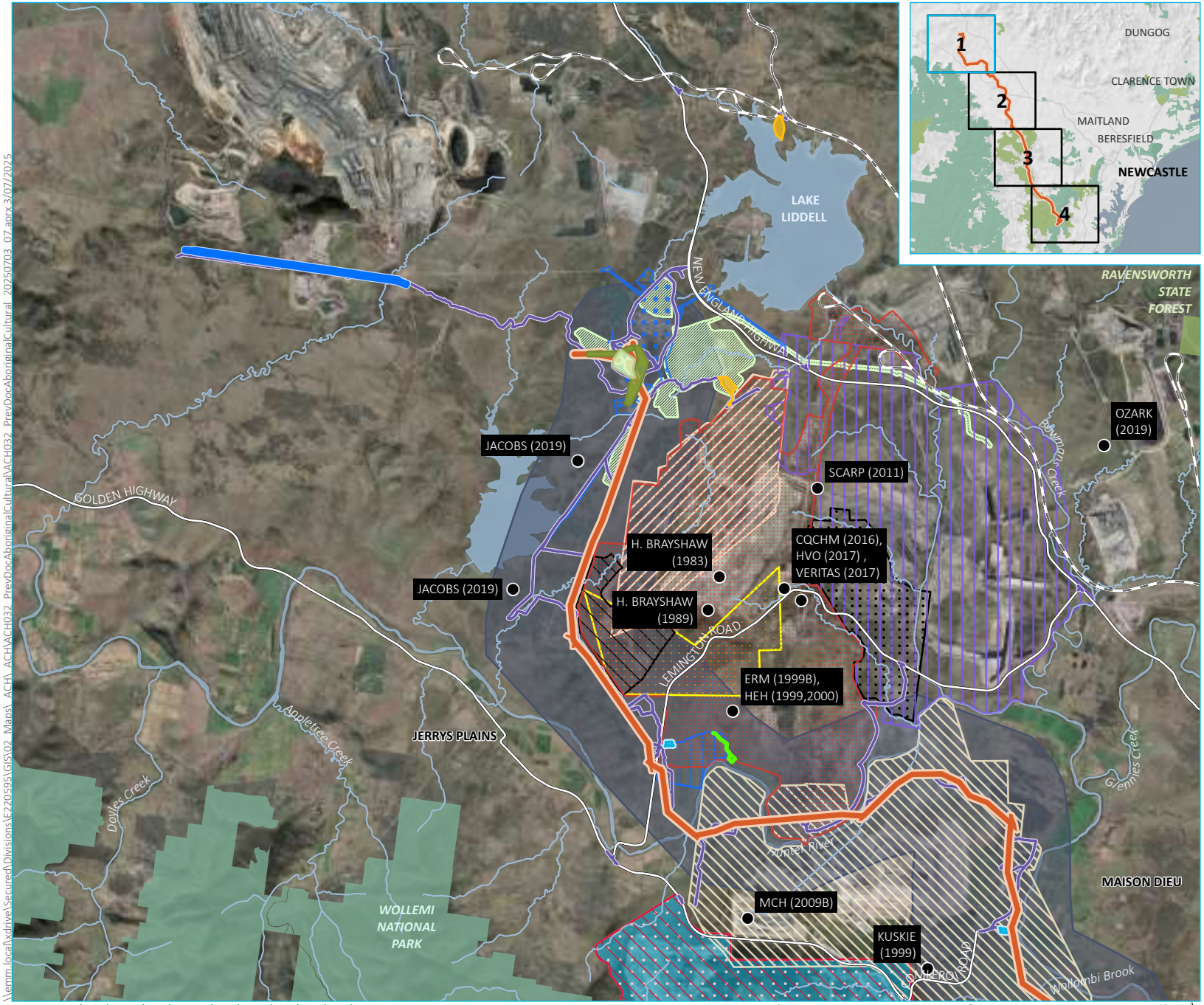
Stone artefact scatters demonstrating higher densities, stratification and potential to be of greater age (i.e. Pleistocene) are more likely to be identified within aeolian or colluvial sand dune/sheets contexts as they are characterised by deeper deposits with better preservation contexts. These landforms are source bordering dunes which are associated with the Warkworth sand system and are generally found within proximity to the Hunter River, Wollombi Brook and their immediate tributaries (usually within 5 to 10 kilometres of their intersection) (see *section 5.2.1*). These site types have generally been assessed as having high scientific significance as they are limited in number, represent stratified deposits (which is rare across the region), and can be of Pleistocene age (>10,000 years ago).

8.2.2 HTP Central and South

In HTP Central and HTP South, there have been limited investigations to date (see Figure 8.1; Appendix E.1). Previously documented sites within the State forests appear to be a mixture of amateur bushwalkers and/or hobby groups, and by NSW State forests personnel when encountered. More regionally, academic studies have also been undertaken including the works of Val Attenbrow (2007) at Mangrove Creek and Jo McDonald's (2008) *Dreamtime Superhighway*, which is based on her PhD works in the vicinity of Mount Yengo.

During consultation for the project, it has become apparent that a recent formal assessment of Corrabare North Flora Reserve by Heritage Now Pty Limited has occurred but remains unavailable publicly. Discussions with Heritage Now Pty Limited indicate that all identified Aboriginal objects and sites are documented on the Heritage NSW AHIMS database (see *section 8.3*). These sites are almost exclusively characterised as rockshelters with various amounts of art and/or deposit. Grinding grooves and culturally modified trees have also been encountered, although the latter must be considered against the historical use of the region by Forestry Corporation of NSW.

As outlined in *Chapter 7 (Cultural values mapping)*, there are also numerous archaeological sites known by the Aboriginal traditional owners that have not been documented or identified due to cultural sensitivity. Where advised to EMM Consulting Pty Limited (EMM), these sites appear to align with the site types documented within HTP Central and HTP South, usually in the form of rockshelters.



KEY

- Previous archaeological investigation not intersecting with project impact area (location approximate)

Previous archaeological investigation

- ACHM (2016)
- CQCHM (2016) and Salvage Report Arrow Heritage Solutions (2019)
- ERM (1995)
- ERM (1997)
- H. Brayshaw (1981)
- Jacobs (2019)
- MCH (2009a)
- OzArk (2016)
- Tocomwall (2015)
- Umwelt (2023b)
- Bayswater Water and Other Associated Operational Works Project (Jacobs 2021)
- HVO Continuation North (EMM 2023)
- Ravensworth Operations Project (Umwelt 2010)
- HVO Continuation South (EMM 2023)
- ERM (2004)

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

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

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

N

Previously documented Aboriginal cultural heritage studies in relation to the project impact area

Map 1 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 8.1

EMM creating opportunities

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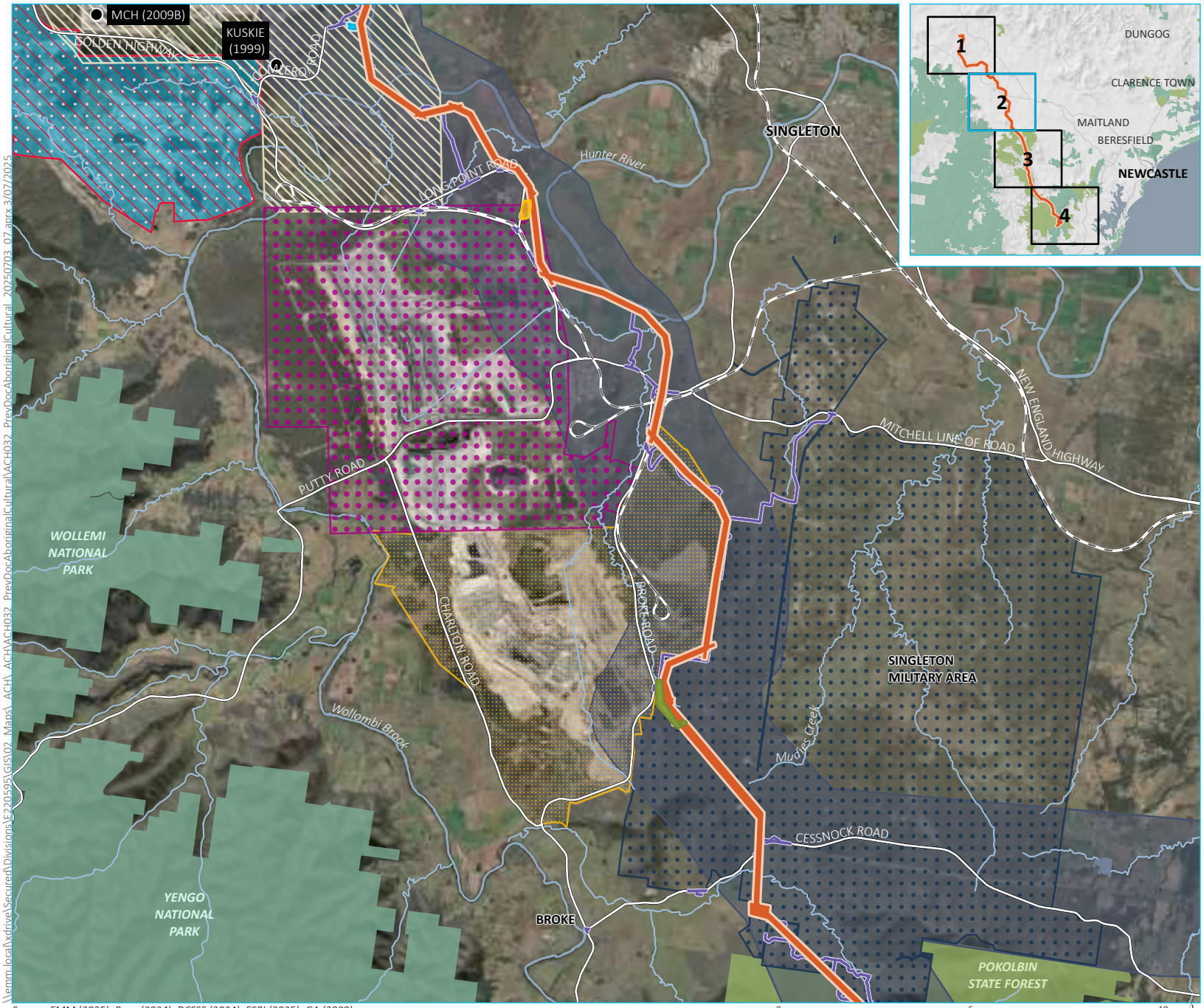

KEY

- Previous archaeological investigation not intersecting with project impact area (location approximate)

Previous archaeological investigation

- ACHM (2016)
- OzArk (2016)
- Tocomwall (2015)
- Umwelt (2023b)
- Warkworth Continuation (CQCHM 2014)
- Bulga Optimisation Project (OzArk 2013)
- Singleton Military Area (Umwelt 2023)
- HVO Continuation South (EMM 2023)

Project impact area

- HTP corridor
- Construction support site
- Laydown area
- Adjustment to existing transmission line (line 81)
- Access track

Existing environment

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

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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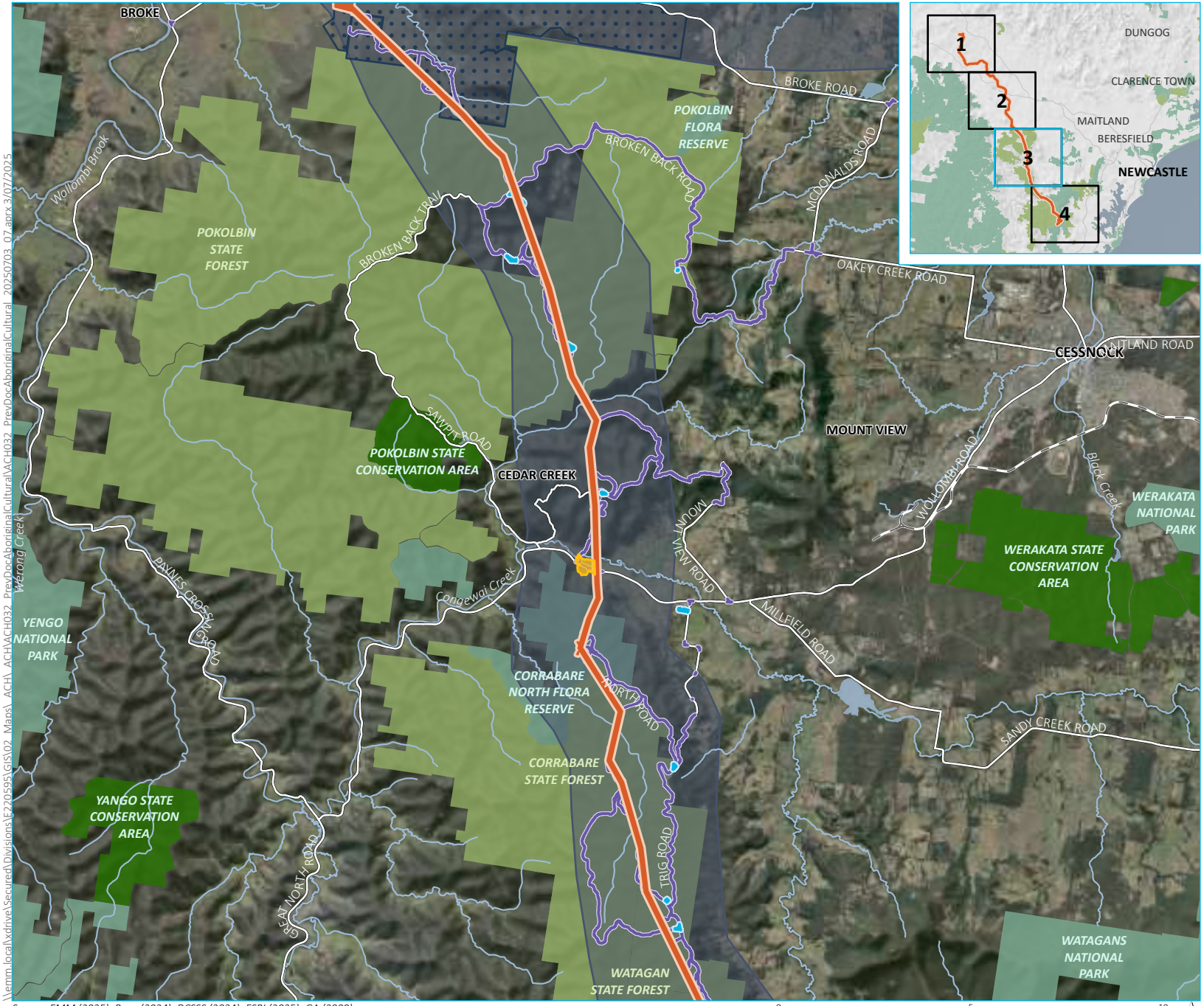
Previously documented Aboriginal cultural heritage studies in relation to the project impact area
Map 2 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 8.1

EMM
creating opportunities



KEY

Previous archaeological investigation
- Umwelt (2023b)
- Singleton Military Area (Umwelt 2023)

Project impact area
- HTP corridor
- Construction support site
- Laydown area
- Access track

Existing environment
- Railway
- Major road
- Named watercourse
- Named waterbody
- Flora reserves
- State forest
- NPWS reserve
- State conservation area

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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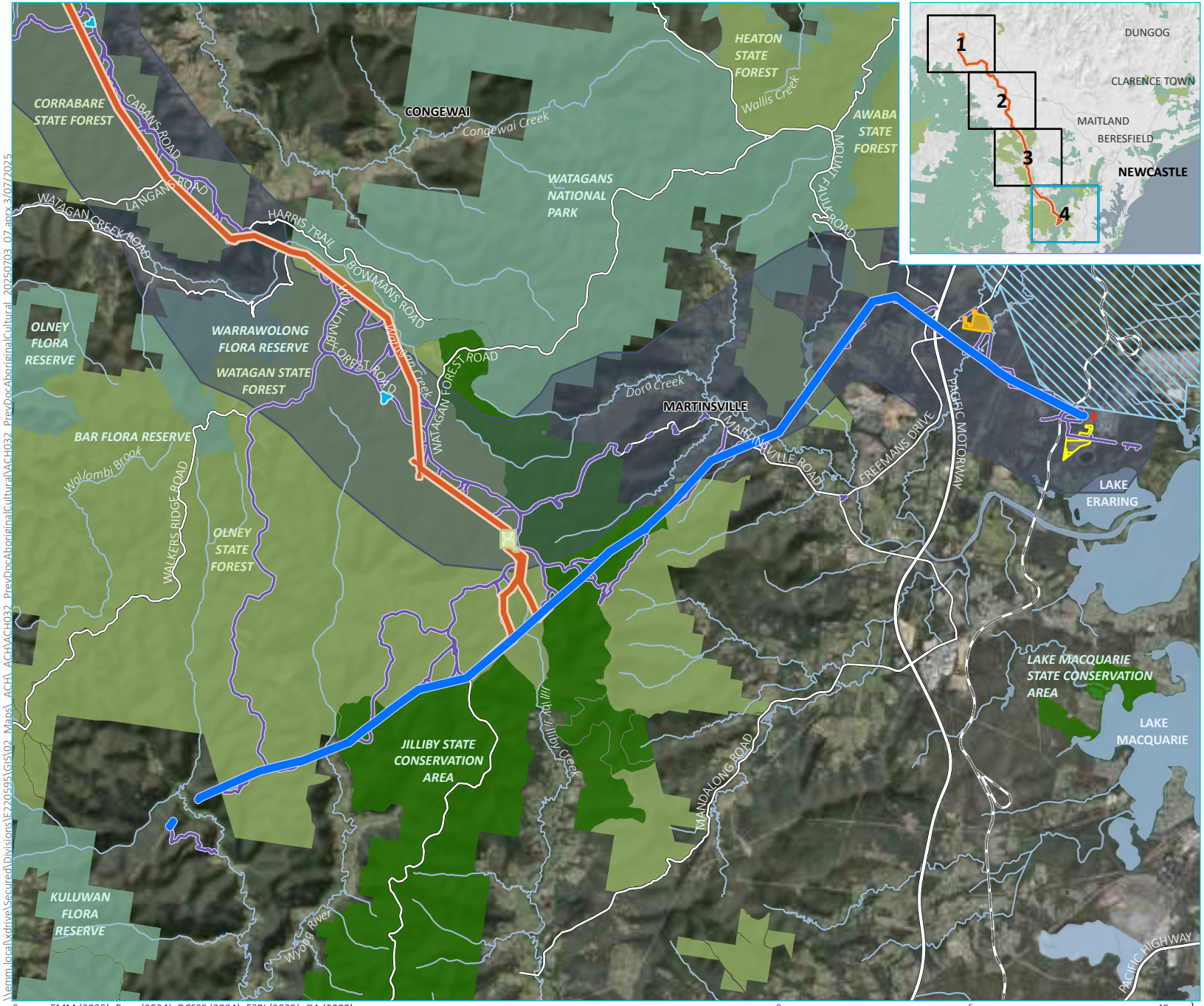
Previously documented Aboriginal cultural heritage studies in relation to the project impact area
Map 3 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 8.1

EMM
creating opportunities



KEY

Previous archaeological investigation
- Jacobs (2021)
- Umwelt (1998)
- Umwelt (2023b)

Project impact area
- HTP corridor
- Olney switching station
- Construction support site
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment
- Railway
- Major road
- Named watercourse
- Named waterbody
- Flora reserves
- State forest
- NPWS reserve
- State conservation area

INSET KEY
- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km

GDA2020 MGA Zone 56

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Previously documented Aboriginal cultural heritage studies in relation to the project impact area
Map 4 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 8.1

EMM
creating opportunities

8.3 AHIMS search results

8.3.1 General overview

The AHIMS database is managed by Heritage NSW and includes a location and description of Aboriginal objects and sites recorded through academic research and cultural heritage management. The database identifies any Aboriginal sites or places registered within the ACHA study area and aids predictions for the project impact area, showing the frequency and distribution of Aboriginal site types in the broader landscape.

On 17 August 2023, 11 and 21 September 2023, AHIMS searches were undertaken that encompassed the project impact area and extended beyond its curtilage. With updates to the project impact area occurring throughout 2024 wherein the alignment has since been refined, and updated searches of the added areas were completed on 10 September 2024, and 1 and 2 October 2024. Due to the size of the project impact area and limitations on searches of the AHIMS database (including limits on search extents and the quantity of results within any 1 search area), this ultimately resulted in the completion of 60 discrete searches being conducted totalling around 2634.3 square kilometres centred on the project impact area. In March 2025, a more targeted, systematic search of the project impact area and surrounds was completed to ensure the results were within 12 months of environmental impact statement (EIS) submission, resulting in 100 searches.[6] Being more constrained to the project impact area, these searches encompassed a slightly smaller area, totalling 1422 square kilometres.

The AHIMS data relevant to the project impact area is presented below. Appendix E.3 to Appendix E.7 present further definitions of the contents of the searches, a review of the overall dataset (that extends beyond the project impact area), the searches themselves, relevant site cards and site descriptions.

The overall searches returned an assemblage of 4070 previously documented sites. When removing duplication, declassified sites and errors, around 3956 previously documented sites remain (including both extant [n=2524], partially destroyed [n=55], and destroyed [n=1377] records). Within the search results are 7 restricted sites: #37-2-2129, #37-2-5284, #37-3-0011, #37-6-1108, #37-6-1113, #37-6-1114, #37-6-3612 and #37-6-3907. Of these, all but one have been previously destroyed by authorised impacts; the remaining site, #37-6-3907 has been declassified as 'Not a site'. As there is no information publicly available for these sites, and they do not need to be managed into the future as they are not extant, we reduce the assemblage to 3949 in the discussions below.

Of the 3949, around 571 are within or near the project impact area. These include some 439 of these sites are within 200 metres but *outside* of the project impact area (see Table 8.1), while 132 are within the project impact area (see Table 8.2). Appendix E.7 provides site descriptions of all sites within 200 metres of the project impact area. Of the 571 sites, 112 have been previously destroyed by authorised impacts associated with other projects and/or based on notes provided in the site cards. This includes 18 of those previously documented in the project impact area, resulting in a total of 114 extant sites within the project impact area. While these sites are considered below, in order to inform the overall archaeological character of the region, it has been noted where these sites have been destroyed and/or removed from the landscape in subsequent sections of the report.

[6] The increase in number of searches in March 2025 compared to October 2024 despite a reduction in project impact area size relates to the latter searches being of a standardised size to reduce duplication and assist in spatial integration. As such, the approach went from fewer larger, but often overlapping search zones, to smaller non-overlapping systematic search zones.

The spatial patterning and major site types of this subset of the data is consistent with the findings outlined in Appendix E.4. Due to the level of development and associated assessment undertaken for planning approvals, the high-density clustering of sites around mining operations in HTP North obfuscates to some degree any discernible archaeological patterning. Within HTP Central and HTP South, there have been limited investigations to date prior to this project. However, when considering site types in relation to topography, there emerges a prevalence of stone artefact sites in HTP North, identified on the undulating flats adjacent to significant watercourses; and in HTP Central and HTP South, rockshelters, grinding grooves, and ceremonial sites dominate in the more rugged and precipitous landscape.

8.3.2 In close proximity to the project impact area

Some 439 sites are within 200 metres of the project impact area, but not within it. Of these, 400 (91%) sites are within HTP North, with fewer sites documented in HTP South (n=20, 5%), and in HTP Central (n=19, 4%). Of the 400 sites in HTP North, artefactual sites are dominate with 99% of sites (n=396) either artefact sites or areas with potential for them to occur. A very small portion of the sites are undefined (n=3, <1%), but the majority of these artefact scatters in HTP North are low density sites of less than 20 artefacts (n=157, 42%), some with potential for subsurface deposit (n=17, 5%); and/or isolated finds (n=179, 47%). The majority of these sites are associated activities within Hunter Valley Operations mining complex and Bulga mining complex. As discussed, this high-density clustering of sites around mining operations is more likely indicative of the level of investigation associated with planning and development proposals in this region, rather than discernible archaeological patterning. However, through these compliance activities, certain trends have emerged and while artefactual sites are known to occur across all landforms in the Hunter Valley, these are considered most likely in higher densities within 100 metres of watercourses (EMM 2023; OzArk 2013).

In HTP North, of the more significant artefact sites within this broader assemblage outside, but near the project impact area, are high density artefact scatters (n=31, 8%), and moderate density sites (n=13, 7%) - several of these with potential for subsurface deposits. As expected, these sites tend to appear in proximity to the Hunter River, generally in areas elevated above the flood limits, but are also distributed across moderate sized watercourses throughout the Hunter Valley Operations mining complex. Examples include: #37-2-0812, #37-2-0088 and #37-2-0092, all reflecting high-density artefact scatters located south of Lake Liddell, on Saltwater Creek and its nearby tributaries, and within which several thousands of artefacts were identified and, in the case of #37-2-0812, a hearth. There is also a cluster of high and moderate density sites along Sandy Hollow Creek, west of Gouldsville.

Within HTP Central and HTP South, the assemblage within 200 metres of the project impact area is more diverse. Of the 39 sites identified in these areas, there are a range of rockshelters (n=9, 23%) with art and/or engravings, grinding grooves (n=10, 26%), culturally modified trees (n=2, 5%), and resource and gathering sites (n=1, 3%), as well as other artefactual sites and hearths. Many of these sites are recorded off ridgelines which not only offer suitable site conditions for rockshelters (i.e. steep to precipitous cliffs) but are used as vehicle access roads throughout the State forests and have historically focussed archaeological investigations in this region. Of these are several notable examples including:

- Warrwalong SWA (#45-3-3059)/Watagan Rockshelter Art (#45-3-4565) represents a collapsed shelter which, when recorded prior to collapse, noted at least 351 motifs, many indeterminate (n=205), but distinguishable motifs include 34 anthropomorphs and 84 kangaroo tracks. The site includes a complex and overlapping engraved mural on the back wall of the shelter, which has been exposed to the elements as a result of the roof collapse. This site is slightly beyond 200 metres, being some ~230 metres southwest of the project impact area in HTP South, and near the intersection of Walkers Ridge Forest Road and Beavens Ridge Forest Road in Olney State Forest.

- Corrabare A (#37-6-0604) represents a rockshelter with art, identified beneath a waterfall of an intermittent stream between Trig Road and Sweetmans Creek in Corrabare State Forest. The site card records a total of 43 motifs including hand stencils (n=23 white, n=5 yellow), boomerangs (n=2) and an axe, as well as a small number of animal motifs in charcoal. The site is situated on a steep escarpment above Sweetmans Creek (4th order), 240 metres to the west, and is ~170 metres from the project impact area.

- The Pinnacle Dora Pinnacle 1 (#45-3-0275) represents a large rockshelter, 17 metres wide and 6 metres high, that has a northwest orientation, with art (white ochre) and a shallow sandy deposit. There are at least 29 motifs, including 14 turtles, 1 large animal figure, 1 fish, 2 circular shapes, 1 long stroke, 5 non-figurative patterns, 4 hand stencils and 1 arm stencil. Grinding grooves were recorded on a boulder at the dripline of the shelter. At some point in the 1980s, the shelter was recorded in detail before removal of some graffiti. The site is documented south of Watagan Road on a ridgeline running parallel to the road. The project impact area is located 130 metres northeast of the site, and are associated with proposed road upgrades.

- Cabans Rd Cliff SWA (#45-3-4516) represents a rockshelter (no dimensions) with at least 35 motifs, primarily charcoal, including 4 macropods, 4 birds, and 4 possible koalas, along with a number of other indeterminate motifs. AHIMS #45-3-3823 is 30 metres northeast of this site, on the same ridge line, and features 5 white hand stencils on the rear of the shelter. Both are approximately 40 metres north of the project impact area, off Langans Road, and face north.

Other sites include grinding grooves that are often found in permanent or semi-permanent watercourses, on soft geology (i.e. sandstone). While many of these record <10 grinding grooves, perhaps more reflective of transient use of the area, at least 2 (Monkey Place Creek/Broken Back Trail [#37-6-0552]/ Broken Back Trail/Monkey Place Ck [37-6-0809] and Olney CPT 75/76 Douglas Pt GDG [#45-3-4543]) are notable as featuring ~30 and ~20 respectively, and might be considered areas of more intense and/or repeated visitation. The sites are located in HTP Central near Broken Back Trail (#37-6-0552/37-6-0809) and on a tributary of Jilliby-Jilliby Creek in HTP South (#45-3-4543). Notably, WST 3 (#45-3-2449), containing >28 grooves, is located in Onley State Forest and 140 metres from the project impact area. This site was originally recorded in 1994 as 8 grooves the base of a waterfall that feeds into a drainage channel, but improved survey conditions during fieldwork for this project resulted in the identification of significantly more grooves at this site. The remaining sites include artefact sites, typically on access tracks where visibility is good, or near other, more visible sites where survey effort may be more intensive as a result, and a small number of culturally modified trees.

Watagan/Olney St (#45-3-4562)/ Scar Tree (Morisset) (#45-3-3378)/Scar Tree (Morisset) (#45-3-3381) is assumed to be related to a single culturally modified tree near a parking area at the intersection of Watagan Forest Road and Wollombi Forest Road and was surveyed 20 metres northwest of its documented location, placing it close to but outside the project impact area.

Table 8.1 Previously documented AHIMS sites within 200m but outside of the project impact area

Site type	Count	% of total
HTP North		
Culturally modified tree (carved or scarred)	2	0.46
Culturally modified tree (scarred)	2	0.46
Hearth with isolated find	1	0.23
High density artefact scatter (>50)	21	4.78
High density artefact scatter (>50) with hearth	1	0.23

Site type	Count	% of total
High density artefact scatter (>50) with hearth and potential archaeological deposit	1	0.23
High density artefact scatter (>50) with potential archaeological deposit	8	1.82
Isolated find	165	37.59
Isolated find with potential archaeological deposit	14	3.19
Low density artefact scatter (≤20)	150	34.17
Low density artefact scatter (≤20) with potential archaeological deposit	17	3.87
Moderate density artefact scatter (21-50)	12	2.73
Moderate density artefact scatter (21-50) with potential archaeological deposit	1	0.23
Potential archaeological deposit	2	0.46
Undefined artefact site	2	0.46
Undefined artefact site with potential archaeological deposit	1	0.23
Subtotal	*400*	*90.12*
HTP Central		
Aboriginal resource and gathering site	1	0.23
Culturally modified tree (scarred)	1	0.23
Grinding groove(s)	4	0.91
Grinding groove, water hole	1	0.23
Hearth	1	0.23
Isolated find	1	0.23
Low density artefact scatter (≤20)	2	0.46
Moderate density artefact scatter (21-50)	1	0.23
Rockshelter with art (pigment or engraved)	4	0.91
Rockshelter with art (pigment or engraved)	1	0.23
Rockshelter with art (pigment or engraved) and potential archaeological deposit	1	0.23
Rockshelter with art (pigment or engraved) and stone arrangement	1	0.23
Subtotal	*20*	*4.56*
HTP South		
Culturally modified tree (carved or scarred)	1	0.23
Grinding groove(s)	4	0.91
Grinding groove, water hole	1	0.23
Isolated find	6	1.37
Low density artefact scatter (≤20)	5	1.14
Rockshelter with art (pigment or engraved)	2	0.46

Site type	Count	% of total
Subtotal	*19*	*4.33*
Grand total	**439**	**100.00**

8.3.3 Within the project impact area

Of the 132 sites within the project impact area, 94% of sites are in HTP North (n=124), with only a small number in HTP Central (n=3, 4%) and HTP South (n=5, 2%). Of the 124 sites in the project impact area in HTP North, all but 1 (#37-2-0737, see below) represent artefact sites of varying densities. Most are isolated finds (n=63, 51%) and low-density scatters (n=52, 42%); only 8 sites reflect more than 20 artefacts, and only 6 of these represent sites of more than 50 artefacts (#37-2-0024, #37-2-0716, #37-2-0721, #37-5-0260, #37-6-4023, #37-6-3376). Of these latter sites, 4 have been previously destroyed, while #37-6-4023 consisting of 65 artefacts on an existing transmission easement west of Gouldsville could not be located during the field investigations (see *section 9.2*) and is considered probably destroyed. Similarly to the above, these more extensive sites appear where the project intersects with important watercourses including Parnells Creek (#37-2-6514), Wollombi Brook (#37-6-3384 and #37-6-3376) and Hobden Gully (#37-5-0260). Notably, #37-6-3384 and #37-6-3376 are both situated on a plain with Wollombi Brook (8th order) being >250 metres and >450 metres west of the creek, respectively. While a significant distance from the creek, both sites are situated on an elevated terrace, both a more desirable camping ground as it is less prone to flooding. The only other previously documented site, #37-2-0737, is a culturally modified tree, previously located near Bulga mining complex and which was destroyed under permit SZ#156 issued to Bayswater Colliery in 1997.

Previously documented sites within the project impact area in HTP Central and HTP South (n=8) are more reflective of rarer and more diverse sites, including:

- DEEP CK MOTHER SWA (#37-6-3714) represents a large shelter [redacted]. At least 146 motifs were recorded and include white (n=26) and yellow (n=13) hand stencils, white (n=2) and yellow (n=1) boomerangs, 2 white axes, 1 snake, 4 lizards, 2 men, and 1 bird. A large number of tally marks were also noted in both white pigment and charcoal. This site was revisited during the field survey for this project and was found in good condition (see *section 9.2*).

- TRGG grinding groove site (#45-3-2456) represents at least 74 grinding grooves identified on 3 sandstone exposures [redacted]. This recorded location of this site is [redacted]. The first exposure is 3.2 metres x 2.2 metres with 34 grooves; the second is 2 metres x 1.3 metres with 23 grooves; and the third is 2 metres x 1 metre and has 17 grooves. The exposures also contain small potholes which collect water. Importantly, while AHIMS locates this site [redacted], coordinates captured during the survey place this site spatially [redacted], and additional grinding grooves were observed (see *section 9.2*).

- Watagan Creek ACD (#45-3-4623) reflects the recording of Watagan Creek within a study by Cessnock City Council. It was considered to reflect a cultural landscape with many known recorded sites, with cultural significance and value for resource gathering, occupation and travel routes, multiple watercourses and with known archaeological sites.' While the site's spatial coordindates documents its location [redacted].

Five artefactual sites are also recorded in HTP Central and HTP South but comprise a low-density stone artefact scatters (n=1) and 4 isolated Aboriginal objects. Examples of these include: #37-6-0725, a small scatter of 17 artefacts identified on the gravel track intersection of Sweetmans Creek Road and Trig Road in Corrabare State Forest; and #37-6-0724 and #45-3-2467, both isolated Aboriginal objects located on a sharp bend of Broken Back Road and Tin Dog Point Road, respectively.

Comprehensive details for previously recorded AHIMS sites within the project impact area are provided in Appendix E.7.

Table 8.2 Previously documented AHIMS sites within the project impact area

Site type	Count	% of total
HTP North		
Culturally modified tree (scarred)	1	0.76
High density artefact scatter (>50)	6	4.55
Isolated find	52	39.39
Isolated find with potential archaeological deposit	11	8.33
Low density artefact scatter (≤20)	47	35.61
Low density artefact scatter (≤20) with potential archaeological deposit	5	3.79
Moderate density artefact scatter (21-50)	2	1.52
Subtotal	*124*	*93.94*
HTP Central		
Isolated find	1	0.76
Low density artefact scatter (≤20)	1	0.76
Rockshelter with art (pigment or engraved)	1	0.76
Subtotal	*3*	*2.27*
HTP South		
Aboriginal ceremony and Dreaming site with Aboriginal resource and gathering	1	0.76
Isolated find	3	2.27
Low density artefact scatter (≤20)	1	0.76
Subtotal	*5*	*3.79*
Grand total	**132**	**100.00**

Notes: These values include 18 Aboriginal objects and/or sites that are listed in the database as 'destroyed'.

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8.4 Predictive model

Aboriginal occupation of the project impact area and surrounds has been well-documented, in large part due to the extensive archaeological assessments undertaken in association with environmental assessments for the region. Such information is more robust within HTP North than other parts of the project impact area. Based on the information outlined in preceding sections, the following predictive model can be developed for the project impact area:

- Entire project impact area
    - Grinding grooves and to a lesser extent quarry/stone procurement sites are prevalent in the region. These are frequently constrained to exposed sandstone outcropping in small moderate watercourses but are also found in other landforms where suitable geology is present. No discernible pattern of these sites is evident in the available data, but they are typically found on large, exposed sandstone platforms either in elevated contexts (comparable to engravings encountered across the Sydney Basin) or within creek beds. These are more likely to be located within HTP Central and HTP South.
    - Burials can occur anywhere in the landscape but are notably more likely within rockshelters, under rock ledges or buried in sandy soil profiles. Their identification in the landscape is rare, and few have been documented in the vicinity of the project impact area. Evidence of burials is generally rare because human bodies are susceptible to the acidic Australian environments and other taphonomic processes. Where subsurface burial is not performed, human bodies can have limited preservation in the archaeological record. Such sites and their component parts are also more susceptible to the impacts of low-level development (such as farming) than other sites. Aboriginal input during cultural values discussions highlighted the crossings of the Hunter River for such sites, although to date none have been documented in the vicinity of the project impact area.
- HTP North
    - Significant artefact scatters and deposits, reflecting extensive and/or repeat past occupation, are prevalent in this region, and can typically be found on elevated locations such as levees and lower slopes adjacent to larger watercourses (>2nd order Strahler). There are extensive references to such cultural materials being encountered on the Hunter River, Wollombi Brook, Loder Creek, Doctors Creek, Parnells Creek, and their tributaries. The presence of deep soil profiles, especially Warkworth sand system units, are also often correlated with the presence of substantive and significant cultural deposits. Within the project impact area, these types of soil profiles are known to occur in the vicinity of the Wollombi Brook and Hunter River confluence and extending northwards into Hunter Valley Operations mining complex continuation project footprint. Densities of at least >25 per square metre (ranges of 20 to 30 per square metre have been applied by various assessments) appear typical when determining an area of past foci, with hundreds and even several thousands of stone artefacts documented previously.
    - Isolated finds and low-density open artefact scatters are the most common site types within the region and can occur across most landforms, even in disturbed contexts. Isolated finds may be indicative of random loss or deliberate discard of a single artefact; the remnant of a now dispersed and disturbed artefact scatter; or an otherwise obscured or subsurface artefact scatter. The most common site type is likely to be surface stone artefactual material reflective of past visitation and/or occupation. Available data suggests that such sites frequently contain few Aboriginal objects (<20) and are predominantly reflective of transitory movement or short-term camping by small parties.

- Culturally modified trees, including scarred and carved trees, may occur where native vegetation has been preserved. Such vegetation is extremely sparse in HTP North and likely constrained to isolated trees or small copses of remnant vegetation. Culturally modified trees typically served utilitarian purposes, and as such are often associated with watercourses and other natural resources associated with short- and long-term occupation. Conversely, carved trees may occur in association with burials, ceremonial sites or as indicators of 'Dreaming' tracks and pathways. Therefore, they may occur only where native vegetation has been preserved, but their location within the landscape is difficult to predict without the aid of cultural knowledge.

- Specific cultural places or stories are not known to occur within the project impact area. Several cultural values investigations have occurred and have demonstrated a number of important traditional, historical and contemporary places, across the region. *Chapter 4 (Aboriginal consultation)* and *Chapter 7 (Cultural values mapping)* outlines these in further detail.

- Post-contact sites, including massacres and/or other frontier violence events, are documented across the Hunter Valley. The early 19th Century saw significant conflict in the region and has been epitomised in the recent attempts to protect the Ravensworth Homestead Estate complex and associated massacre. A comprehensive review of these activities by Dunn (2020) has not identified any within the project impact area, but such events are reliant on a biased historical record, and as such, evidence of these activities may be present within the project impact area. Where present, they would reflect a range of potentially traditional and colonial remains in close proximity, including stone artefacts, glass and/or ceramic artefacts, etc.

• HTP Central and HTP South

- Rockshelters and associated features (including art and cultural deposits) are generally found in the steeper sandstone relief and escarpments throughout this part of the project impact area. Numerous examples are documented within the Heritage NSW AHIMS database. While more broadly such sites are closely constrained to environmental resources (e.g. permanent water, etc.), the project impact area is encompassed within an extensive ceremonial landscape between Mount Sugarloaf and Mount Yengo. Rockshelters in this region were, therefore, not just utilitarian, but may also have had spiritual and/or religious connections, and as such may occur in other environmental contexts. Notably, several previously recorded sites are in elevated positions on ridgelines/hill tops or upper slopes associated with these features.

- Culturally modified trees, including scarred and carved trees, may occur where native vegetation has been preserved. HTP Central and HTP South has been subject to historical and contemporary logging, and it remains unclear whether such native remanent vegetation is present. However, the potential for such sites is probable given the extensive utilitarian and ceremonial activities known to have occurred in this region.

- Cultural places and/or stories are known to be present throughout this part of the project impact area. The project impact area is situated between several promontories that have traditional and/or contemporary importance to the local Aboriginal community. These types of sites may reflect natural features, such as Mount Yengo and Lizard Rock; archaeological sites such as rockshelters connected to the Dreaming place or story; and intangible values and connections that cannot be robustly spatially determined. *Chapter 7 (Cultural values mapping)* explores these sites further.

- Post-contact sites associated with historical and contemporary practises by the local Aboriginal community. In HTP Central, there is less evidence of frontier violence (although it may have occurred), and sites are more likely to reflect Aboriginal people working in the timber or pastoral industries, as well as increasing re-connection to traditional practise in the late 20th century.

8.4.1 Classification of rockshelters

The nature of sandstone geology within the project impact area results in the prevalence of natural clefts, gaps, overhangs, caves and rockshelters being present. It is considered improbable that all such features would have been used in the past by Aboriginal people, and therefore it would not be accurate to record them all as 'rockshelters' requiring consideration in this ACHA. While a large number of such features were encountered and documented within the field program (see *Chapter 9 (Field investigations)*), it is considered likely that many are not cultural or were used by people in the past. Rockshelters that exhibit engravings, art and/or other cultural materials can be clearly identified as cultural where encountered. However, overhangs, caves or other undulations in the sandstone geology that do not have such cultural features will be more difficult to discern their past use or not.

Here, rockshelters in the region that are documented to have been used in the past (typically containing observed cultural materials) were reviewed and then used to develop criteria for considering sites that are less clear based on field observations.

Within the AHIMS database, around 36 rockshelters have available data in close proximity to the project impact area, which can provide information on the size, shape, position, composition, etc., of these sites (see Appendix E.8). Of these, 33 demonstrate evidence of past use, typically in the form of art motifs and/or observed cultural materials in the form of stone artefacts. The remaining 3, all in the vicinity of Sweetman's Creek, have limited information.

Spatially, these sites are primarily found on upper and/or steep slopes in close proximity to ridgelines. Vertical cliffs are perhaps unsurprisingly also identified as locations of these features. They appear frequently on upper and steeper slopes throughout the State forests. Proximity to water is more variable, but the majority of them are found within 100 metres, and all within 200 metres, of minor tributaries where this data has been captured.

When reviewing the size of these sites, they are on average 17 square metres in size (σ = 19 square metres), with an opening of 6 metres (σ = 5 metres), a height of 2.5 metres (σ = 1.1 metres) and a depth of 3.9 metres (σ = 1.6 metres). Some of the largest sites have spatial areas of up to 75 square metres and an opening of some 20 metres long x 5 metres high. With few exceptions, the entrance of documented sites will always be more than 1.5 metres in length and height. The depth of rockshelters is also typically in the order of several metres from the entrance.

Few of those rockshelters with art contain evidence of potential archaeological deposits, although several did contain hearths or stone artefactual materials indicative of past occupation. It is notable that 86% of rockshelters previously documented contained artworks; and may suggest that where such features are not present, it is unlikely the site has been used in the past.

i Selection criteria

When considering the information outlined above, a number of consistent patterns are evident for rockshelters that are known to have been of anthropogenic use. These can provide criteria that can be compared with observations in the field to determine whether an overhang, cleft or cave has the potential to have been used in the past. These include:

1. the rockshelter has evidence of past use in the form of engravings, art motifs, stone artefactual and/or other cultural material within its curtilage or on any adjacent talus slope/s

2. cultural sites or materials are documented within 100 metres of the rockshelter, and therefore it can be assumed would have been visited/occupied through these activities

3. the rockshelter is on or near elevated locations where significant view-lines of key promontories and/or other broad vistas may be desirable. Landforms should be dominated by upper, steep slopes or on the edge of prominent ridgelines

4. the rockshelter is on or near named watercourses or water sources. Where present, the site should generally be above any probable flood levels from the water source

5. the rockshelter has an opening at least 1.5 metres long x 1.5 metres high and have depths of >2 metres. Floor sizes should be >3 square metres or is of the size that can fit multiple individuals comfortably sitting and/or laying side-by-side. Lower roofs are known to occur, and where encountered, entrances longer than 3 metres should be expected

6. the site is known to the Aboriginal community and will have been documented by them in the past or will have stories and relationships to activities previously undertaken.

For the purposes of this ACHA, where (1) is evident, the site is considered an Aboriginal site. Where (1) is absent, multiple other criteria (≥3) would be required to classify the observed feature as an archaeological site. This criterion is applied to potential rockshelter sites identified during the fieldwork in *section 9.2* and Appendix E.8.

9 Field investigations

9.1 Summary of this chapter

This chapter provides an overview of the field investigations undertaken as part of the Aboriginal cultural heritage assessment (ACHA). In summary:

- On-site validation consisted of a 38+ week field program, including pedestrian survey and test excavations undertaken by EMM Consulting Pty Limited (EMM) archaeologists and representatives of the registered Aboriginal parties (RAPs). The field investigations focussed on the project impact area but extended beyond this zone as a result of refinements to design during the field program. The field survey was undertaken between March 2024 and March 2025, with test excavations occurring between September and October 2024. Ultimately, this program resulted in approximately 190 days of on-Country activities for the Aboriginal individuals and organisations involved in the project (equivalent to over 600 person days).

- The field survey encompassed around 643 kilometres (or ~2259 hectares) of linear pedestrian transects across the project impact area and included 7702 individual points of observation and documentation. Some 72% of the project impact area was investigated. Of the remaining 28%, 4% are sealed hardstand areas (such as roads) and 3% is inaccessible dangerous terrain, as such only 17% remains to be surveyed. Visibility and coverage were relatively poor (~4% to 10%) due to dense vegetation, either low grass cover in HTP North or dense sclerophyll forest in HTP Central and HTP South. As a result of the close engagement the project undertook to avoid key cultural heritage places identified during fieldwork, the impact area was subject to ongoing refinement throughout the field investigation. This ultimately resulted in field survey of project components that have since changed, and that are now outside the project impact area. When incorporating these activities, ~1045 kilometres of field survey was undertaken for the project.

- Overall, the field survey identified 195 Aboriginal sites and places within the project impact area, broken down as around 156 newly identified by the project and 39 previously documented and validated by the field survey. When including investigations outside the current project impact area due to refinements, around 375 Aboriginal sites and places were documented and validated including, 293 newly identified and 82 previously documented Aboriginal Heritage Information Management System (AHIMS) sites and validated. A further 81 previously documented AHIMS sites were revisited but could not be relocated and are assumed destroyed. A small number of previously documented sites located within the refined project impact area (n=13) were not subject to field investigation, as they were identified after the field survey program, due to project refinements. Of these, 9 are documented as having been previously destroyed, and 3 considered likely destroyed. Only 1 site is considered possibly extant and is discussed further in *Chapter 10 (The archaeological assemblage of the project area)*.

- The cultural assemblage identified during the field investigations aligned closely with the desktop and archaeological information. In HTP North, sites were dominated by various densities of stone artefacts frequently in association with major watercourses or their lesser tributaries, including Parnells Creek, Wollombi Brook, Loder Creek, and Monkey Place Creek. Within HTP Central and HTP South, sites were dominated by rockshelters, culturally modified trees and grinding grooves sites. Spatially, these patterns were harder to discern and very much dependent on the location condition of the geological substrate and vegetation present at any given location. However, there are clusters of sites contained within localised cultural landscapes, especially near Trig Road and Flat Rock. Several of these site recordings were considered tentative at the time of recording, and further analysis and/or specialist investigations have resulted in declassification of some of these places. Various other site types were also encountered within HTP Central and HTP South, including places of cultural importance to the contemporary community.

- A program of test excavations was proposed for areas of predicted Warkworth sand system and/or potential subsurface cultural deposits within HTP North and HTP Central. Excavations were undertaken in accordance with a project specific Archaeological Research Design (ARD) approved by Heritage New South Wales (NSW) but ultimately aligned closely with established Heritage NSW guidelines. Due to land access constraints, test excavations were focussed with the Singleton Military Area and in the vicinity of Congewai Creek. In relation to the former, multiple proposed alignments were investigated; and the results used to inform the final project impact area.

- Overall, some 50 test pits (47 x 0.25-square metres test pits, 3 x 1-square metre test pits, totalling 14.75 square metres) were undertaken within the Singleton Military Area as discrete 20-metre grids focussed on proposed project elements. These primarily identified a shallow duplex or fabric contrast soil profile, with a low density of cultural materials encountered in the upper 40 centimetres. Small pockets of predicted Warkworth sand system were encountered in two areas, each less than 1.6 hectares in size, and neither containing significant cultural materials. Optically stimulated luminescence (OSL) ages suggest initial formation >12,000 years ago for these deposits. One of these locales was avoided through project re-design. The recovered cultural materials included a wide range of raw materials and were indicative of early manufacturing processes; and likely dating to the last few thousand years.

- Overall some 54 test pits (53 x 0.25 square metres test pits, 1 x 1-square metre test pit, totalling 14.25 square metres) were undertaken on the southern bank of Congewai Creek as a discrete 20-metre grid focussed on proposed project elements. These primarily identified a shallow duplex or fabric contrast soil profile, with a low density of cultural materials encountered in the upper 40 centimetres. Three discrete areas of higher density cultural materials, 19 and 32 square metres, were encountered, between 0.1 to 0.6 hectare in size and located between 100 to 200 metres from the creek's edge. These have been identified as HTP-C-FA01 (#37-6-4490), HTP-C-FA02 (#37-6-4489), and HTP-C-FA03 (#37-6-4491) in subsequent sections. The recovered cultural materials included a wide range of raw materials and were indicative of early manufacturing processes. OSL ages from the site suggest initial formation of the deposit 3000 to 5000 years ago, with the cultural materials deposited in the last 2500 to 3000 years. Discrete locations and varying depths of the cultural deposits strongly suggest repeated visitation occurred at this locale in the past.

9.2 Archaeological survey

9.2.1 Approach and methods

The project impact area has been subject to an extensive field survey campaign as part of this assessment, extending over 30 weeks, primarily between 18 March and 22 August 2024, but extending up until 14 March 2025 (see Figure 9.1 and Figure 9.2) as the project design continued to evolve. These works were undertaken by EMM archaeologists (including Amber Morgan, Antonella Skepasianos, Cameron Neal, Courtney Culley, Frances Robson, Joel Mason, Mikhaila Chaplin, Phillipa O'Brien-Pounde, Rohani Dutch, Taylar Reid, and William Truscott), with participation of Aboriginal representatives. While invitation to participate in the field survey was made to the 31 key RAPs identified for the project (see Appendix B.4), only some 15 of these ultimately sought to be involved in this component of this ACHA. These included Wonnarua, Awabakal, and Darkinjung traditional owners (see Table 9.1).

The primary aims of the field survey were to:

- identify Aboriginal archaeological sites and/or places with the assistance of Aboriginal participants

- characterise the landscape to aid predictions of archaeological potential and sensitivity

- identify sites or areas that would require further investigation if planned for development as part of the project
- identify sites or areas to be avoided by development, where possible
- identify areas with minor or negligible Aboriginal cultural heritage values that hold no constraint for development as part of the project.

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). To ensure the proposed areas of (potential) impact were suitably surveyed, the survey targeted the project impact area generally; and each transect aligned with discrete landforms, where feasible. The survey also utilised the predictive model developed for the project (see *section 8.4*). Each survey participant was spaced approximately 10 to 20 metres apart for each transect. Ultimately this allowed for survey of areas ~100 metres in width. Due to poor visibility across the project impact area the assessment calculations assume that each participant could identify and inspect exposures within 5 to 10 metres either side of them. Notwithstanding, this calculation does not account for more obtrusive site types such as rock shelters and culturally modified trees, which are observable from a much greater distance.

The survey team targeted ground exposures along transects, outcropping bedrock, and other features where cultural material were predicted to occur. It must, however, be noted that archaeological surveys are inherently limited by ground surface visibility conditions and, therefore, are considered to only sample the landscape. The archaeological survey did not aim to cover the entire ground surface within the project impact area, but rather to characterise the archaeological landscape through accessible portions of the area. This is particularly noteworthy for the access roads which connect the project impact area to the wider road network. In HTP North, these roads comprise of primarily sealed, major and minor roads and were not a focus of the survey. In HTP Central and South, a large portion of the roads in the State forests were surveyed, as this largely comprises semi-formed access tracks and roads by which the team could survey while accessing the proposed easement areas.

The effectiveness of the survey is determined through its effectiveness in recording and analysing survey coverage data. This includes identifying the distribution of cultural materials across the landscape and considering the potential for archaeological deposits. The percentage of the ground surface exposed in each landform, and the visible ground surface within exposures (as ground exposures are often obscured by vegetation, gravels, etc.), influences the survey results. For example, an archaeologically sensitive landform surface that is highly exposed by erosion is likely to reveal cultural materials, whereas a similar landform that is thickly grassed will obscure surface artefacts if they are present. Overall, calculation of effective survey coverage is used to estimate not only how much area was physically surveyed, but also how favourable the survey conditions were for the identification of cultural materials.

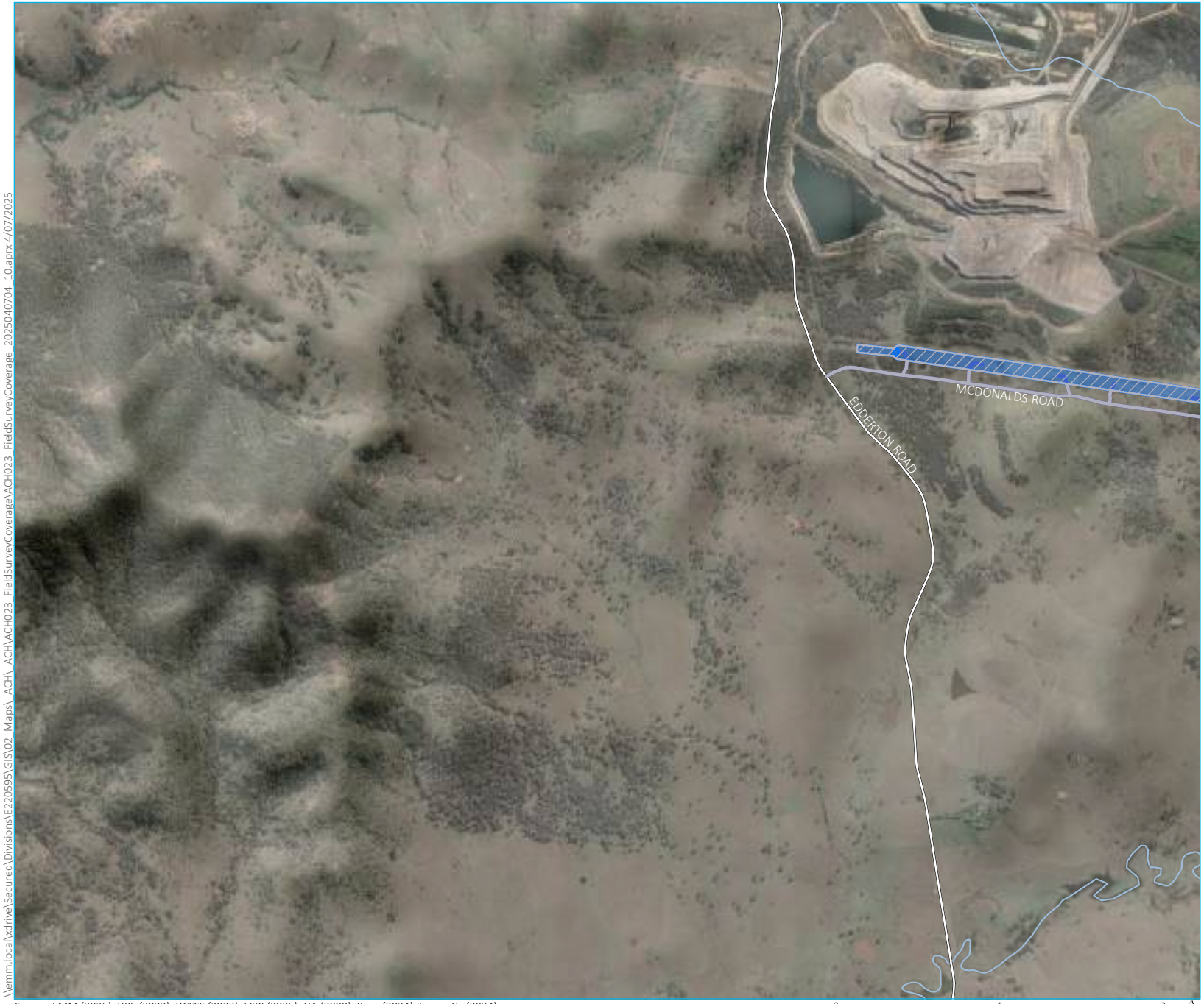
Site recording was completed in accordance with the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010). Site locations and their details were recorded with mobile phones using site recording forms created by EMM on the Survey123 application for ArcGIS (Esri© software) (see Figure 9.2). The mobile phones had a location accuracy of up to ±3 metres, which is similar to hand-held non-differential global positioning system (GPS) units (~5 metres). The Survey123 forms allowed for a site's location, details and representative photographs to be linked together, which avoided potential post-fieldwork issues around data integrity.

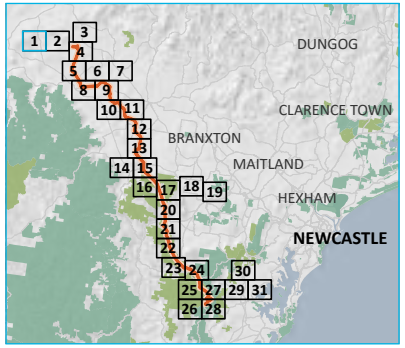
Survey transects were recorded as tracks on GPS units and detailed information about each transect recorded on a separate Survey123 form created by EMM (see Figure 9.2). The Survey123 form allowed for survey transects starting points, details and representative photographs to be recorded. The course of survey transects were recorded as tracks on hand-held non-differential GPS units which were linked to the Survey123 forms.

Table 9.1 Aboriginal participants involved in the field survey

Organisation and/or individual	Personnel
HTP North	
Wanaruah Local Aboriginal Land Council (LALC)	[redacted]
Ungooroo Aboriginal Corporation	[redacted]
Widescope Indigenous Group	[redacted]
Wonnarua Elders Council/Upper Hunter Wonnarua Council Incorporated	[redacted]
Wonnarua Nation Aboriginal Corporation	[redacted]
A1 Indigenous Services	[redacted]
Amanda Hickey Cultural Services	[redacted]
Thomas Dahlstrom	[redacted]
Aliera French Trading	[redacted]
Long Gully Cultural Services	[redacted]
HTP Central	
Awabakal LALC	[redacted]
Mindaribba LALC	[redacted]
Biraban LALC	[redacted]
Cacatua Culture Consultants/AGA Services	[redacted]
Marrung-Ta Aboriginal Corporation/Culturally Aware	[redacted]
Wonn1 Consulting	[redacted]
Awabakal Descendants Traditional Owners Aboriginal Corporation	[redacted]
Kiray Putjung Aboriginal Corporation	[redacted]
Gomeroi Namoi Traditional Owners	[redacted]
Bawurra	[redacted]
HTP South	
Biraban LALC	[redacted]
Awabakal Descendants Traditional Owners Aboriginal Corporation	[redacted]
Awabakal & Guringai Pty Ltd	[redacted]

Organisation and/or individual	Personnel
Awabakal Traditional Owners Aboriginal Corporation	[redacted]
Renee Sales	[redacted]





KEY

Survey coverage

- Surveyed

Project impact area

- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 1 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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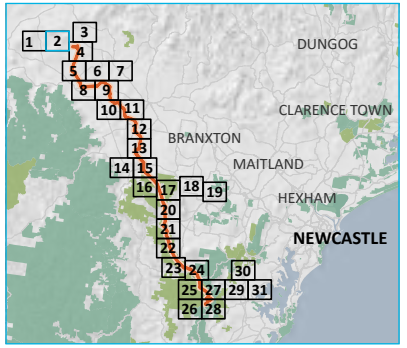

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 2 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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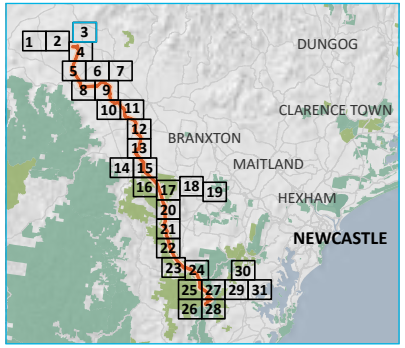

KEY

Survey coverage
- Surveyed
- Non-Surveyed

Project impact area
- Construction support site
- Access track

Existing environment
- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

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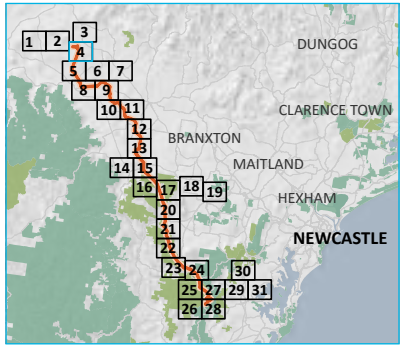
Field survey coverage of the HTP
Map 3 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities



KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site
- Adjustment to existing transmission line (lines 31 and 32)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 4 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
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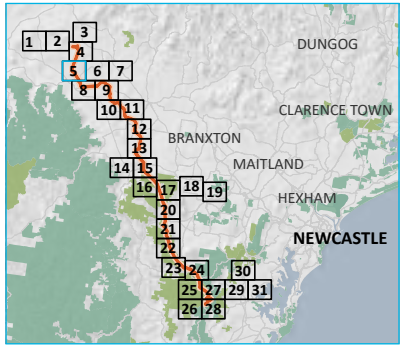

KEY

Survey coverage
- Surveyed
- Non-Surveyed

Project impact area
- HTP corridor
- Laydown area
- Access track

Existing environment
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

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Field survey coverage of the HTP
Map 5 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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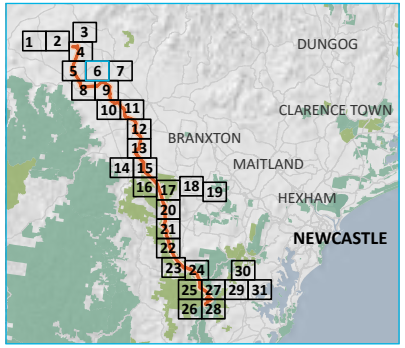

KEY

Survey coverage

Non-Surveyed

Project impact area

Access track

Existing environment

Major road

Minor road

Named watercourse

Named waterbody

INSET KEY

Major road

HTP corridor

NPWS reserve

State forest

Field survey coverage of the HTP
Map 6 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

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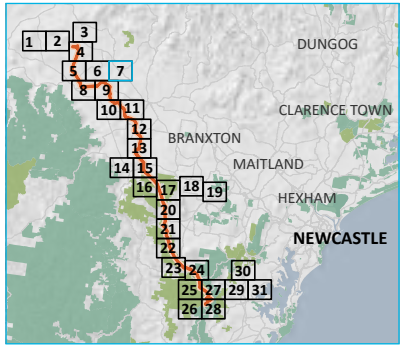

KEY

Survey coverage

- Non-Surveyed

Project impact area

- Access track

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 7 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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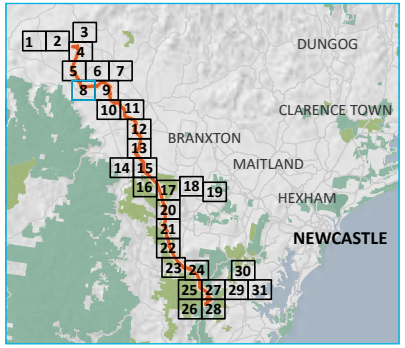

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 8 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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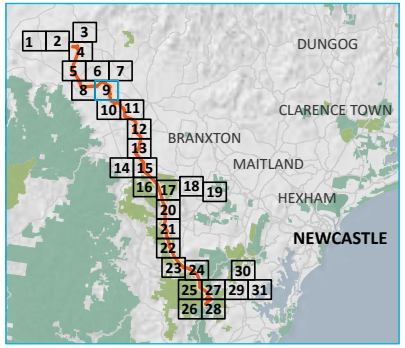

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Laydown area
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 9 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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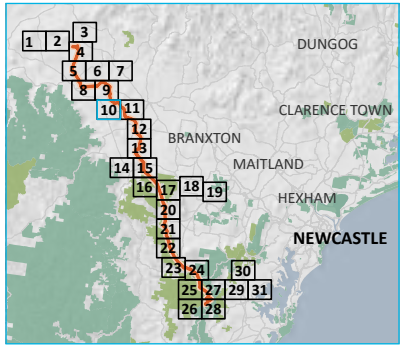

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Access track

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 10 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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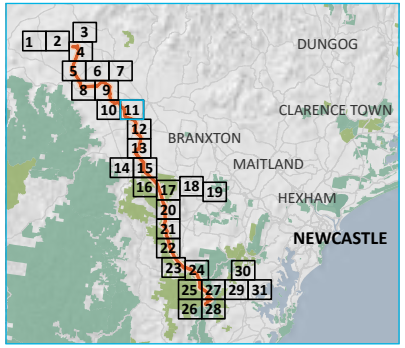

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Construction support site
- Access track

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 11 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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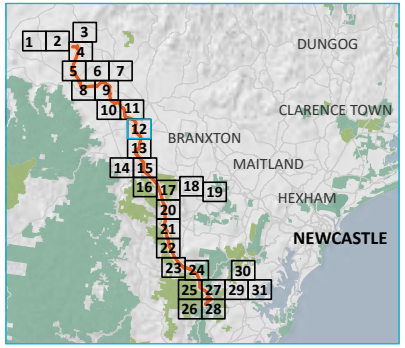

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Access track

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 12 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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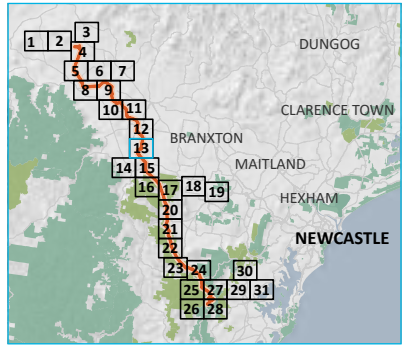

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Adjustment to existing transmission line (line 81)
- Access track

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 13 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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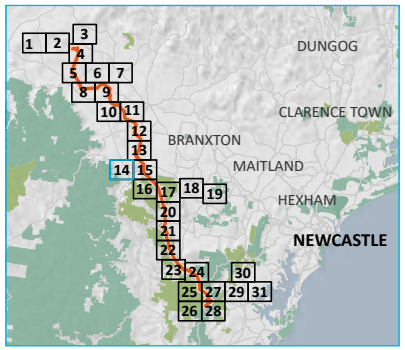

KEY

Survey coverage

- Non-Surveyed

Project impact area

- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 14 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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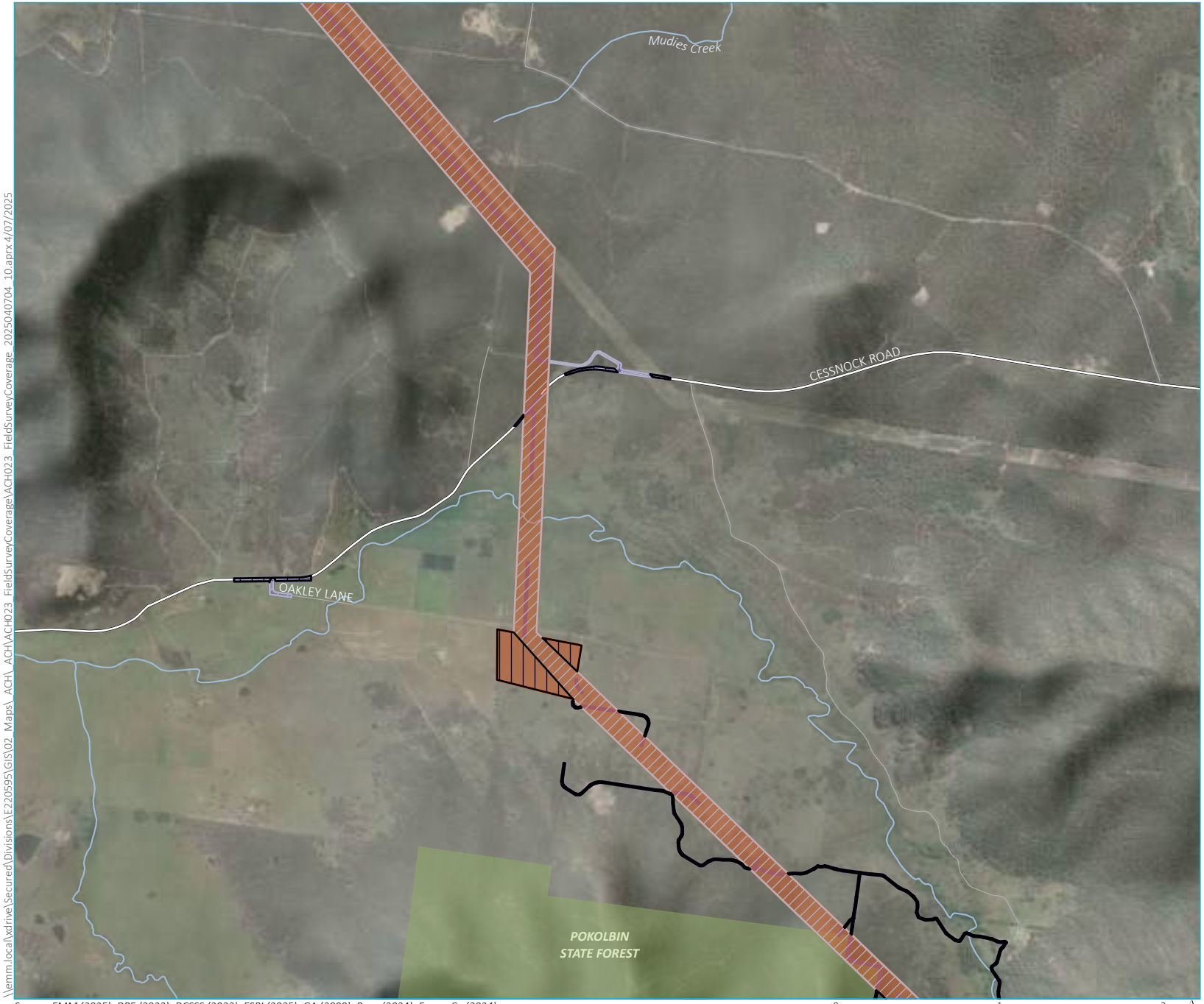

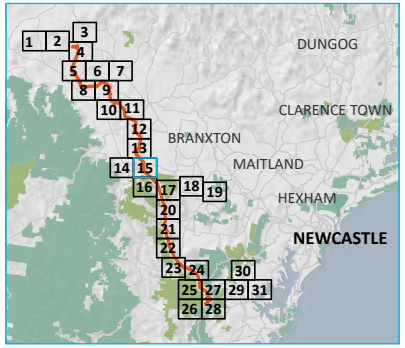

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 15 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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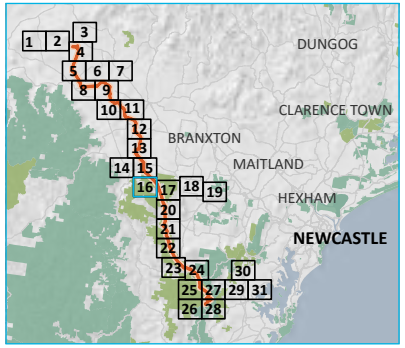

KEY

Survey coverage

- Surveyed
- Non-Surveyed
- Dangerous

Project impact area

- HTP corridor
- Access track
- Named watercourse
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 16 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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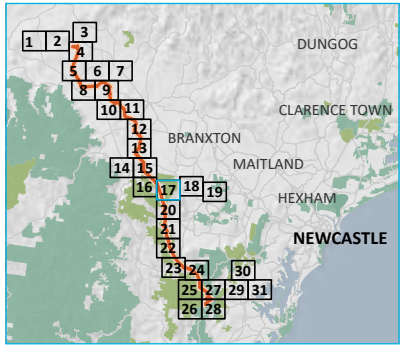

KEY

Survey coverage
- Surveyed
- Dangerous

Project impact area
- HTP corridor
- Laydown area
- Access track

Existing environment
- Minor road
- Named watercourse
- Named waterbody
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 17 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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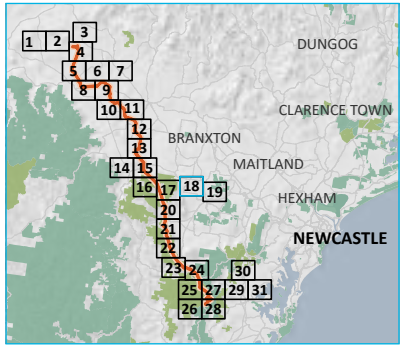

KEY

Survey coverage

- Non-Surveyed
- Dangerous

Project impact area

- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 18 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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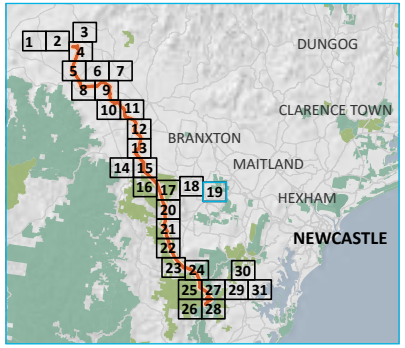

KEY

Survey coverage

- Non-Surveyed

Project impact area

- Access track

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 19 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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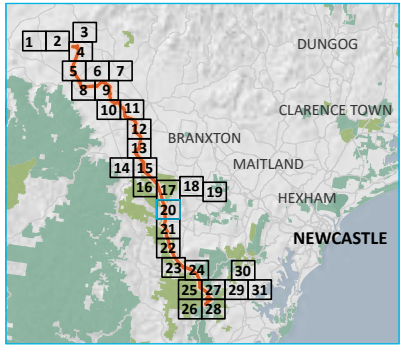
EMM creating opportunities



KEY

Survey coverage
- Surveyed
- Non-Surveyed
- Dangerous

Project impact area
- HTP corridor
- Construction support site
- Laydown area
- Access track

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

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 20 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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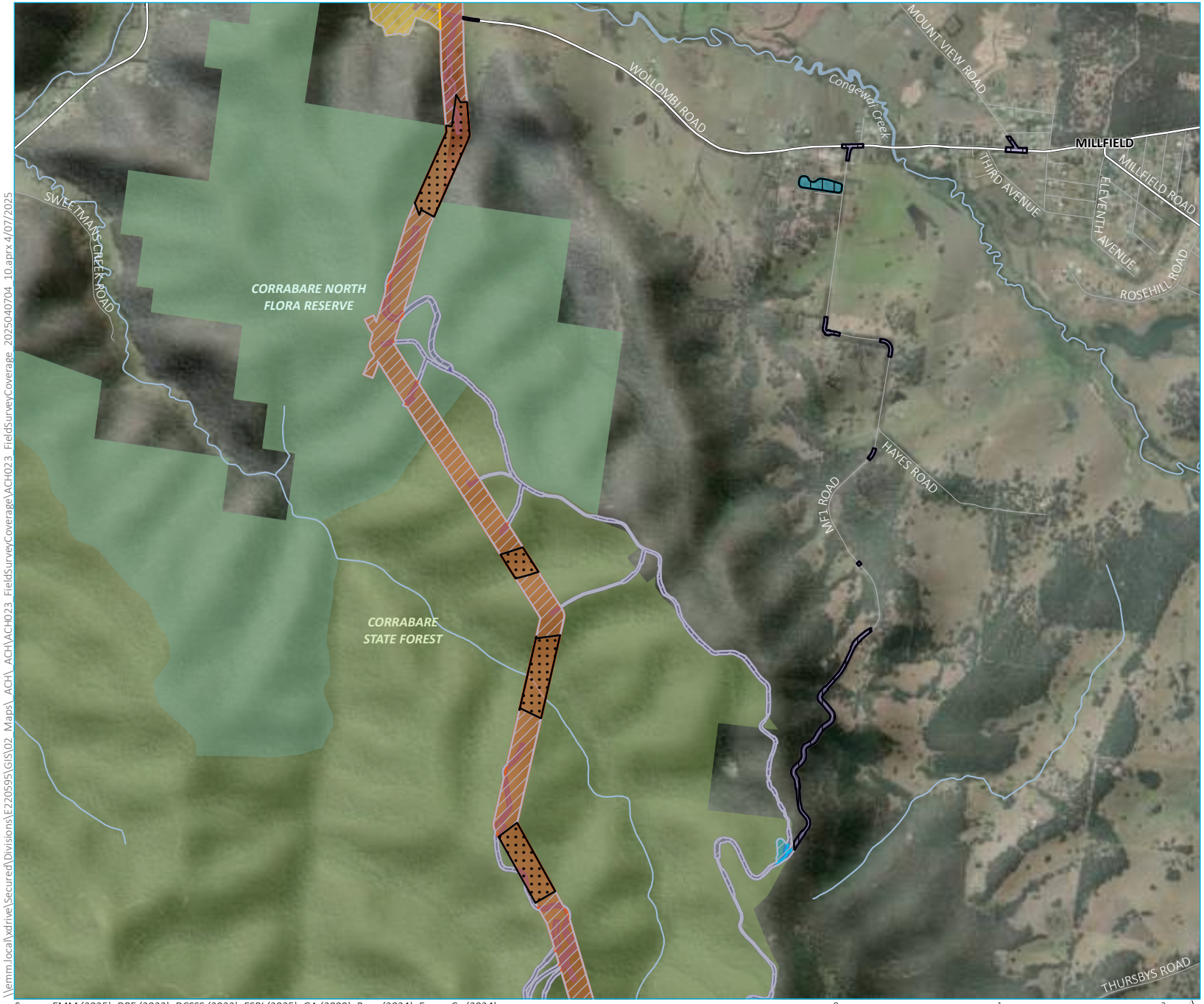

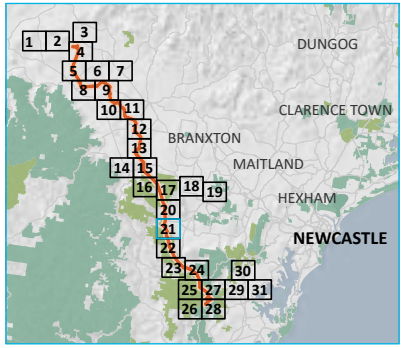

KEY

Survey coverage
- Surveyed
- Non-Surveyed
- Dangerous

Project impact area
- HTP corridor
- Construction support site
- Laydown area
- Access track

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

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 21 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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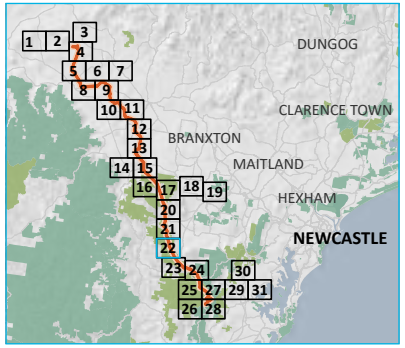
creating opportunities



KEY

Survey coverage
- Surveyed
- Dangerous

Project impact area
- HTP corridor
- Laydown area
- Access track

Existing environment
- Minor road
- Named watercourse
- NPWS reserve
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 22 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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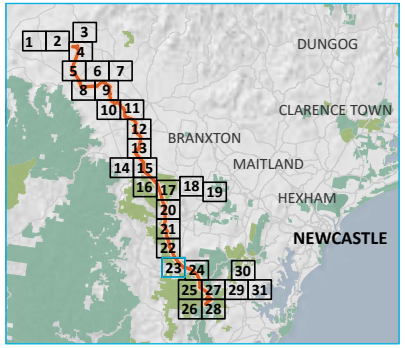

KEY

Survey coverage

- Surveyed

Project impact area

- HTP corridor
- Access track

Existing environment

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

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 23 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
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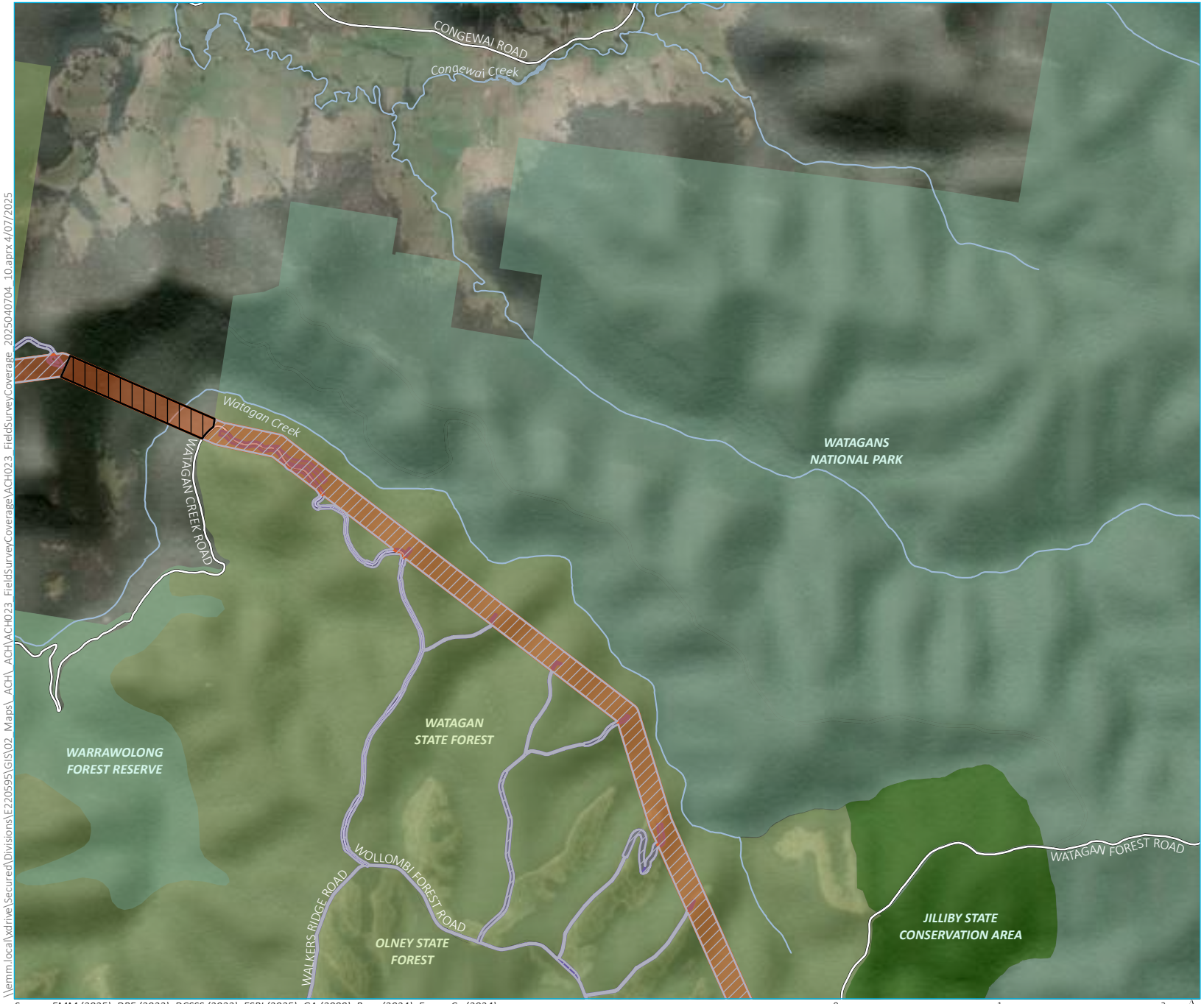

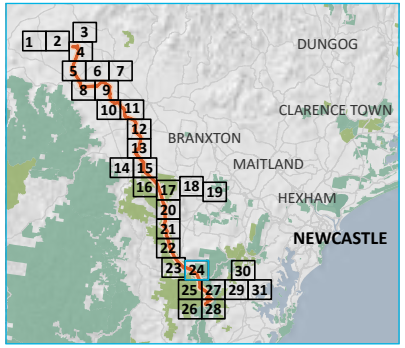

KEY

Survey coverage
- Surveyed
- Non-Surveyed

Project impact area
- HTP corridor
- Access track

Existing environment
- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 24 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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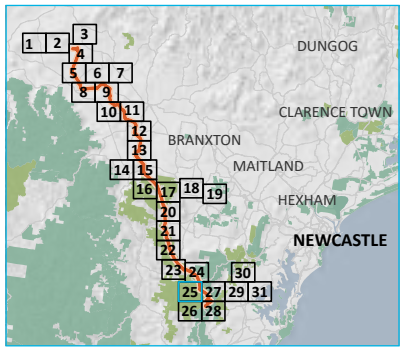

KEY

Survey coverage

- Surveyed

Project impact area

- HTP corridor
- Laydown area
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 25 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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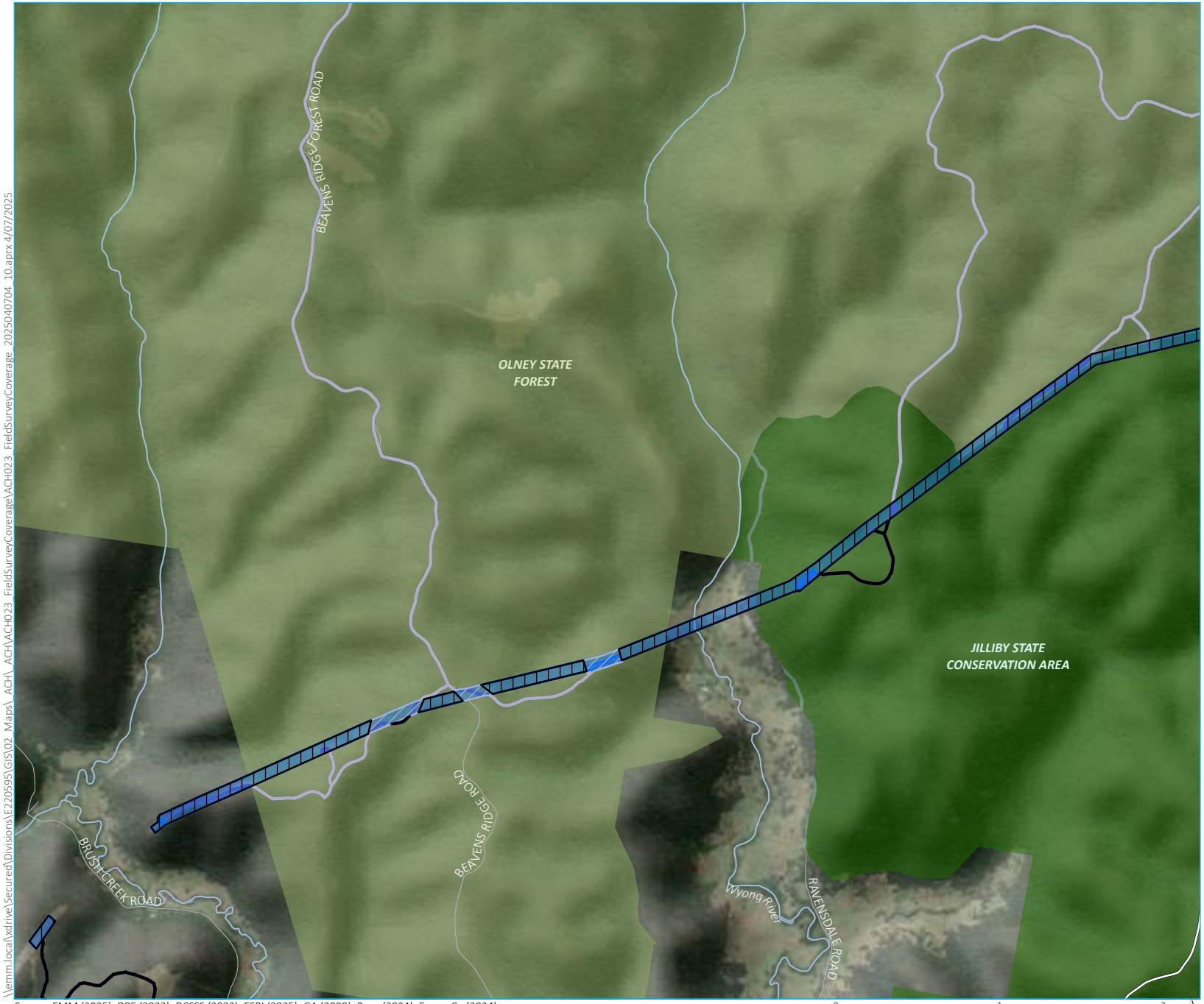

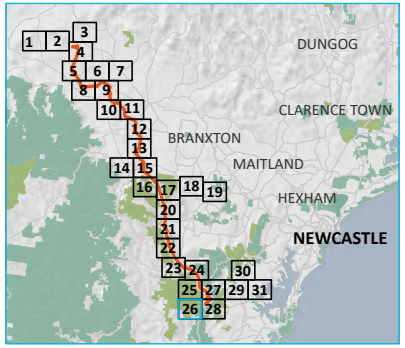

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 26 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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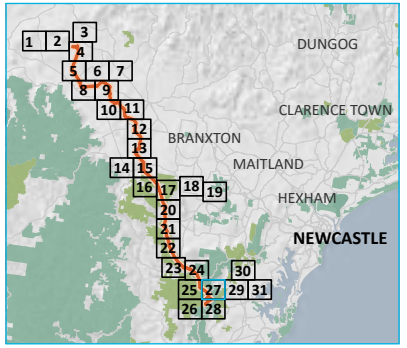
creating opportunities



KEY

Survey coverage
- Surveyed
- Non-Surveyed

Project impact area
- HTP corridor
- Olney switching station
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment
- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 27 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

creating opportunities

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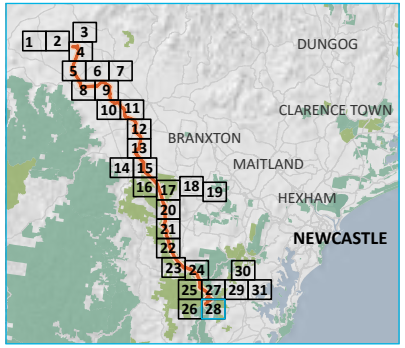

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- HTP corridor
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 28 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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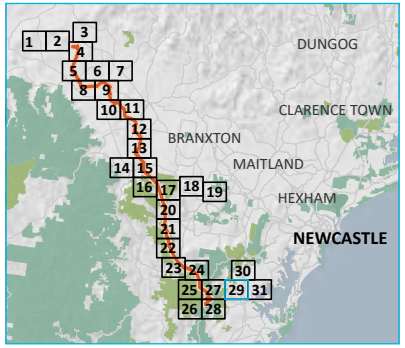

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 29 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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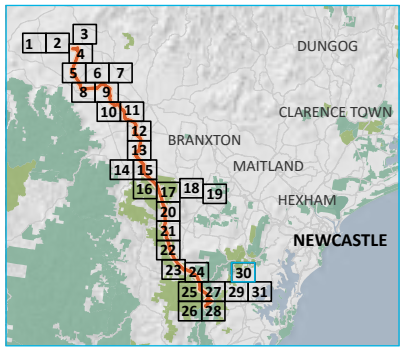

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- Construction support site
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey coverage of the HTP
Map 30 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km
GDA2020 MGA Zone 56
N

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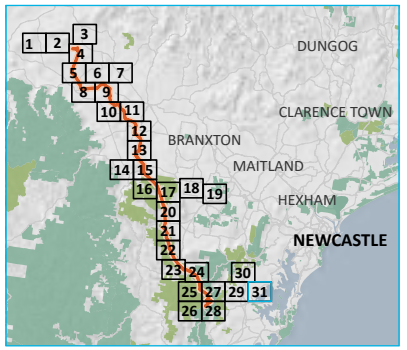

KEY

Survey coverage

- Surveyed
- Non-Surveyed

Project impact area

- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody
- State conservation area

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DPE (2023); DCSSS (2023); ESRI (2025); GA (2009); Beca (2024); EnergyCo (2024)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey coverage of the HTP
Map 31 of 31

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.1

EMM
creating opportunities

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9.2.2 HTP North

i Results

Some 20 discrete Survey Units (SU) were undertaken across the HTP North corridor (see Figure 9.2, Plate 9.1 to Plate 9.34, Table 9.2, Appendix F.1 to Appendix F.3). These encompassed and extended beyond the project impact area in several locations as the design was refined. Overall, these encompassed around 195 kilometres of pedestrian survey across the project, and a total of ~1024 hectares (see Figure 9.2). Despite dense ground cover across much of the project impact area, around 197 discrete site observations and/or recordings were made in the HTP North during the course of the investigation and outlined in further detail in *section 9.2.2ii*.

The results of the field investigations aligned closely with the desktop and archaeological information outlined in preceding sections. The project impact area is dominated by undulating and rolling hills primarily interlaced with minor ephemeral creeklines or open damp depressions (see Plate 9.1 to Plate 9.18). More intermittently, more permanent watercourses, notably portions of the Hunter River were encountered across the ACHA study area (see Plate 9.13). The edges of the Hunter River are large expansive plains with few landform features, and appear to flood periodically (see Plate 9.6, Plate 9.7 and Plate 9.9). Cultural materials were typically found on high ground adjacent to these flat plains, rather than upon them, perhaps reflective of the active hydrological processes still occurring in close proximity to the river. Near the southern edge of the HTP North impact area, primarily within the Singleton Military Area, the landscape begins to change with increasing occurrences of discrete sandstone promontories, domes and pinnacles (see Plate 9.33 and Plate 9.34). These are most evident north of Cessnock Road, which provides some screening of Lizard Rock to the west near Broke. The final transect of the alignment in this portion of the project impact area (SU17) was situated at the foot-slopes of Pokolbin State Forest, and Plate 9.34 shows the clear transition between the Hunter Central Lowlands and the steeper relief around Cessnock.

The majority of the project impact area was dominated by low-lying ground cover, including various grasses and small shrubs (see Plate 9.1). Typically trees where encountered as isolated features or formed small pockets (see Plate 9.5, Plate 9.16 and Plate 9.23). They became increasingly dense through the Singleton Military Area where pastoralism and other activities are limited (see Plate 9.32). There was some variety in vegetation types that will be discussed in the ecological investigations of the project, but trees appeared to be dominated by she-oaks (*Casuarina* sp.) and visually appeared young in age (see Plate 9.27). No substantively large or remnant vegetation within which culturally modified trees may occur was encountered by the field team.

While a number of soil landscapes are documented in the project impact area (see *section 5.2.2*), visually 2 main differences were observed in the field:

- The majority of the project impact area was characterised as a shallow duplex soil profile where a thin compact pale brown clayey sand A1 horizon topsoil was intermittently observed over a hard brown or red-brown medium clay with frequent ironstone pisoliths or gravels (see Plate 9.25).

- In closer proximity to the Hunter River and Wollombi Brook, soil profiles appear more sandy – perhaps indicative of the Warkworth sand sheet. This was most evident in SU9, immediately north of Wollombi Brook, and visibly along Archerfield Road (see Plate 9.17).

Unfortunately, low ground cover was too dense to robustly determine the extent of these sandier deposits within the project impact area, although the visual observations align with the desktop information presented in *section 5.2.2*.

The project impact area has been subject to a range of historical and modern activities that has resulted in various levels of localised ground disturbance. Disturbance is primarily associated with pastoral activities, including access tracks, dams, fences, and other livestock-related activities (see Plate 9.7). However, there were also rail corridors, roads and transmission easements found throughout the HTP North impact area (see Plate 9.17, Plate 9.20, Plate 9.26 and Plate 9.30). Evidence of mining activities were also evident within HTP North, including the Hunter Valley Operations mining complex continuation project, with some areas considered reclaimed and/or rehabilitated found primarily in the vicinity of the Hunter River in SUs 6 to 9 inclusive (see Plate 9.16 and Plate 9.18).

Section 9.2.2ii present the cultural materials encountered as part of the field investigations. These entirely consisted of stone artefacts, predominantly isolated objects or low densities (see Table 9.2 and Table 9.3). The highest number of sites were encountered within SUs 1, 11, 12 and 14. These transects encompass Plashett Dam, Parnells Creek, Wollombi Brook, Gouldsville, and areas east of Bulga mining complex, respectively (see Figure 9.2). These are all in proximity to named watercourses, although several have now been artificially dammed, and several appear to be ephemeral (or dry at the time of field investigations). A number of these were identified in the archaeological review in *Chapter 8 (Archaeological context)* and have been previously identified as areas where past activity was known to have occurred. Where encountered, cultural materials were commonly found on truncated exposures where ground cover was absent.

Table 9.2 Summary of field survey and archaeological findings within HTP North corridor

Unit #	Length (m)	Area (m^2)*	Landscape	Exposure (%)	Visibility (%)	Effective coverage		Number of Aboriginal sites identified within the project impact area†, ‡
						Area (m^2)	% of area	
SU1	55,005	2,679,457	Gentle undulating hills with small open depressions	10	30	80,384	3	38
SU2	12,359	777,765	Gentle undulating hills abutting a flat floodplain with open depressions	10	20	15,555	2	4
SU3	2035	133,134	Flat floodplain abutting low rocky hills with open depressions	30	40	15,976	12	-
SU4	1522	153,616	Flat floodplain adjoining gentle undulating hills	10	20	3072	2	-
SU5	2047	142,202	Flat plain with intermittent open depressions	10	20	2844	2	1
SU6	3600	250,687	Modified landforms set within flat plains	10	10	2507	1	-
SU7	2854	252,070	Flat plain with intermittent open depressions	10	20	5041	2	-
SU8	7693	611,898	Modified alluvial terrace with limited open depressions	10	30	18,357	3	7
SU9	515	192,527	Modified landforms set within undulating hills	10	20	3851	2	6

Unit #	Length (m)	Area (m²)*	Landscape	Exposure (%)	Visibility (%)	Effective coverage		Number of Aboriginal sites identified within the project impact area†, ‡
						Area (m²)	% of area	
			with small open depressions					
SU10	2117	110,005	Modified landforms set within gentle hills with small open depressions	10	30	3300	3	1
SU11	18,003	1,010,302	Gentle undulating hills with open depressions	20	40	80,824	8	28
SU12	15,556	563,429	Flat floodplain with open depressions	10	20	11,269	2	8
SU13	6836	414,242	Gentle undulating hills with open depressions	30	20	24,854	6	2
SU13-N	-	-	Gentle undulating floodplain with open depressions	-	-	-	-	-
SU14	21,664	869,973	Modified landforms set within flat plains with small open depressions	20	30	52,198	6	17
SU14-W	-	-	Modified landforms set within flat plains with small open depressions	-	-	-	-	-
SU15	5048	421,720	Modified landforms set within flat plains with small open depressions	20	20	16,869	4	2
SU16	10,837	574,222	Gentle undulating hills with small open depressions	20	20	22,969	4	2
SU17	27,721	1,084,883	Flat plain abutting steep spurs to the south	10	20	21,698	2	2
SU35	-	-	Modified landforms comprising undulating hills with hardstand roads.	-	-	-	-	-
Total	**195,412**	**10,242,131**	**-**	**-**	**-**	**381,568**	**-**	**118**
Average	*11,495*	*602,478*	-	*15*	*24*	*17,344*	*4*	*9*

Notes:

* This calculation excludes access tracks that form part of the project impact area as well as the Gouldsville and Singleton Military Area options that were not surveyed as part of this assessment. The area does include construction compounds and substations.

† Count of Aboriginal sites include previously recorded Aboriginal Heritage Information Management System (AHIMS) sites that were validated and newly identified sites (see Table 9.3 for further details).

‡ Values allocated as "NA" were not surveyed as part of this assessment due to access restrictions or alignment refinments post the completion of fieldwork.

Table 9.3 Aboriginal sites documented by survey unit within the HTP North project impact area

SU	Newly identified Aboriginal sites and places	Total (n)	Previously identified Aboriginal sites (AHIMS #) relocated	Total (n)	Previously identified Aboriginal sites (AHIMS #) not relocated	Total (n)	Previously identified Aboriginal sites (AHIMS) not revisited	Total (n)	Overall total (n)
SU1	HTP-N-AS01, HTP-N-AS02, HTP-N-AS03, HTP-N-AS05, HTP-N-AS06, HTP-N-AS08, HTP-N-AS15, HTP-N-AS17, HTP-N-AS47, HTP-N-AS66, HTP-N-AS67, HTP-N-AS71, HTP-N-AS72, HTP-N-AS73, HTP-N-AS74, HTP-N-AS75, HTP-N-AS76, HTP-N-IF01, HTP-N-IF02, HTP-N-IF03, HTP-N-IF04, HTP-N-IF05, HTP-N-IF06, HTP-N-IF08, HTP-N-IF56, HTP-N-IF63, HTP-N-IF65, HTP-N-IF66, HTP-N-IF68, HTP-N-IF69 HTP-N-IF70,	31	37-2-0549, 37-2-6495, 37-2-6496, 37-2-6497, 37-2-6498, 37-2-6501, 37-2-6503	7	37-2-0024, 37-2-0501, 37-2-0721, 37-2-0737, 37-2-0751, 37-2-0810, 37-2.0814, 37-2-0815, 37-2-0817, 37-2-2796, 37-2-5987, 37-2-6282, 37-2-6285, 37-2-6502, 37-2-6514	15	37-2-0716, 37-2-5988, 37-2-5989, 37-2-5990, 37-2-6097, 37-2-6098	6	**59**
SU2	HTP-N-AS19, HTP-N-AS20, HTP-N-IF11, HTP-N-IF53	4	-	-	-	-	-	-	**4**
SU3	-	-	-	-	-	-	-	-	**-**
SU4	-	-	-	-	37-5-0568, 37-5-0946	2	-	-	**2**
SU5	HTP-N-AS69	1	-	-	-	-	-	-	**1**
SU6	-	-	-	-	-	-	-	-	**-**
SU7	-	-	-	-	-	-	37-5-0260	1	**1**
SU8	HTP-N-AS24, HTP-N-IF14, HTP-N-IF15, HTP-N-IF49	4	37-6-3038, 37-6-3039, 37-6-3040	3	37-6-3005, 37-6-3036, 37-6-3037, 37-6-3041	4	37-3-1614	1	**12**
SU9	HTP-N-AS50, HTP-N-IF17, HTP-N-IF58, HTP-N-IF59, HTP-N-IF60, HTP-N-IF71	6	-	-	-	-	-	-	**6**
SU10	HTP-N-AS63	1	-	-	-	-	-	-	**1**

SU	Newly identified Aboriginal sites and places	Total (n)	Previously identified Aboriginal sites (AHIMS #) relocated	Total (n)	Previously identified Aboriginal sites (AHIMS #) not relocated	Total (n)	Previously identified Aboriginal sites (AHIMS) not revisited	Total (n)	Overall total (n)
SU11	HTP-N-AS27, HTP-N-AS27, HTP-N-AS64, HTP-N-IF16, HTP-N-IF19, HTP-N-IF21, HTP-N-IF22, HTP-N-IF23, HTP-N-IF51, HTP-N-IF52	10	37-6-3348, 37-6-3350, 37-6-3379, 37-6-3384, 37-6-3484, 37-6-3488, 37-6-3492, 37-6-3499, 37-6-3502, 37-6-3505, 37-6-3506, 37-6-3507, 37-6-3508, 37-6-3514, 37-6-3515, 37-6-3516, 37-6-4049, 37-6-4068	18	37-6-3344, 37-6-3345, 37-6-3346, 37-6-3347, 37-6-3349, 37-6-3351, 37-6-3352, 37-6-3353, 37-6-3354, 37-6-3357, 37-6-3358, 37-6-3359, 37-6-3373, 37-6-3374, 37-6-3375, 37-6-3376, 37-6-3378, 37-6-3380, 37-6-3383, 37-6-3473, 37-6-3474, 37-6-3477, 37-6-3478, 37-6-3479, 37-6-3480, 37-6-3481, 37-6-3482, 37-6-3485, 37-6-3486, 37-6-3487, 37-6-3491, 37-6-3493, 37-6-3494, 37-6-3496, 37-6-3498, 37-6-3500, 37-6-3501, 37-6-3503, 37-6-3504, 37-6-3509, 37-6-3510, 37-6-4035, 37-6-4038, 37-6-4042, 37-6-4043, 37-6-4069, 37-6-4070, 37-6-4071, 37-6-4073, 37-6-4080	51	37-6-4023	1	**79**
SU12	HTP-N-IF26, HTP-N-IF47, HTP-N-IF50	3	37-6-3100, 37-6-3116, 37-6-3156, 37-6-3157, 37-6-3163	5	37-6-3080, 37-6-3158, 37-6-3159, 37-6-3160, 37-6-3161, 37-6-3162	6	37-6-3097	1	**15**
SU13	HTP-N-AS30, HTP-N-AS31	2	-	-	37-6-2848	1	-	-	**3**
SU13-N	Not surveyed	-	Not surveyed	-	Not surveyed	-	Not surveyed	-	**-**
SU14	HTP-N-AS32, HTP-N-AS33, HTP-N-AS37, HTP-N-AS38, HTP-N-AS59, HTP-N-AS60, HTP-N-AS61, HTP-N-AS62, HTP-N-IF31, HTP-N-IF32, HTP-N-IF33, HTP-N-IF34, HTP-N-IF35, HTP-N-IF37, HTP-N-IF57	15	37-6-2833, 37-6-2842	2	-	-	37-6-1981	1	**18**
SU14-W	Not surveyed	-	Not surveyed	-	Not surveyed	-	Not surveyed	-	**-**
SU15	HTP-N-AS56, HTP-N-AS57	2	-	-	-	-	-	-	**2**
SU16	HTP-N-IF38, HTP-N-IF39	2	-	-	-	-	-	-	**2**

SU	Newly identified Aboriginal sites and places	Total (n)	Previously identified Aboriginal sites (AHIMS #) relocated	Total (n)	Previously identified Aboriginal sites (AHIMS #) not relocated	Total (n)	Previously identified Aboriginal sites (AHIMS) not revisited	Total (n)	Overall total (n)
SU17	HTP-N-AS45, HTP-N-IF41	2	-	-	-	-	-	-	**2**
SU35	Not surveyed	-	Not surveyed	-	Not surveyed	-	Not surveyed	-	**-**
Total	**-**	**83**	**-**	**35**	**-**	**78**	**-**	**11**	**207**

Plate 9.1 Gentle rolling hills and undulating flats typical of SU1, view south

Plate 9.2 Sparsely populated clump of regrowth trees commonly found around Plashett Reservoir in SU1, view south

Plate 9.3 Example of the undulating hills intersecting the floodplain throughout the western portion of SU2, view southeast

Plate 9.4 An incised drainage channel showing the patches of isolated vegetation focussed on ephemeral watercourses in SU2, view east

Plate 9.5 Sandstone exposure common throughout the eastern portion of SU3, view northwest

Plate 9.6 View of the floodplain stretching across the eastern portion of SU3 across the Hunter River, view northwest

Plate 9.7 Gentle undulating foot-slopes east of the Hunter River found in SU4, view south

Plate 9.8 Example of vehicle tracks on low hills noted throughout SU4, view east

Plate 9.9 Evidence of flooding disturbance on the eastern bank of the Hunter River in SU5, view north

Plate 9.10 Cattle track crossing the flat grassy plain on either side of the Hunter River in SU5, view west

Plate 9.11 Flat reclaimed mining land forming SU6, view south

Plate 9.12 Example of mining disturbance neighbouring the reclaimed plain that forms SU6, view northeast

Plate 9.13 Gentle hills surrounding a dry Hobden Gully (2nd order creek) that dominates much of SU7, view south

Plate 9.14 Overview of the Hunter Valley Operations mining complex along the southern boundary of SU7 bordering the flat plains, view south

Plate 9.15 Example of regrowth sapling forest with limited exposures found in SU8, view west

Plate 9.16 Gently inclined alluvial terrace that forms part of reclaimed mining land in SU8, view south

Plate 9.17 Flat dirt track recorded off Archerfield Road typical of the landscape in SU9, view east

Plate 9.18 Reclaimed gently sloped embankment between Hunter Valley Operations mining complex and Archerfield Road in SU9, view east

Plate 9.19 Low undulating hills typical of the highly disturbed landscape present in SU10, view north

Plate 9.20 Example of a transmission line clearing in SU10, view north

Plate 9.21 Ground exposure commonly found in the areas surrounding watercourses in SU11, view south

Plate 9.22 Dense grass cover across agricultural fields observed throughout SU11, with (a heavily vegetated) Wollombi Brook pictured in the background, view east

Plate 9.23 Small exposures around a dam checked for artefacts in SU12, view southwest

Plate 9.24 Flat floodplain evident in much of SU12, view south

Plate 9.25 Eroding clay exposure noted around young saplings in SU13, view southwest

Plate 9.26 Flat terrace abutting Loder Creek (pictured left) which is heavily vegetated, view north

Plate 9.27 Revegetated open forest typical of flat plain observed in SU14, view south

Plate 9.28 Evidence of large dam on the border of Bulga Mine in SU14, view west

Plate 9.29 Vehicle track through the scrub commonly found in the relatively flat plain throughout SU15, view north

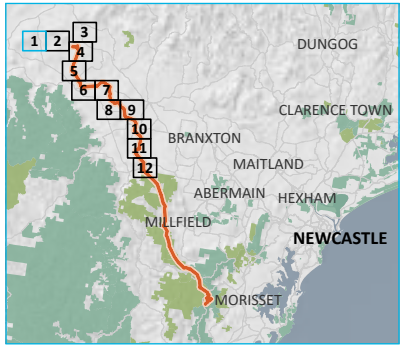
Plate 9.30 Transmission corridor and overgrown vehicle track observed in SU15, view northwest

Plate 9.31 Grassy plain noted in much of SU16 with a small dam, view north

Plate 9.32 Surface exposures evident in clearings surrounding drainage channels in SU16, view northeast

Plate 9.33 Moderately steep footslope surveyed throughout much of the southern end of SU17, view east

Plate 9.34 Tall grass growing around Monkey Place Creek in SU17, view south



KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU1

Project impact area

- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor
Map 1 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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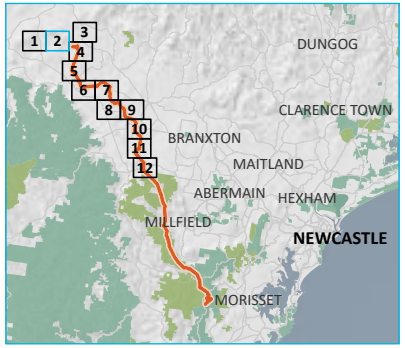

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU1

Project impact area

- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

0 1 2 km

GDA2020 MGA Zone 56

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Field survey transects in HTP North transmission corridor
Map 2 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

EMM
creating opportunities

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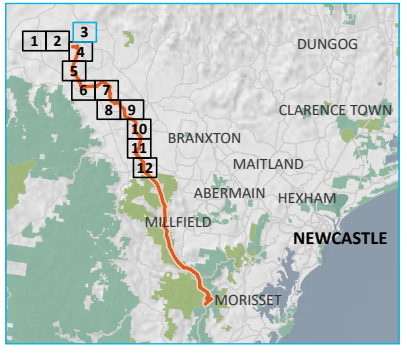

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU1
- SU35

Project impact area

- Construction support site
- Access track

Existing environment

- Railway
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor
Map 3 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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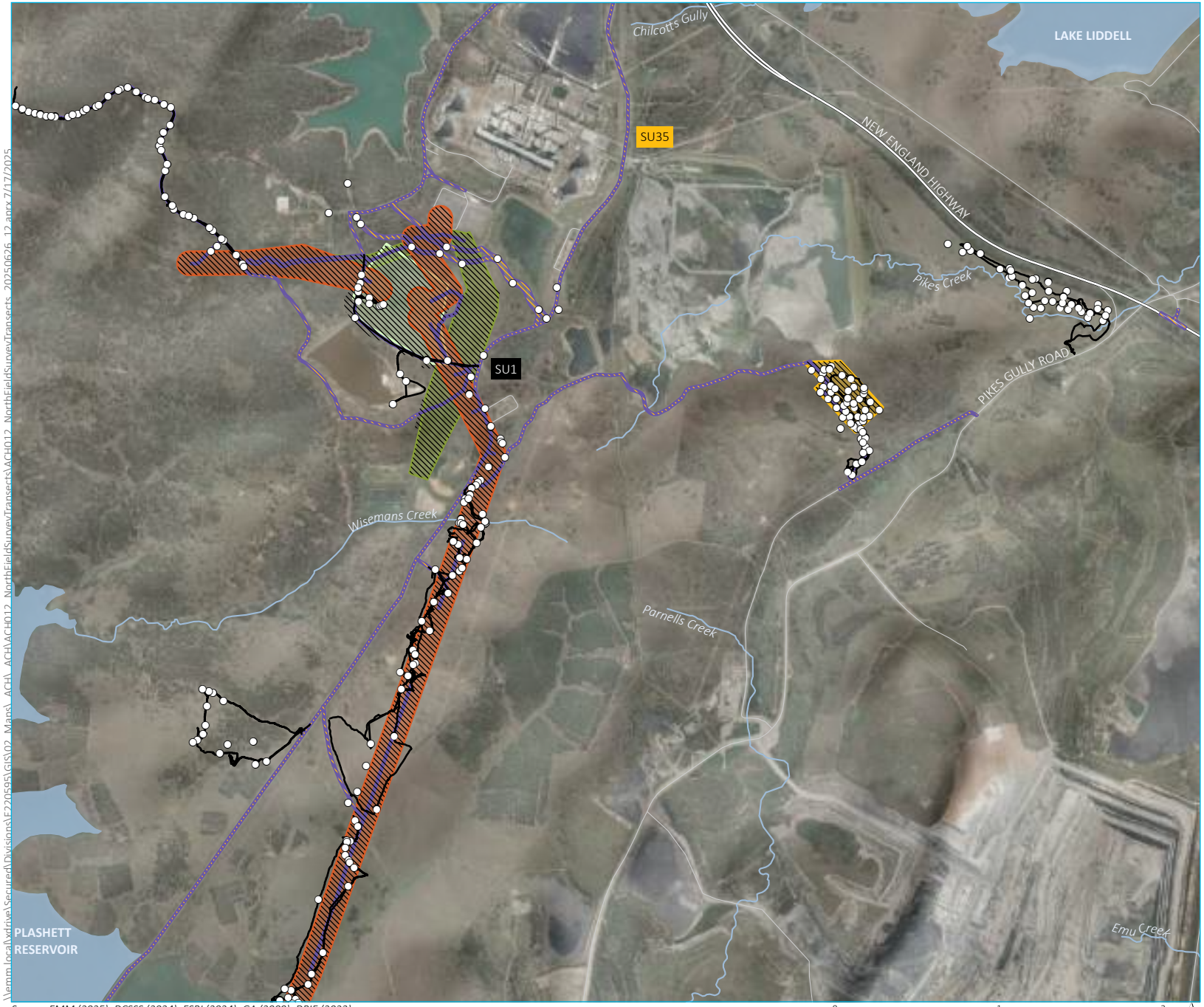

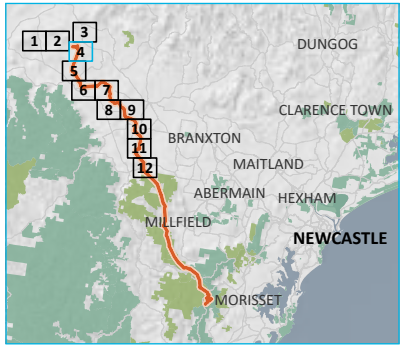

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU1
- SU35

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site
- Adjustment to existing transmission line (lines 31 and 32)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor
Map 4 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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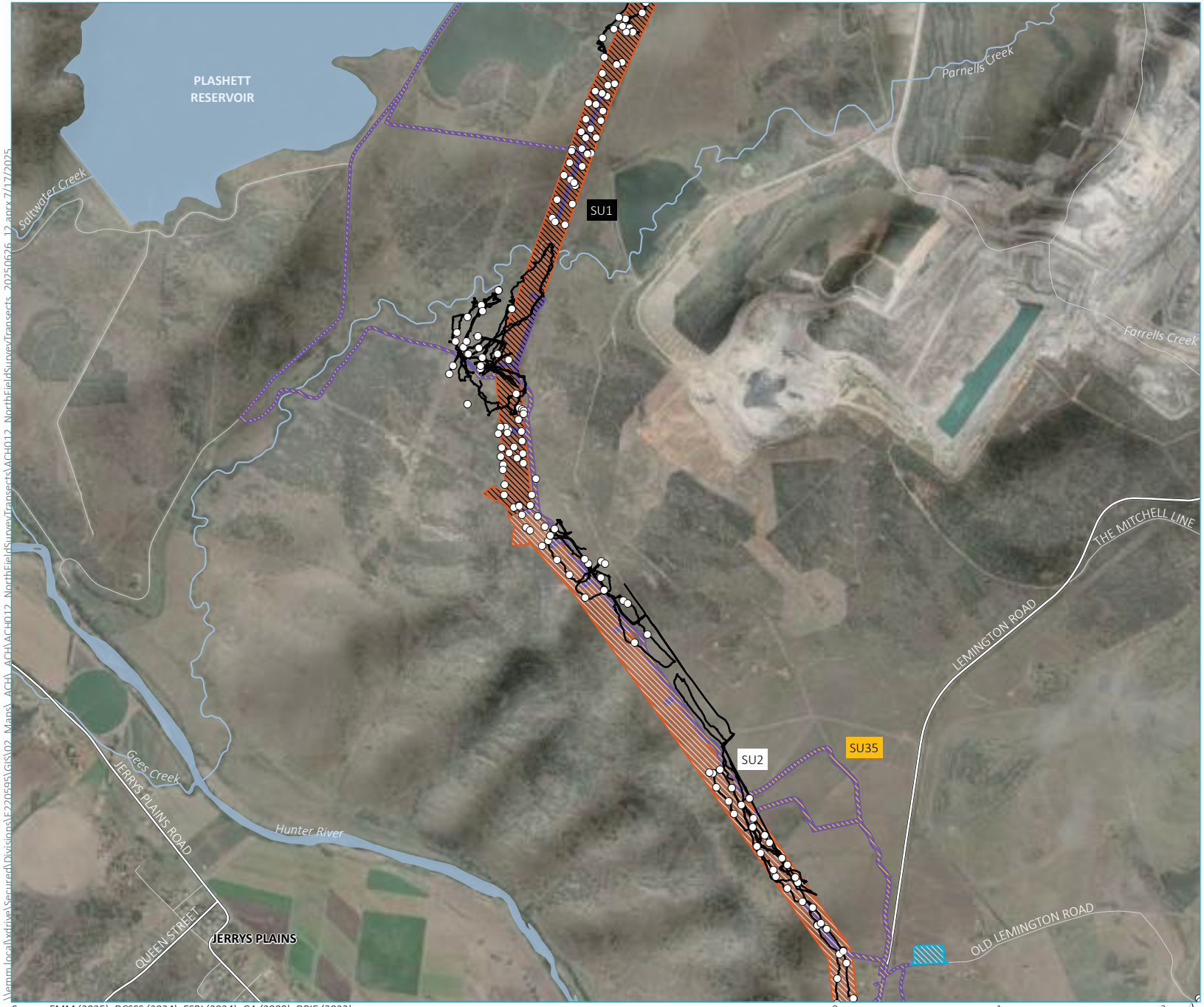

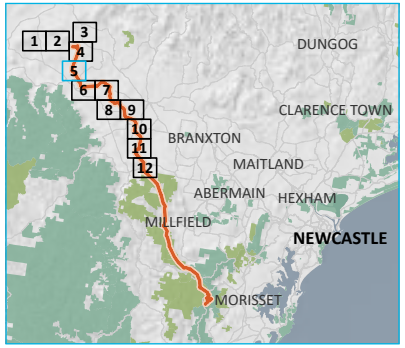

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU1
- SU2
- SU35

Project impact area

- HTP corridor
- Laydown area
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

Field survey transects in HTP North transmission corridor
Map 5 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

EMM
creating opportunities

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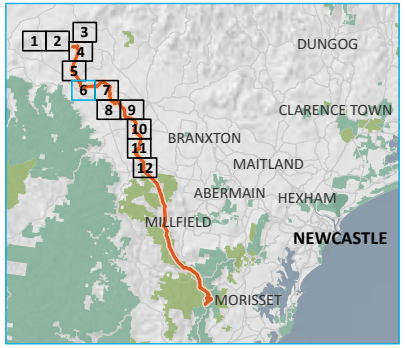

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU2
- SU3
- SU4
- SU5
- SU6
- SU35

Project impact area

- HTP corridor
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor

Map 6 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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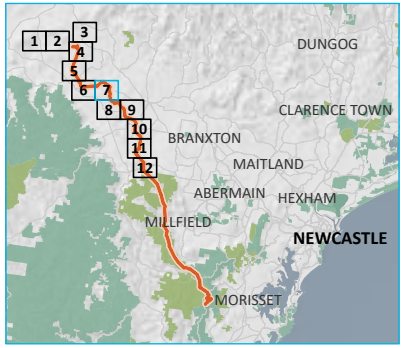

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU6
- SU7
- SU8
- SU9
- SU10
- SU11
- SU35

Project impact area

- HTP corridor
- Laydown area
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor
Map 7 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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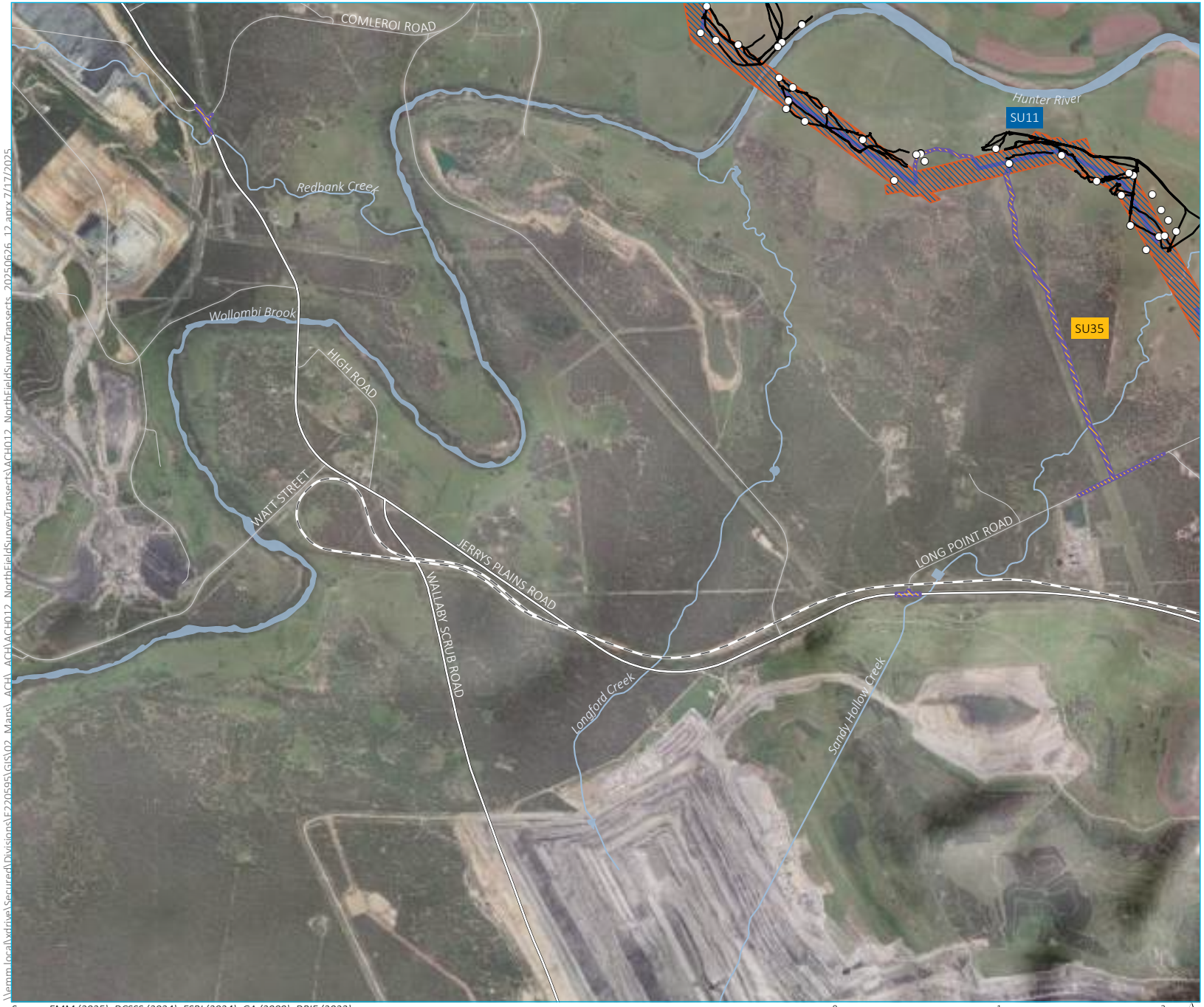

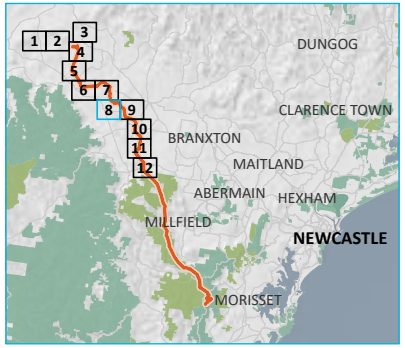

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU11
- SU35

Project impact area

- HTP corridor
- Access track

Existing environment

- Railway
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor
Map 8 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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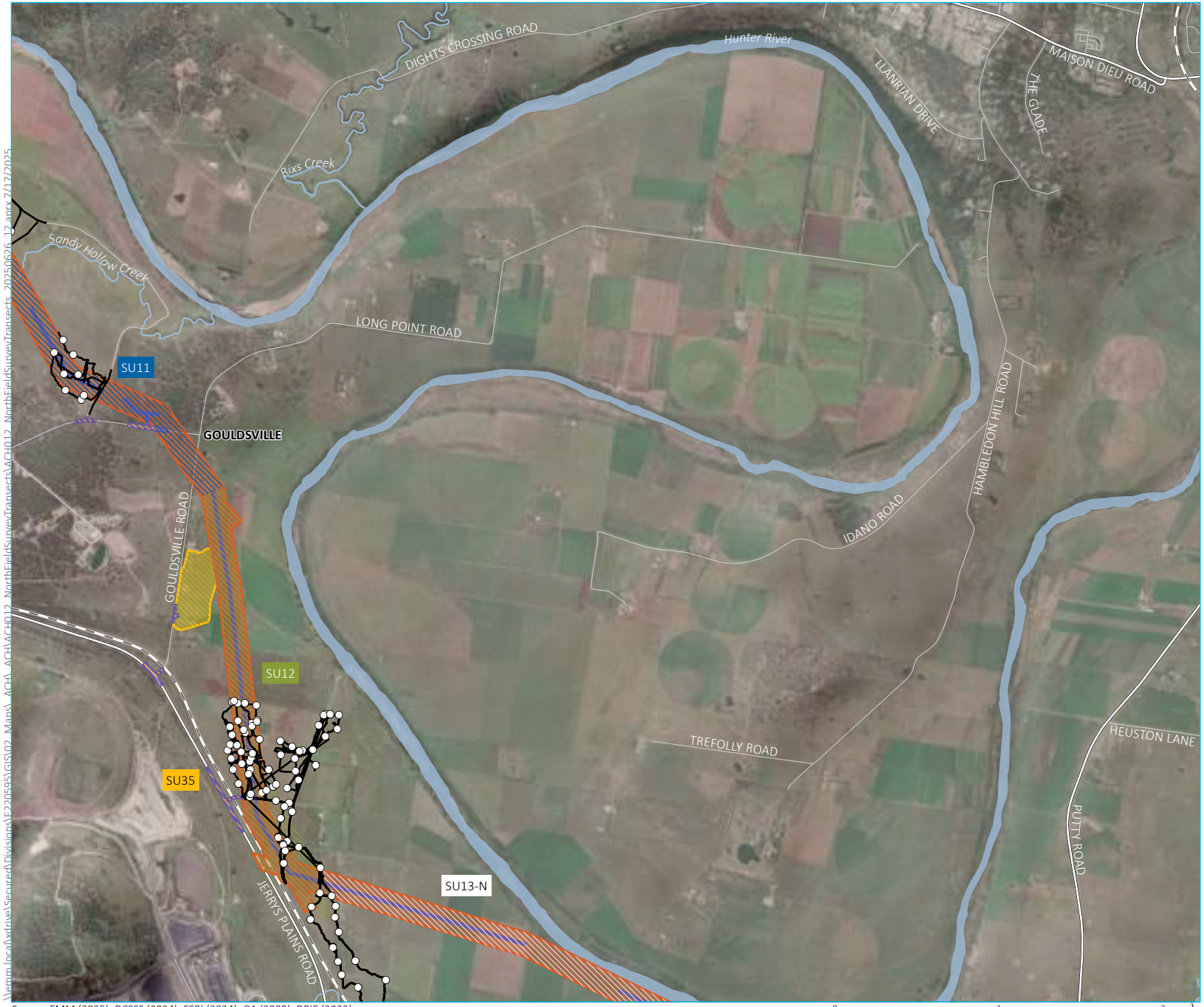

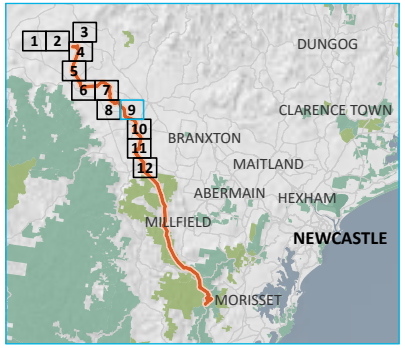

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU11
- SU12
- SU13-N
- SU35

Project impact area

- HTP corridor
- Construction support site
- Access track

Existing environment

- Railway
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor
Map 9 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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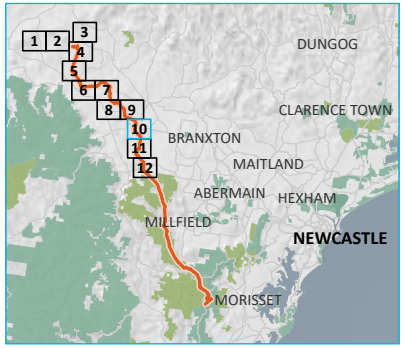

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU13
- SU13-N
- SU14
- SU35

Project impact area

- HTP corridor
- Access track

Existing environment

- Railway
- Major road
- Minor road
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor

Map 10 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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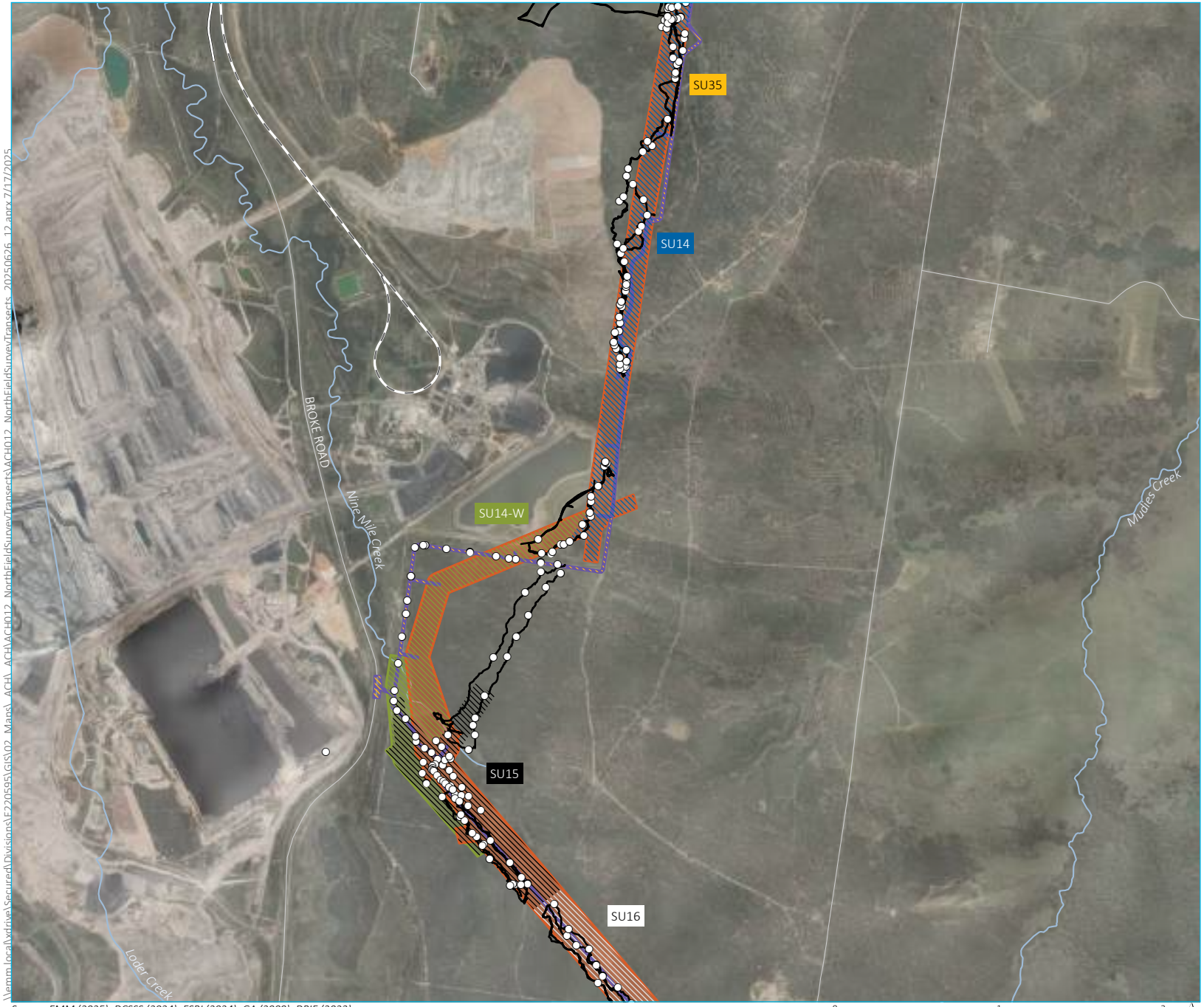

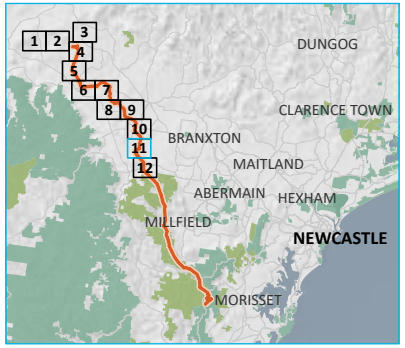

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU14
- SU14-W
- SU15
- SU16
- SU35

Project impact area

- HTP corridor
- Adjustment to existing transmission line (line 81)
- Access track

Existing environment

- Railway
- Major road
- Minor road
- Named watercourse

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP Central transmission corridor

Map 11 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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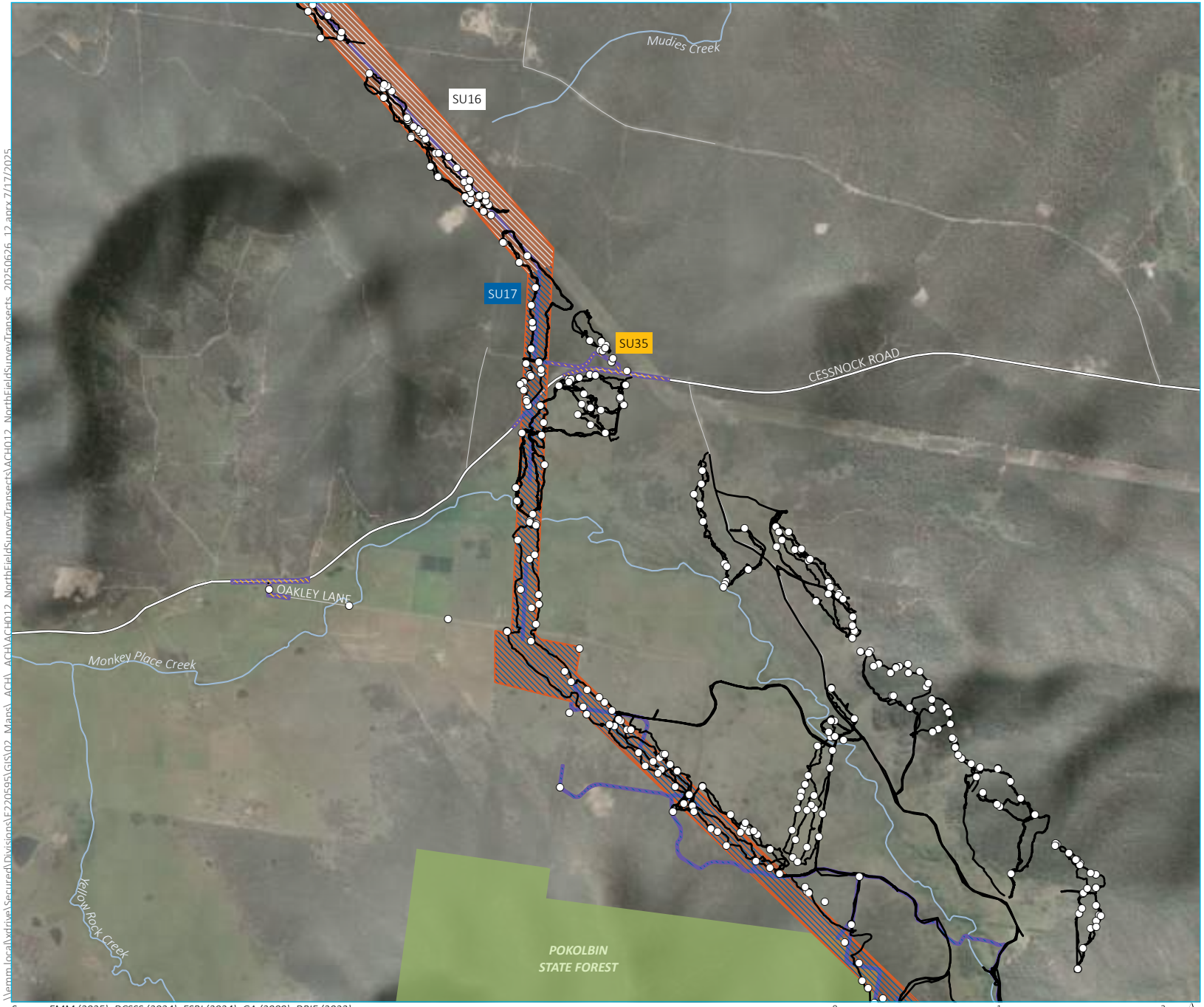

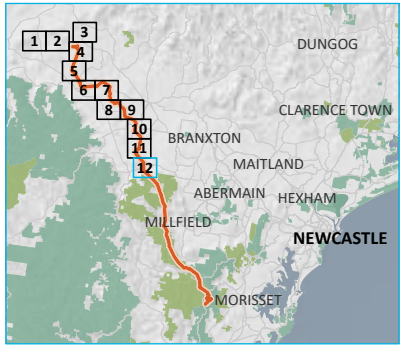

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU16
- SU17
- SU35

Project impact area

- HTP corridor
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP North transmission corridor
Map 12 of 12

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.2

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Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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ii Aboriginal sites identified

The field investigations identified 118 discrete Aboriginal site recordings in HTP North within the project impact area (see Table 9.3 and Table 9.4, Figure 9.3, Appendix F.3). These included 83 newly identified sites, and the relocation of 35 previously documented sites. A further 78 previously documented site locations were revisited but failed to identify any cultural materials; and in many cases are considered to have been destroyed through natural or anthropogenic processes. Eleven previously documented sites were not visited as a result of land access or late refinements to the project designs following the field investigation.

Of those cultural materials encountered, they were dominated by stone artefacts of various densities. Some 52 of the sites were identified as low-density containing less than 20 artefacts (and commonly <5), and 59 were isolated stone artefacts. As outlined in *section 9.2.2i*, they were found in all parts of the project impact area, and frequently in the vicinity of named creek and water-courses, albeit not necessarily permanent water. Of note were 2 high-density artefact scatters encountered in SUs 1 and 13 including:

- HTP-N-AS01 consisted of 57 stone artefacts on a gentle foot-slope immediately south of Wisemans Creek (see Plate 9.35 and Plate 9.36)

- HTP-N-AS30 consisted of several hundred stone artefacts found on bank some 70 metres from a tributary of Loder Creek (see Plate 9.39 and Plate 9.40).

The cultural assemblage observed was consistent with the broader archaeological patterning of the region (see *Chapter 8 (Archaeological context)*). Stone artefacts were dominated by indurated mudstone/tuff/chert raw materials (IMTC), with silcrete and quartz raw also common. Diagnostic features were limited, but where present, suggest the use of the region in the late Holocene (<5000 years ago), and is consistent with the raw materials documented. None of the sites could be robustly identified as of greater antiquity, although IMTC raw materials can be characteristic of Pleistocene (>10,000 years ago) activity in some parts of the Sydney Basin (Williams et al. 2014).

In addition, due to the ongoing project refinement, a further 64 newly identified sites were documented outside of the project impact area, a further 15 previously recorded sites revisited and validated, and 30 previously documented sites were revisited but could not be relocated and are believe in most instances to be destroyed. While not further outlined in this report, these sites, which are now outside of the project impact area, have all been added/updated on the Heritage NSW AHIMS database (see Table 9.5).

Table 9.4 Summary of Aboriginal sites (newly identified and previously documented) within the HTP North corridor

Site type	SU																				Total (n)
	1	2	3	4	5	6	7	8	9	10	11	12	13	13-N	14	14-W	15	16	17	35	
High density artefact scatter (>50)	1		-	-	-	-	-	-	-	-		-	1	-	-	-	-	-	-	-	**2**
High density artefact scatter (>50), potential archaeological deposit	1		-	-	-	-	-	-	-	-		-	-	-	1	-	-	-	-	-	**2**
Isolated find	17	2	-	-	-	-	-	4	5	-	13	4	-	-	8	-		2	1	-	**56**
Isolated find, potential archaeological deposit			-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	**3**
Low density artefact scatter (≤20)	16	2	-	-	1	-	-	3	1	1	11	1	1	-	6	-	2	-	1	-	**46**
Low density artefact scatter (≤20), potential archaeological deposit	2		-	-	-	-	-	-	-	-	2	1	-	-	1	-	-	-	-	-	**6**
Moderate density artefact scatter (21-50)			-	-	-	-	-	-	-	-	1		-	-		-	-	-	-	-	**1**
Moderate density artefact scatter (21-50), potential archaeological deposit	1		-	-	-	-	-	-	-	-		-	-	-	1	-	-	-	-	-	**2**
Total (n)	**38**	**4**	**-**	**-**	**1**	**-**	**-**	**7**	**6**	**1**	**28**	**8**	**2**	**-**	**17**	**-**	**2**	**2**	**2**	**-**	**118**

Notes: Values exclude some 79 previously recorded sites that were revisited but could not be relocated and 10 that were only identified following the field program as a result of project refinement.

Table 9.5 Identified Aboriginal sites recorded as part of the HTP North, both outside and within the project impact area by site type

Site type	Total (n)	Total (%)
Within project impact area		
High density artefact scatter (>50)	2	1.69
High density artefact scatter (>50), potential archaeological deposit	2	1.69
Isolated find	56	47.46
Isolated find, potential archaeological deposit	3	2.54
Low density artefact scatter (≤20)	46	38.98
Low density artefact scatter (≤20), potential archaeological deposit	6	5.08
Moderate density artefact scatter (21-50)	1	0.85
Moderate density artefact scatter (21-50), potential archaeological deposit	2	1.69
Total (n)	**118**	**100.00**
Outside the project impact area*		
Culturally modified tree (carved or scarred), isolated find	1	1.27
Grinding groove	1	1.27
High density artefact scatter (>50)	2	2.53
Isolated find	31	39.24
Isolated find, potential archaeological deposit	1	1.27
Low density artefact scatter (≤20)	39	49.37
Moderate density artefact scatter (21-50)	3	3.80
Moderate density artefact scatter (21-50), potential archaeological deposit	1	1.27
Total (n)	**79**	**100.00**

Notes: Values exclude some 78 previously recorded sites within the project impact area that were revisited but could not be relocated and 11 sites within the project impact area that were only identified following the field program as a result of project refinement.

*Of these, 59 are within 200 metres of the project impact area.

Plate 9.35 HTP-N-AS01 sample of mudstone and silcrete flakes (n=7)

Plate 9.36 HTP-N-AS01 context view south of a gently inclined foot-slope south of Wisemans Creek with exposures caused by sheet wash erosion

Plate 9.37 HTP-N-AS15 sample of mudstone, quartz and chert flakes (n=26)

Plate 9.38 HTP-N-AS15 context view east of an exposure caused by sheet wash erosion on a very gently inclined hillslope

Plate 9.39 HTP-N-AS30 sample of mudstone and silcrete flakes (n=6)

Plate 9.40 HTP-N-AS30 context view north of a large exposure (30 m x 40 m) caused by sheet wash erosion and a modified water management contour

Plate 9.41 HTP-N-AS32 sample of mudstone flakes (n=6)

Plate 9.42 HTP-N-AS32 context view south of a clay exposure on the bank of an unnamed 3rd-order stream with regrowth vegetation

Plate 9.43 HTP-N-GG01 overview south, noting 2 of 4 boulders in the foreground and background next to an informal access track

Plate 9.44 HTP-N-GG01 detail from boulder showing at least 6 grooves

Plate 9.45 HTP-N-GG01 detail from boulder exhibiting at least 2 grooves

Plate 9.46 HTP-N-GG01 detail from boulder exhibiting at least 14 grooves

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9.2.3 HTP Central and South

i Results

Some 17 discrete transects (SU) were undertaken across the HTP Central (n=9) and HTP South (n=8) corridor (see Figure 9.4, Plate 9.47 to Plate 9.72, Table 9.6, Appendix F.1 to Appendix F.3). These encompassed and extended beyond the project impact area in several locations as the design was refined. Overall, these encompassed around 475 kilometres of pedestrian survey across the project impact area in HTP Central and HTP South, and a total area of ~1169 hectares (see Figure 9.2). Despite dense ground cover across much of the project impact area, around 77 discrete site observations and/or recordings were made during the course of the investigation and outlined in further detail in *section 9.2.3ii*.

The results of the field investigations aligned closely with the desktop and archaeological information outlined in preceding sections. The project impact area in HTP Central and HTP South was characterised by steep and dissected sandstone plateau, including flat ridgelines and pediments interspersed with deep ravines that contain generally ephemeral creek lines (see Plate 9.48, Plate 9.53, Plate 9.56 and Plate 9.57). Slopes throughout the State forests and flora reserves were moderate to steep, and in some parts too dangerous to traverse. With the exception of Congewai Creek – a rare water gap in the project impact area – watercourses were generally ephemeral, lacked clear alluvial terraces or floodplains, and appeared prone to periodic flash flooding (see Plate 9.53 and Plate 9.60). Congewai Creek is a permanent major watercourse the flows between Pokolbin State Forest and Corrabare Flora Reserve (see Plate 9.49 and Plate 9.50). This creek had a large terrace to its south, which was considered to have potential for buried cultural materials and was subject to test excavations (see *section 9.3*). Hills in its immediate vicinity are gentle and moderate before becoming increasingly steep a few hundred metres to the north and south within SU20 and SU22, respectively.

Dora Creek, another substantive watercourse in this portion of the project, is also crossed by the project. The route in this area primarily follows existing roads and transmission lines in the vicinity of Martinsville. As such limited field investigation was undertaken of this creek, despite being comparable in size to Congewai Creek further north.

Where observable, soil profiles were generally shallow, with frequent sandstone outcropping and geological substrate exposed. Soil profiles typically consisted of thin organic topsoils immediately over the sandstone geology (see Plate 9.48, Plate 9.58, Plate 9.59 and Plate 9.61). On some of the larger ridgelines and pediments where the subsoil was more established, subsoil was composed of degrading sandstone, appearing as pale, coarse, loose sand. Where the project extends to less steep inclines and slopes, such as project access tracks in SU33, a more consistent duplex soil profile as seen in HTP North transmission corridor was observed (see Plate 9.67 and Plate 9.71). As such, cultural materials were encountered were typically present on the surface, with limited potential for buried cultural deposits across much of this portion of the project impact area. In these parts of the project, cultural materials were more consistently associated with rockshelters and/or culturally modified trees that are related more closely to the geological relief and vegetation than the presence and condition of the soil profile in contrast to the HTP North corridor (see *section 9.2.2*).

Vegetation within this part of the project impact area was extremely dense (see Plate 9.56 and Plate 9.62). It consisted of various dry sclerophyll forest, including a range of gum, ironbark, and she-oak tree species, with dense undergrowth of ferns, shrubs and mosses. Despite being predominantly managed as State forests, there was limited evidence of de-vegetation. There are numerous access tracks and fire-trails throughout the project impact area, which are indicative of such management, but visual observations found little evidence of fallen trees or tree stumps indicative of large-scale logging (see Plate 9.53 and Plate 9.62). As such, it is considered the disturbance for much of the project impact area within HTP Central and the northern portions of HTP South were primarily natural, including fires, flash flooding and general geological processes (such as mass movement and sandstone exfoliation).

In more open environments, grass cover also occurred, especially on the fringe of road corridors (see Plate 9.68). Trees encountered were generally small in stature and girth, but this was considered to reflect the limited soil profile they were established in rather than necessarily regrowth from past logging activities,

Closer to Martinsville, increased active logging and plantations were evident, as well as increased visitation for leisure activities (e.g. camping, etc). In these locations, evidence of anthropogenic influence was more prevalent (see Plate 9.61 and Plate 9.70).

Section 9.2.3ii presents the cultural materials encountered as part of the field investigations. These were more varied than HTP North, and were dominated by rockshelters, culturally modified trees and grinding groove sites (see Table 9.6 and Table 9.7). The highest number of sites were encountered within SUs 18, 22, 23 and 24. These transects encompass the northern portions of Pokolbin State Forest, Corrabare Flora Reserve, a central portion of Watagan State Forest (near Watagan Creek Road) (see Figure 9.4 and Figure 9.5). There is limited spatial patterning that can be determined from these findings, with many of the sites dictated at a local level by the nature of the sandstone bedrock and outcropping (i.e. rockshelters the predominant site type can only occur where caves or overhangs form). These broader areas and environments were, however, identified in the archaeological review in *Chapter 8 (Archaeological context)*, and have been previously identified as areas where past activity was known to have occurred.

Table 9.6 Summary of field survey and archaeological findings within HTP Central and HTP South transmission corridor

SU	Length (m)	Area (m²)	Landscape	Exposure (%)	Visibility (%)	Effective coverage		Aboriginal sites identified within or near the fieldwork investigation area †, ‡
						Area (m²)	% of area	
HTP Central								
SU18	55,005	1,079,828	Sheer ridgeline with steep hillslopes and rocky overhangs	20	5	10,798	1	21
SU19	-	-	Steep gully system with multiple open depressions	-	-	-	-	-
SU20	-	-	Steep slopes and undulating gullies with small open depressions	-	-	-	-	-
SU21	2776	288,213	Gentle undulating plain with open depressions	10	5	1441	1	0
SU22	16,518	531,429	Steep slopes with undulating gullies and rocky overhangs	10	5	2657	1	9
SU23	14,494	522,027	Sheer gully system with rugged outcrops and open depressions	10	5	2610	1	11
SU24	35,503	1,378,657	Steep slopes with rugged outcrops and small open depressions	5	5	3447	0	12

SU	Length (m)	Area (m²)	Landscape	Exposure (%)	Visibility (%)	Effective coverage		Aboriginal sites identified within or near the fieldwork investigation area †, ‡
						Area (m²)	% of area	
SU32	10,202	884,742	Modified landforms set within undulating hills	80	60	424,676	48	4
SU33	84,679	807,962	Modified landforms set within undulating hills	80	50	323,185	40	4
HTP South								
SU25	-	-	Moderate to steep gully with open depressions	-	-	-	-	-
SU26	19,776	699,239	Steep slopes with undulating gullies with small open depressions	10	5	3496	1	9
SU27	17,066	554,644	Moderate undulating slopes with infrequent rocky outcrops and small open depressions	10	5	2773	1	-
SU28	7398	163,933	Steep slopes with undulating gullies and small open depressions	10	5	820	1	-
SU29	3216	251,474	Moderate undulating slopes with infrequent rocky outcrops and small open depressions	10	5	1257	-	-
SU30	7616	587,271	Moderate undulating slopes with small open depressions	10	5	2936	1	2
SU31	69,102	2,432,983	Exisiting transmission line and associated access tracks	20	10	48,660	-	2
SU34	84,945	859,900	Modified landforms set within steep hills	80	40	277,189	32	2
Total	**424,439**	**11,048,617**	**-**	**-**	**-**	**1,105,945**	**-**	**77**
Average	*30,317*	*789,187*	-	*26*	*15*	*78,996*	*9*	*6*

Notes: † Count of Aboriginal sites include previously recorded AHIMS sites that were validated and newly identified sites (see Table 9.7).

‡ Values allocated as 'NA' were not surveyed as part of this assessment due to access restrictions or alignment refinements post the completion of fieldwork.

Table 9.7 Aboriginal sites documented by survey unit within the HTP Central and South project impact area

SU	Newly identified Aboriginal sites and places	Total (n)	Previously identified Aboriginal sites (AHIMS) relocated	Total (n)	Previously identified Aboriginal sites (AHIMS) not relocated	Total (n)	Previously identified Aboriginal sites (AHIMS) not revisited	Total (n)	Overall total (n)
SU18	HTP-C-RS45, HTP-C-RS46, HTP-C-RS47, HTP-C-RS51, HTP-C-RS52, HTP-C-RS53, HTP-C-RS54, HTP-C-RS55, HTP-C-RS56, HTP-C-RS57, HTP-C-RS58, HTP-C-RS59, HTP-C-RS60, HTP-C-RS62, HTP-C-RS63, HTP-C-RS64, HTP-C-RS65, HTP-C-RS66, HTP-C-RS67, HTP-N-AS55	20	37-6-3714	1	-	-	-	-	21
SU19	Not surveyed	-	Not surveyed	-	Not surveyed	-	Not surveyed	-	-
SU20	Not surveyed	-	Not surveyed	-	Not surveyed	-	Not surveyed	-	-
SU21	-	-	-	-	-	-	-	-	-
SU22	HTP-C-CMT02, HTP-C-CMT03, HTP-C-CMT04, HTP-C-CMT05, HTP-C-RS01, HTP-C-RS02, HTP-C-RS03, HTP-C-RS04, HTP-C-RS18	9	-	-	-	-	-	-	9
SU23	HTP-C-AR01, HTP-C-CMT07, HTP-C-CMT08, HTP-C-CMT12, HTP-C-CMT13, HTP-C-CMT14, HTP-C-CMT15, HTP-C-GG03, HTP-C-RS22, HTP-C-RS23, HTP-C-RS24	11	-	-	-	-	-	-	11
SU24	HTP-C-AR02, HTP-C-CMT21, HTP-C-CMT22, HTP-C-GG05, HTP-C-IF03, HTP-C-RS27, HTP-C-RS29, HTP-C-RS30, HTP-C-RS31, HTP-C-RS34, HTP-C-RS35, HTP-C-RS50	12	-	-	-	-	-	-	12
SU25	-		45-3-4623	1	-	-	-	-	1

SU	Newly identified Aboriginal sites and places	Total (n)	Previously identified Aboriginal sites (AHIMS) relocated	Total (n)	Previously identified Aboriginal sites (AHIMS) not relocated	Total (n)	Previously identified Aboriginal sites (AHIMS) not revisited	Total (n)	Overall total (n)
SU26	HTP-S-GG01, HTP-S-RS07, HTP-S-RS09, HTP-S-RS12, HTP-S-RS13, HTP-S-RS14, HTP-S-RS15, HTP-S-RS16, HTP-S-RS17	9	-	-	-	-	-	-	9
SU27	-	-	-	-	-	-	-	-	-
SU28	-	-	-	-	-	-	-	-	-
SU29	-	-	-	-	-	-	-	-	-
SU30	HTP-S-RS06, HTP-S-RS18	2	-	-		-		-	2
SU31	HTP-S-RS19, HTP-S-RS20	2	-	-	-	-	45-3-0905, 45-7-0311	2	4
SU32	HTP-C-AS02, HTP-C-CMT18, HTP-C-IF02	3	37-6-0724	1		-	-	-	4
SU33	HTP-C-CMT09, HTP-S-CP01, HTP-C-IF01	3	37-6-2779	1	37-6-0725	1	-	-	5
SU34	HTP-S-CMT02, HTP-S-CS01	2	-	-	45-3-2454, 45-3-2467	2	-	-	4
Total	**-**	**73**	**-**	**4**	**-**	**3**	**-**	**2**	**82**

Plate 9.47 Steep, densely vegetated slopes typical of the rugged landscape in SU18, view east

Plate 9.48 Example of outcropping sandstone forming a steep ridgeline in SU18, view south

Plate 9.49 Gently undulating plain situated on the bank of Congewai Creek in SU21, view east

Plate 9.50 Gentle hills straddling Pokolbin and Corrabare State forests in SU21, view west

Plate 9.51 Portion of juvenile forest that was previously logged in SU22, view north

Plate 9.52 Sandstone outcropping frequently observed in SU22, view south

Plate 9.53 Steep gully system carved by Sweetmans Creek that dominates SU23, view north

Plate 9.54 Rugged sandstone outcrops commonly recorded throughout SU23, view southeast

Plate 9.55 Open forest with large old trees straddled between steep slopes noted in some portions of SU24, view north

Plate 9.56 Revegetated overgrown forest with no visibility in SU24, view north

Plate 9.57 Watercourse crossing at the bottom of steep undulating hills frequently observed in SU26, view south

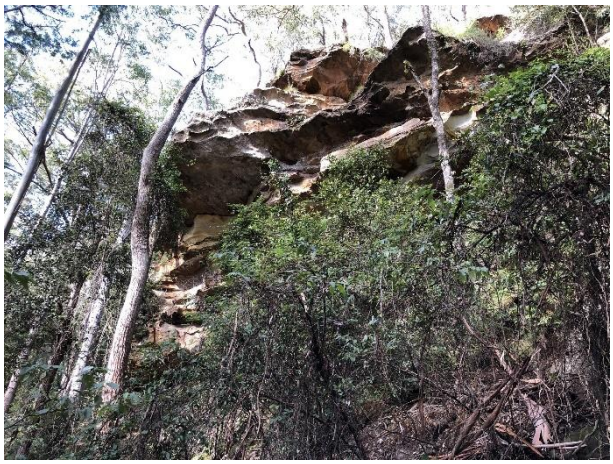


Plate 9.58 Rugged sandstone cliffs noted in the northern part of SU26, view southeast

Plate 9.59 Undulating hills with an overgrown and disturbed drainage channel noted in SU27, view southwest

Plate 9.60 Evidence of heavily disturbed forest recorded in SU27, view southwest

Plate 9.61 Previously logged undulating slopes with invasive vegetation typically found in SU28, view west

Plate 9.62 Intact sub-tropical vegetation noted in portions of SU28, view south

Plate 9.63 Relatively flat foot-slope commonly observed in SU29, view west

Plate 9.64 Overgrown logging road typical of disused tracks in SU29, view north

Plate 9.65 Steep slopes bordering a densely vegetated Jilliby Jilliby Creek in SU30, view north

Plate 9.66 Sandstone outcrops with a view of the valley floor typical of the landscape featured in SU30, view northwest

Plate 9.67 Cleared transmission tower pad on ridge in SU31, view north

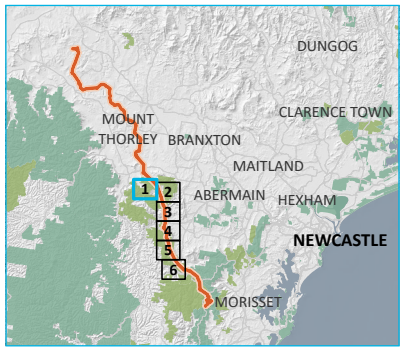
Plate 9.68 Spanned areas between transmission towers, interspersed by dense vegetation frequently noted in SU31, view west

Plate 9.69 Established sand road commonly found throughout SU32, view north

Plate 9.70 Narrow and overgrown dirt access track typical of sections of SU32, view south

Plate 9.71 Example of a gravel road used by logging trucks frequently found in SU33, view east

Plate 9.72 Eroded dirt track recorded in portions of SU33, view northeast



KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU17
- SU18
- SU32

Project impact area

- HTP corridor
- Access track

Existing environment

- Named watercourse
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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GDA2020 MGA Zone 56

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Field survey transects in HTP Central transmission corridor
Map 1 of 6

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.4

EMM
creating opportunities

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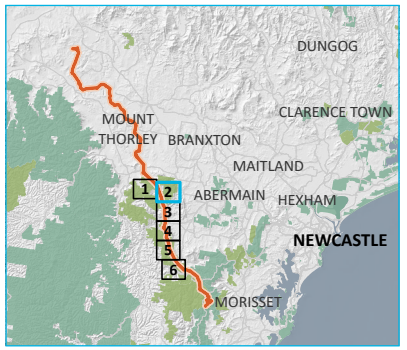

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU18
- SU32

Project impact area

- HTP corridor
- Laydown area
- Access track

Existing environment

- Minor road
- Named watercourse
- Named waterbody
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP Central transmission corridor
Map 2 of 6

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.4

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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GDA2020 MGA Zone 56

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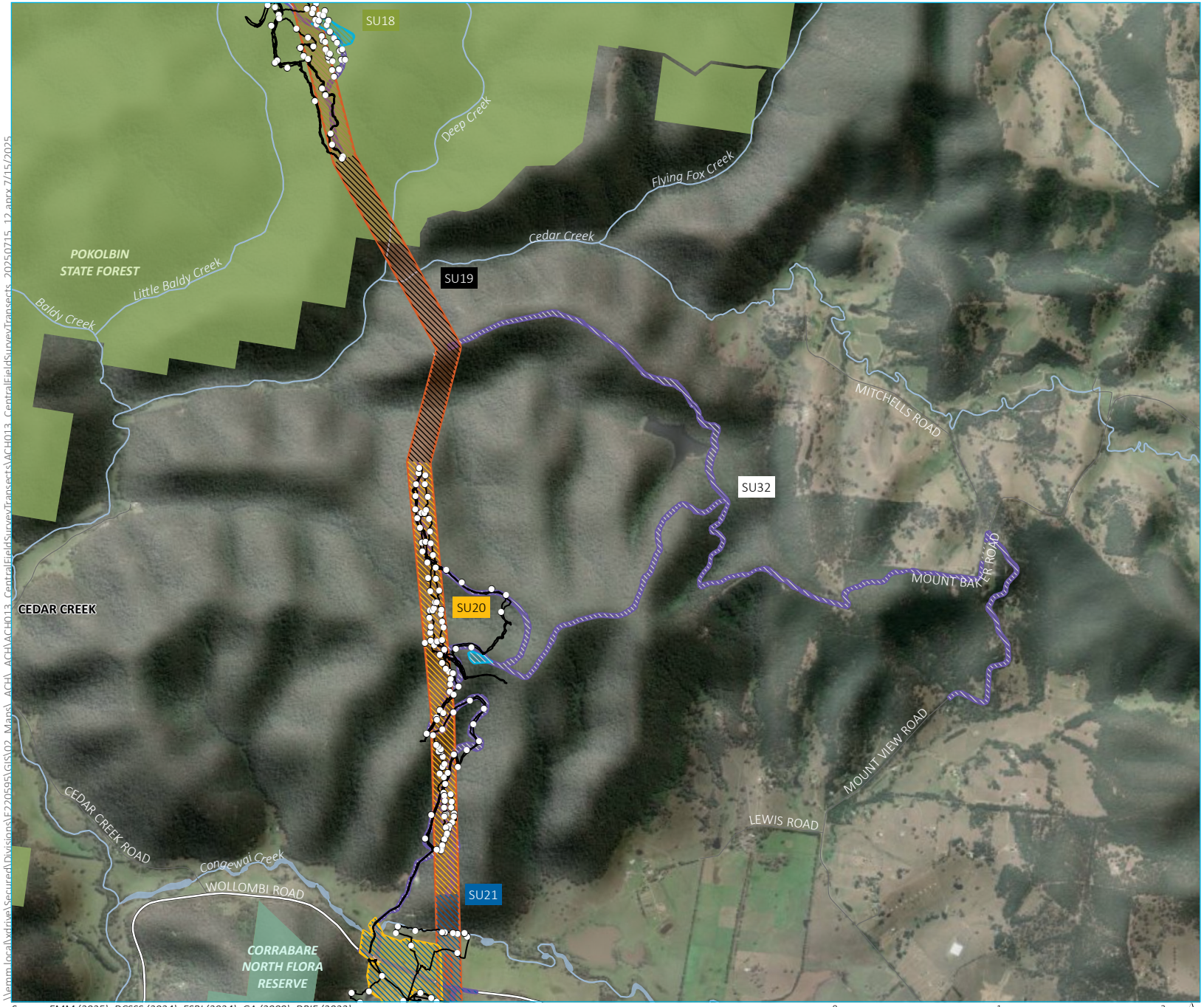
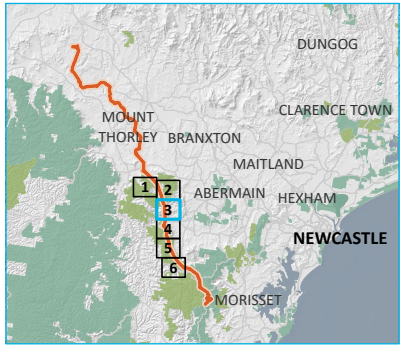
creating opportunities





KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU18
- SU19
- SU20
- SU21
- SU32

Project impact area

- HTP corridor
- Construction support site
- Laydown area
- Access track

Existing environment

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

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP Central transmission corridor
Map 3 of 6

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.4

EMM creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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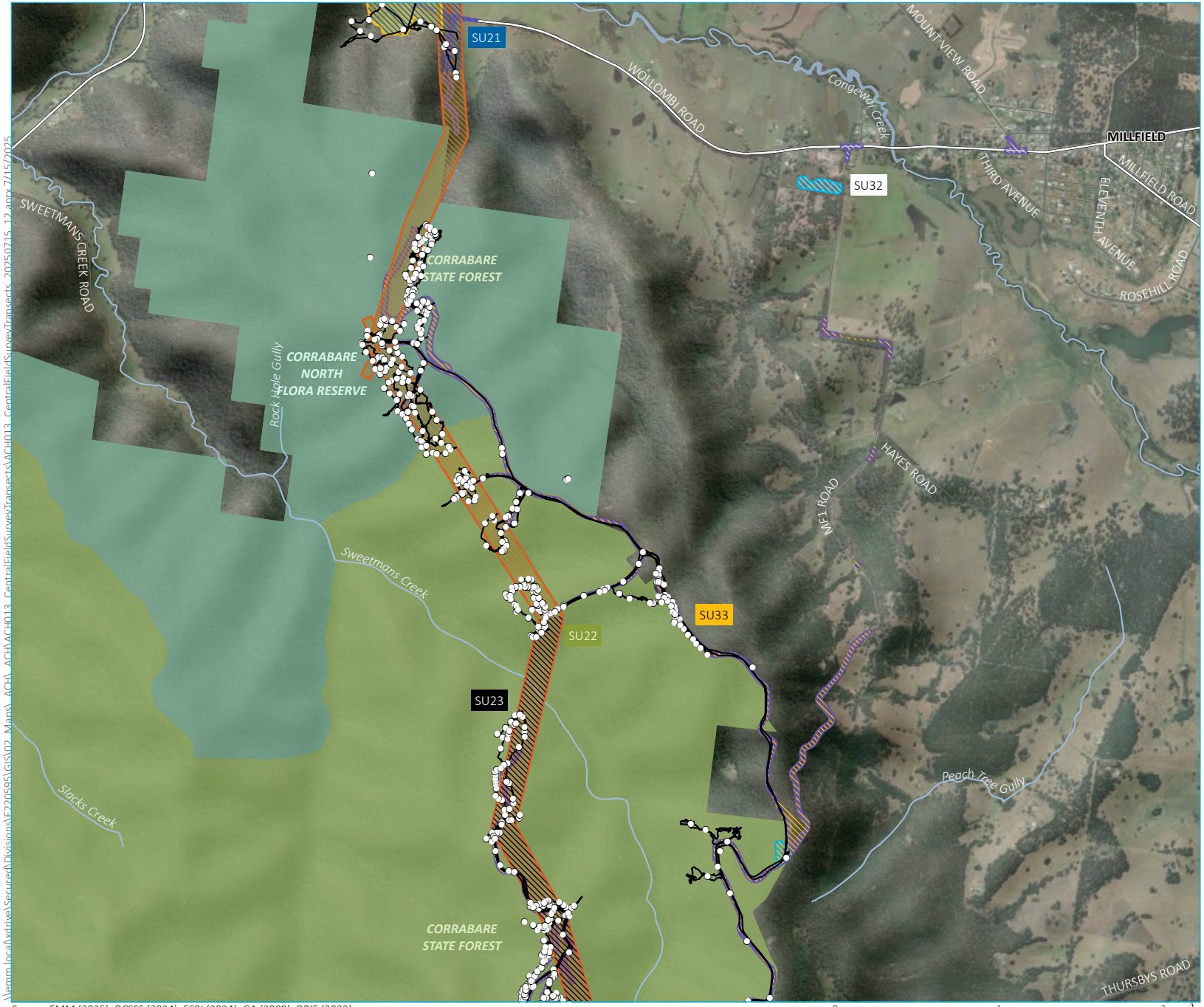

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU21
- SU22
- SU23
- SU32
- SU33

Project impact area

- HTP corridor
- Construction support site
- Laydown area
- Access track

Existing environment

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

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP Central transmission corridor
Map 4 of 6

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.4

EMM creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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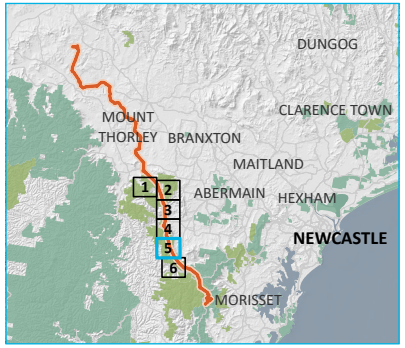

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU23
- SU24
- SU33

Project impact area

- HTP corridor
- Laydown area
- Access track

Existing environment

- Minor road
- Named watercourse
- NPWS reserve
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP Central transmission corridor
Map 5 of 6

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.4

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

0 1 2 km
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KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU24
- SU33

Project impact area

- HTP corridor
- Access track

Existing environment

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

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP Central transmission corridor
Map 6 of 6

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.4

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

0 1 2 km
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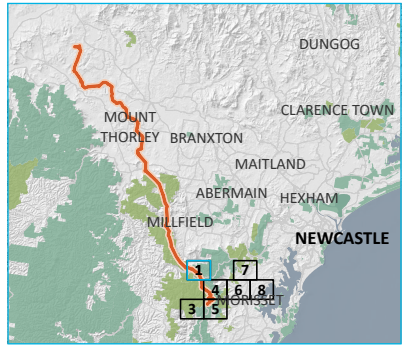

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU24
- SU25
- SU26
- SU33
- SU34

Project impact area

- HTP corridor
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP South transmission corridor
Map 1 of 8

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.5

EMM
creating opportunities

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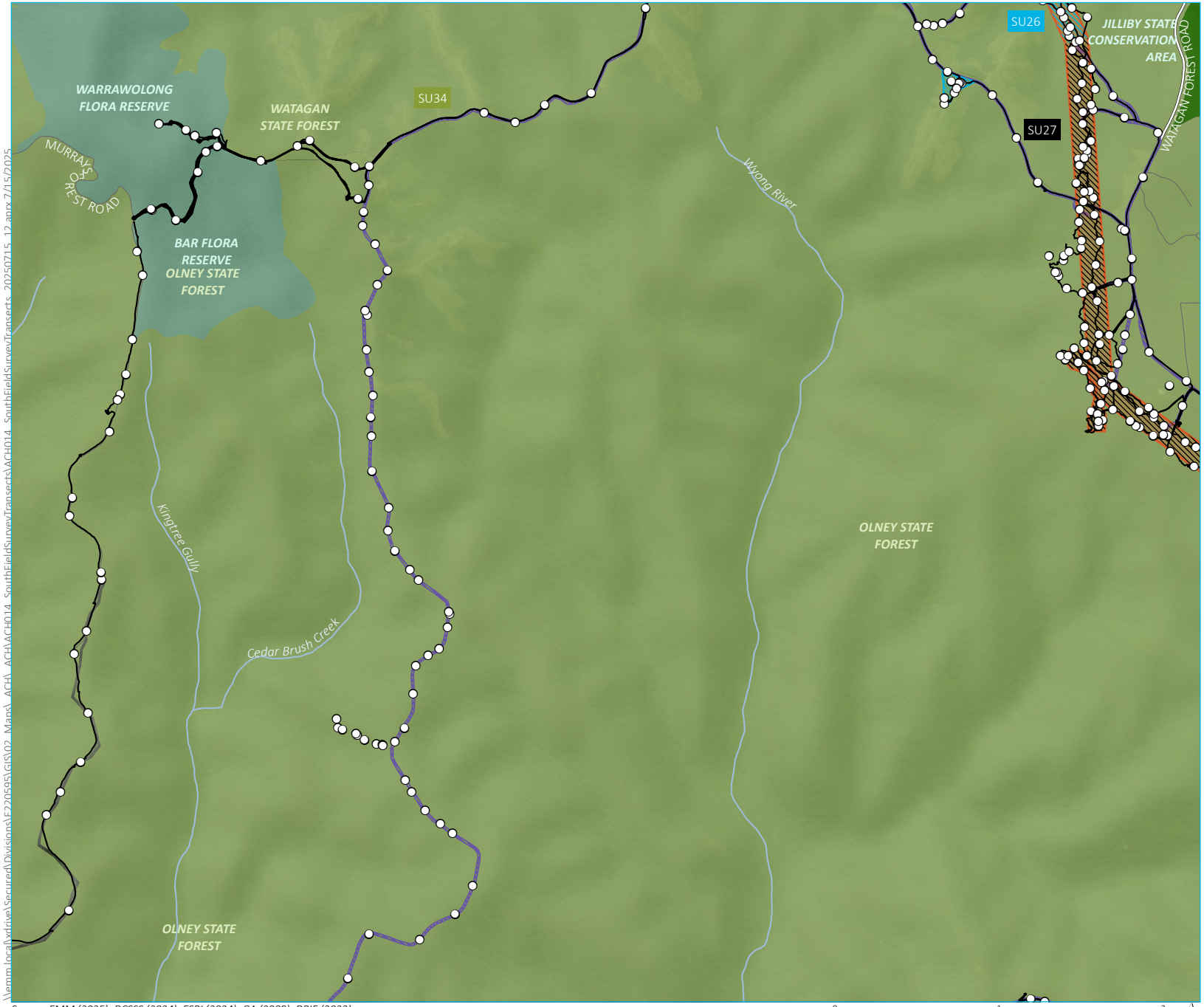

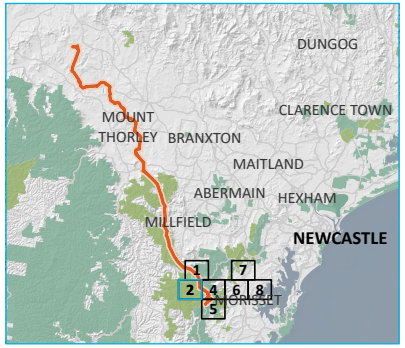

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU26
- SU27
- SU34

Project impact area

- HTP corridor
- Laydown area
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP South transmission corridor
Map 2 of 8

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.5

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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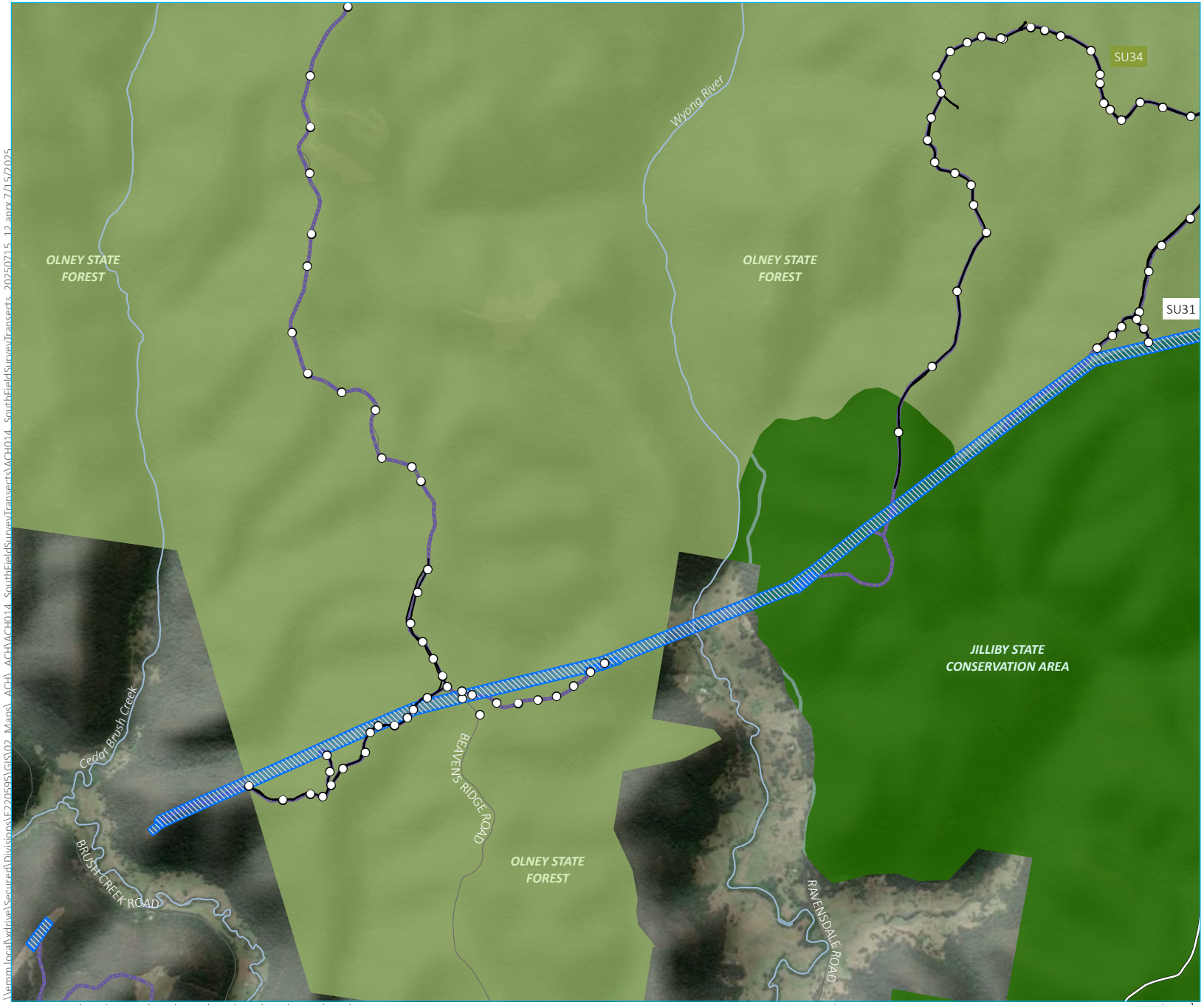

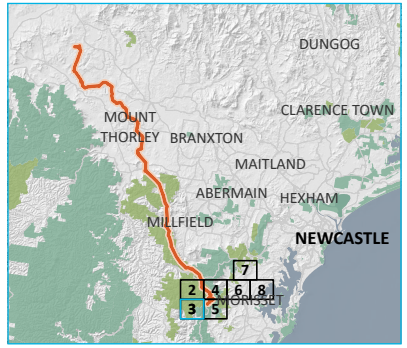

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU31
- SU34

Project impact area

- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP South transmission corridor
Map 3 of 8

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.5

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

0 1 2 km
GDA2020 MGA Zone 56
N

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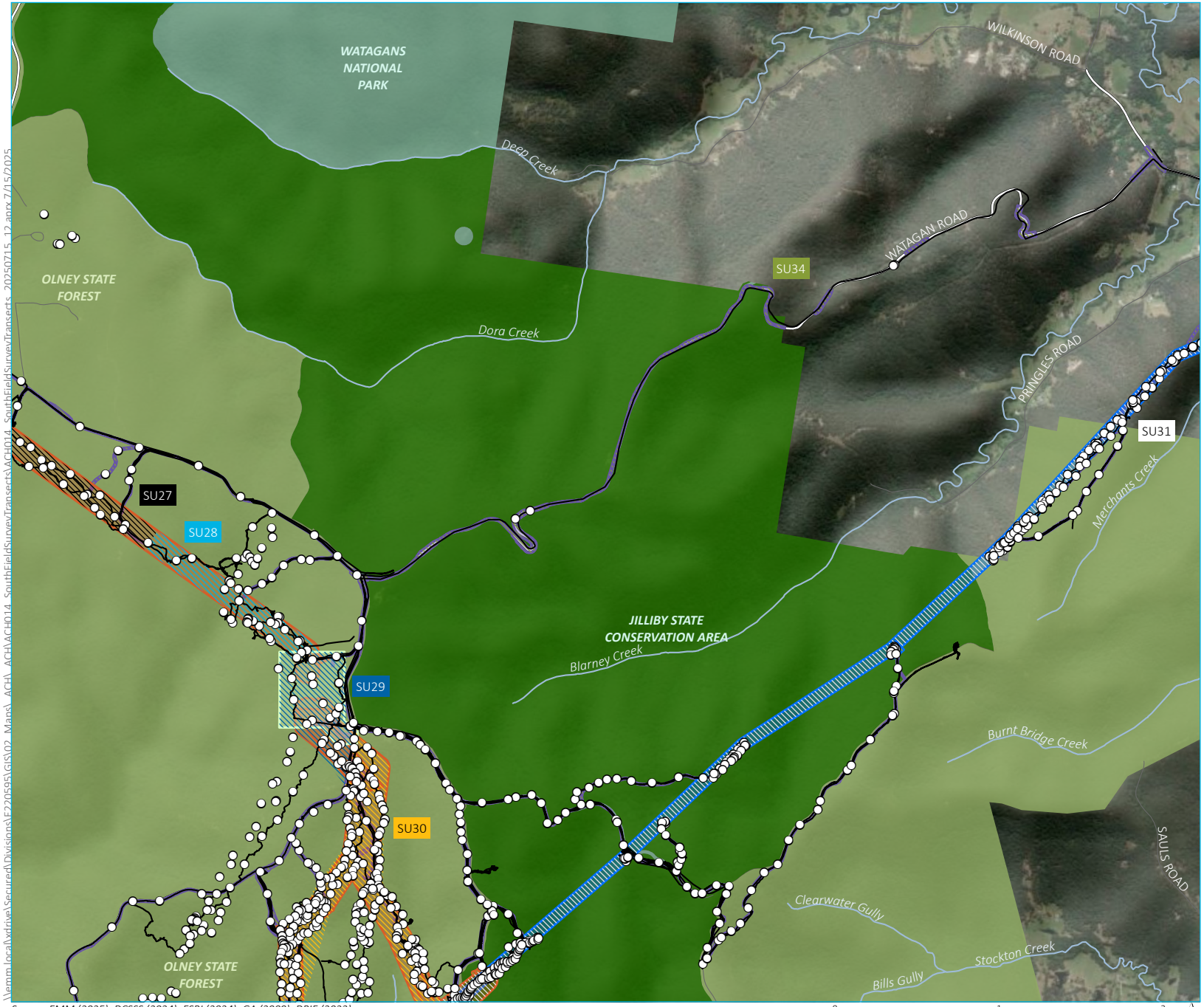

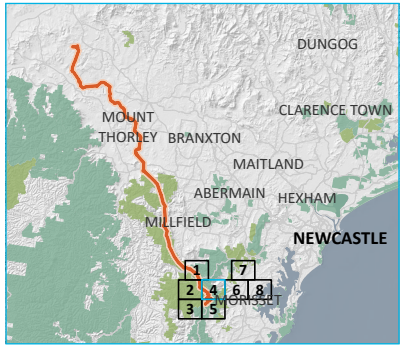

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU27
- SU28
- SU29
- SU30
- SU31
- SU34

Project impact area

- HTP corridor
- Olney switching station
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP South transmission corridor
Map 4 of 8

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.5

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

0 1 2 km

GDA2020 MGA Zone 56

N

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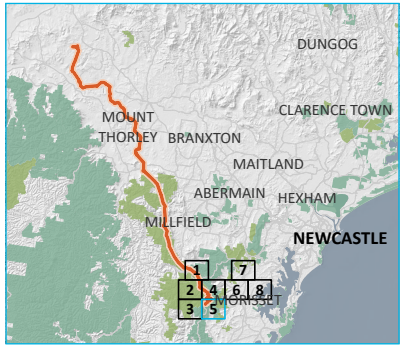

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU30
- SU31
- SU34

Project impact area

- HTP corridor
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Field survey transects in HTP South transmission corridor
Map 5 of 8

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.5

EMM
creating opportunities

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

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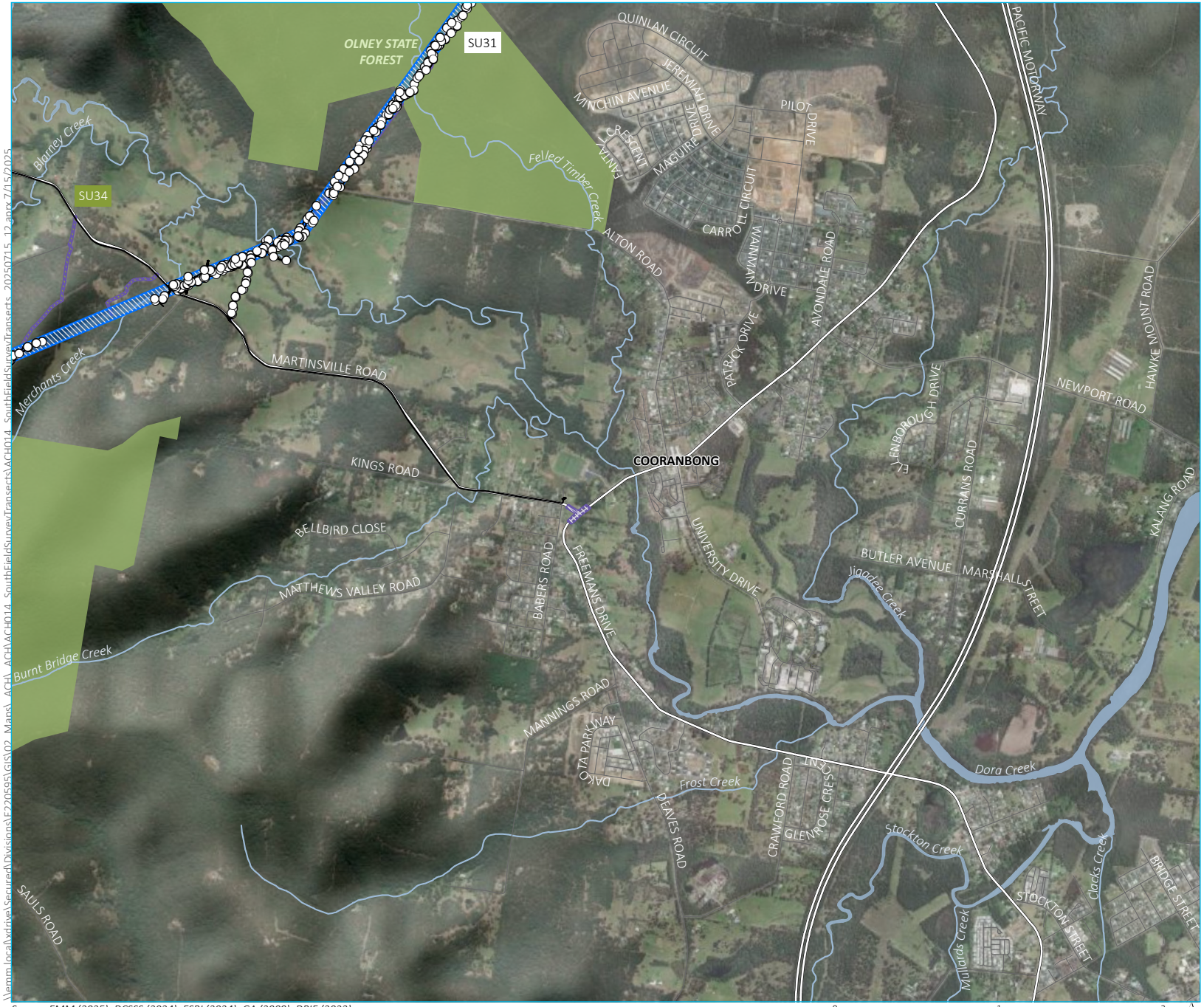

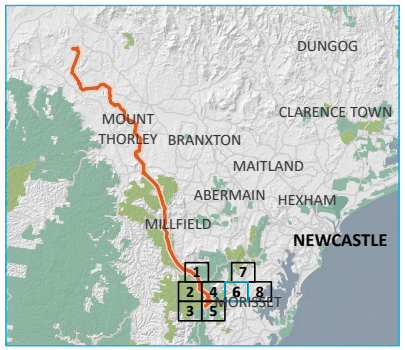

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU31
- SU34

Project impact area

- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey transects in HTP South transmission corridor
Map 6 of 8

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.5

EMM
creating opportunities

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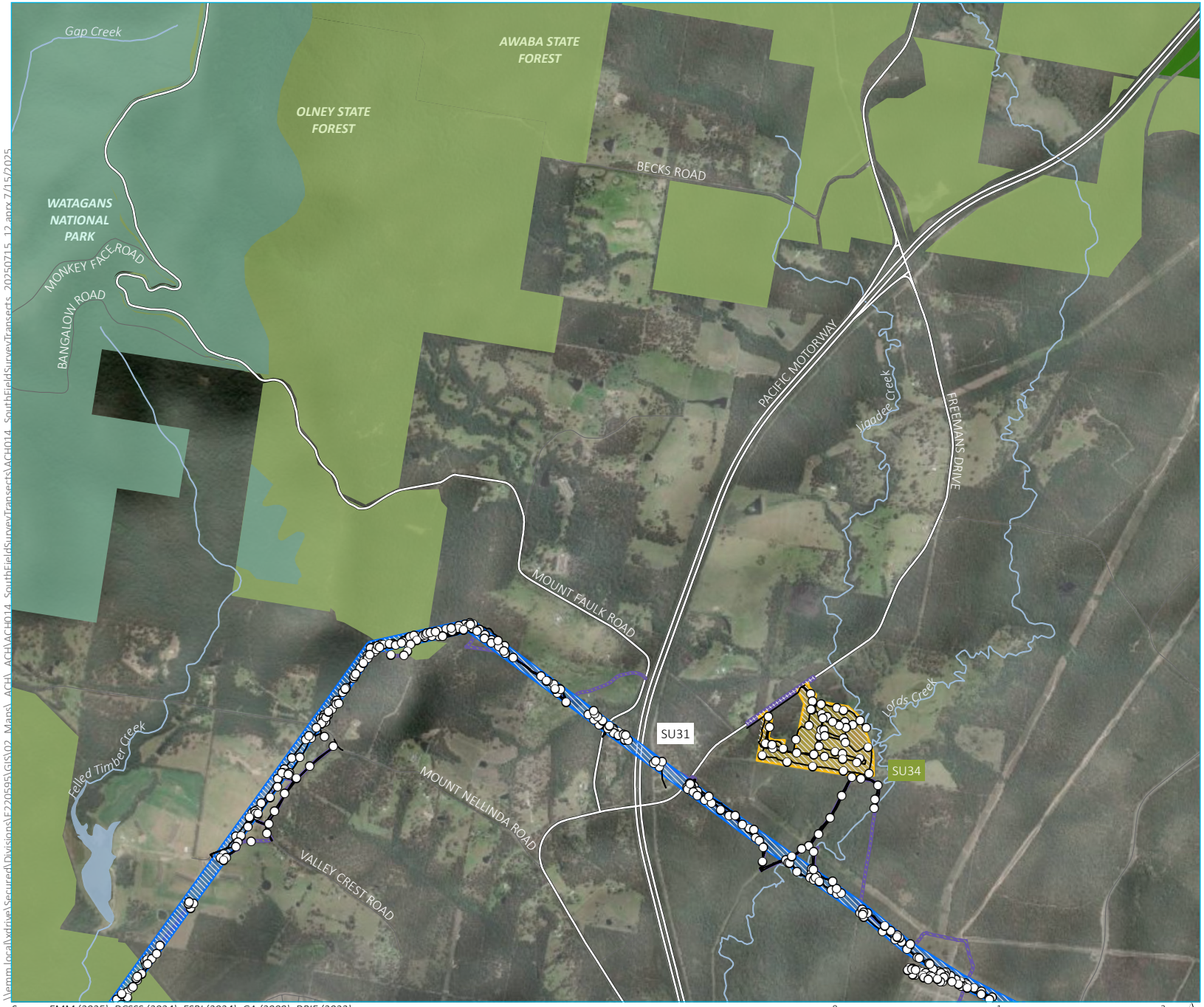

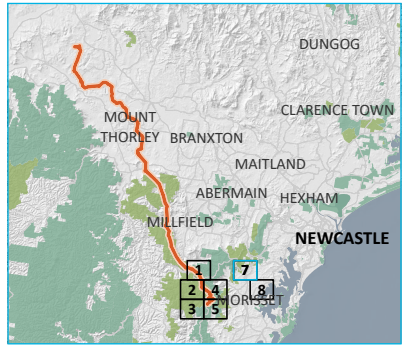

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU31
- SU34

Project impact area

- Construction support site
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey transects in HTP South transmission corridor
Map 7 of 8

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.5

EMM
creating opportunities

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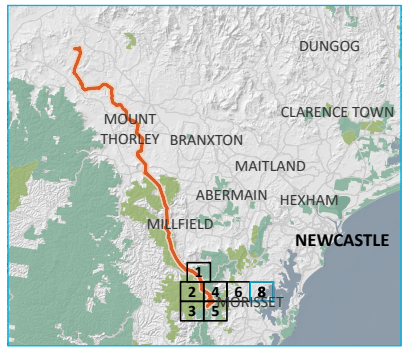

KEY

- Field survey documentation point
- Field survey track

Survey unit

- SU31
- SU34

Project impact area

- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody
- State conservation area

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); DCSSS (2024); ESRI (2024); GA (2009); DPIE (2023)

0 1 2 km

GDA2020 MGA Zone 56

N

Field survey transects in HTP South transmission corridor
Map 8 of 8

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.5

EMM creating opportunities

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ii Aboriginal sites identified

The field investigations identified 77 discrete Aboriginal site recordings within the project impact area (see Table 9.3 and Table 9.4, Figure 9.6 and Figure 9.7, Appendix F.3). These included 73 newly identified sites, and the relocation of 4 previously documented sites. A further 3 previously documented site locations were revisited but failed to identify any cultural materials; and in many cases are considered to have been destroyed through natural or anthropogenic processes. Two previously documented sites were not visited as a result of land access or late refinements to the project designs following the field investigation.

Of those cultural materials encountered, they were dominated by rockshelters and culturally modified trees. Some 47 of the sites identified in the project impact area were identified as rockshelters, although of these only one contained art motifs and/or evidence of cultural deposits (see Table 9.8). Of note was DEEP CK MOTHER SWA (#37-6-3714), which consisted of a large rockshelter in the northern portion of Pokolbin State Forest, within which over 140 art motifs from white and red ochres were encountered (see Plate 9.89 to Plate 9.92).

However, a significant number of the rockshelters identified revealed no visual evidence of past visitation (n=41), and consisted of natural overhangs, caves or gaps in the sandstone geology without visual signs of past visitation. As outlined in *section 8.4.1*, such places can be hard to robustly determine to reflect cultural activities, and a series of criteria against known archaeological rockshelters sites have been developed. When aligning these criteria against those 41 recordings which are located within the project impact area, detailed review by multiple EMM archaeologists resulted in 4 reaching thresholds indicative of past use (see Appendix F.4). These include HTP-C-RS02, HTP-S-RS16, HTP-S-RS19 and HTP-S-RS20; and in subsequent sections of this report only these 4 are identified as archaeological features, with the remaining 37 de-classified as reflecting natural geological features. These 4 sites meet criteria associated with their size and knowledge by the local Aboriginal community, as well as proximity to other cultural materials. These 4 sites are found in the northern portions of Watagan State Forest (HTP-S-RS16), the northern portions of the Corrabare Flora Reserve (HTP-C-RS02), and Olney State Forest (HTP-S-RS19, HTP-S-RS20). They are generally found in elevated locations in close proximity to various watercourses. None have significant view-lines or visibility from their locations, which are often within dense bushland (acknowledging past cultural burning regimes have changed in these locations since the pre-colonial period).

A large number of culturally modified trees (n=19) were also documented during the field investigation (see Plate 9.77 to Plate 9.80). Of these, 16 were within the project impact area, the remaining three outside as a result of project refinements. These included both cultural scarring and anthropogenic modifications to the growth of trees (e.g. creation of rings). These are distributed across the project impact area and occur in a wide range of environmental and locational contexts. Many have a tentative status given the historical activities (e.g. logging) in the region, and further specialist activities were undertaken with an arboriculturist and Aboriginal participants to further explore and characterise the sites. Appendix F.5 provides the report of these activities, and which has resulted in the classification of one of the 19 site recordings as having been culturally modified. This site (HTP-C-CMT05) is discussed further in subsequent sections of the report, with the remaining 18 being de-classified as non-cultural.

In addition to these 2 main site features, a number of other site types were encountered within the project impact area. These included 3 grinding groove sites (see Plate 9.95 and Plate 9.96), and a small number of artefact sites, predominately isolated finds and/or low density stone artefact scatters. Of note was a number of cultural places, including resources – considered to reflect an analogy of the broader cultural landscape within the State forests – and a contemporary wishing well that may have reflected a former spring (see Plate 9.93 and Plate 9.94).

While outside the project impact area, a number of significant stone arrangements, HTP-C-SA1 and HTP-C-SA2, were encountered near Crumps Road in Corrabare State Forest (see Plate 9.86 to Plate 9.88). These sites consisted of a number of discrete small U-shaped collapsed stone walls typically 1 to 2 metres in size on a steep scarp orientated towards Mount Yengo; and encompassed within the Trig Road cultural landscape. Given the significance of these sites, the project was re-aligned to avoid them, and they are no longer within the project impact area, but remain in close proximity.

As a result of the ongoing project refinement, a further 73 newly identified sites were documented outside of the project impact area, a further 28 previously recorded sites revisited and validated, and 18 previously documented sites were revisited but could not be relocated and are believed in most instances to be destroyed. While not further outlined in this report, these sites have all been added/updated on the Heritage NSW AHIMS database (see Table 9.9).

Table 9.8 Summary of Aboriginals sites (newly identified and previously documented validated) within the project impact area of HTP Central (SU17–24, 32 and 33) and HTP South (SU25–31 and 34)

Site type	SU																	Total (n)
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
Aboriginal ceremony and dreaming, Aboriginal resource and gathering	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	**1**
Aboriginal resource and gathering	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	**2**
Cultural place	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	**2**
Culturally modified tree (carved or scarred)	-	-	-	-	4	6	2	-	-	-	-	-	-	-	1	2	1	**16**
Grinding groove	-	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-	-	**3**
Isolated find	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1	-	**3**
Low density artefact scatter (<20)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	**3**
Rockshelter (no cultural markers)	18	-	-	-	3	2	7	-	7	-	-	-	2	2	-	-	-	**41**
Rockshelter, art (pigment or engraved)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**
Rockshelter, potential archaeological deposit	1	-	-	-	2	1	-	-	1	-	-	-	-	-	-	-	-	**5**
Total (n)	**21**	**-**	**-**	**-**	**9**	**11**	**12**	**1**	**9**	**-**	**-**	**-**	**2**	**2**	**4**	**4**	**2**	**77**

Notes: Values exclude some three previously recorded sites that were revisited but could not be relocated and two that were only identified following the field program as a result of project refinement.

Table 9.9 Identified Aboriginal sites recorded as part of the HTP Central and HTP South, both outside and within the project impact area by site type

Site type	Total (n)	Total (%)
Within project impact area		
Aboriginal ceremony and dreaming, Aboriginal resource and gathering	1	1.30
Aboriginal resource and gathering	2	2.60
Cultural place	2	2.60
Culturally modified tree (carved or scarred)	16	20.78
Grinding groove	3	3.90
Isolated find	3	3.90
Low density artefact scatter (<20)	3	3.90
Rockshelter (no cultural markers)	41	53.25
Rockshelter, art (pigment or engraved)	1	1.30
Rockshelter, potential archaeological deposit	5	6.49
Total (n)	**77**	**100.00**
Outside project impact area*		
Aboriginal ceremony and dreaming, rockshelter	1	0.99
Aboriginal resource and gathering	3	2.97
Culturally modified tree (carved or scarred)	13	12.87
Grinding groove	12	13.40
Grinding groove, isolated find	1	0.99
Isolated find	3	2.979
Low density artefact scatter (<20)	3	2.97
Moderate density artefact scatter (21–50)	1	0.99
Rockshelter (no cultural markers)	36	35.64
Rockshelter, art (pigment or engraved)	11	10.89
Rockshelter, art (pigment or engraved), grinding groove, low density artefact scatter	2	1.98
Rockshelter, art (pigment or engraved), grinding groove, potential archaeological deposit	1	0.99
Rockshelter, art (pigment or engraved), potential archaeological deposit	2	1.98
Rockshelter, art (pigment or engraved), stone arrangement	1	0.99
Rockshelter, potential archaeological deposit	7	6.93

Site type	Total (n)	Total (%)
Stone arrangement	4	3.69
Total (n)	**101**	**100.00**

Notes: Values exclude some 3 previously recorded sites within the project impact area that were revisited but could not be relocated and 2 previously recorded sites within the project impact area that was identified following the field program as a result of project refinement.

*Of these, 64 are within 200 metres of the project impact area.

Plate 9.73 HTP-C-GG03 grinding groove with a second groove partially showing in the bottom left corner

Plate 9.74 HTP-C-GG03 context view south-east of grinding grooves on a sandstone platform beside Sweetmans Creek within dense regrowth forest

Plate 9.75 HTP-C-GG05 single grinding groove

Plate 9.76 HTP-C-GG05 context view west of grinding groove on a sandstone boulder situated atop a small waterfall within dense regrowth forest

Plate 9.77 HTP-C-CMT18 potential large scar, scar is south facing

Plate 9.78 HTP-C-CMT18 top of potential large scar, context view north

Plate 9.79 HTP-C-CMT19 potential ring tree, with detail of ring facing east-west

Plate 9.80 HTP-C-CMT19 context view west along southern verge of Broken Back Trail on top of ridge. Site is within regrowth forest

Plate 9.81 HTP-C-AR01 mature grass tree, largest within site extent, context view southwest

Plate 9.82 HTP-C-AR01 context view west of four mature grass trees within dense regrowth forest on a very gently inclined upper hillslope

Plate 9.83 HTP-C-AR02 native hibiscus shoots along tributary embankment, context view north

Plate 9.84 HTP-C-AR02 native hibiscus shoots along tributary embankment within dense regrowth forest, context view west

Plate 9.85 HTP-C-RS02 context view north of a sandstone escarpment and potential rockshelter on a ridge within dense regrowth forest

Plate 9.86 HTP-C-SA01 view north, noting the good outlook over Corrabare State Forest from the damaged site

Plate 9.87 HTP-C-SA02 view southeast, the larger of the 2 stone arrangements

Plate 9.88 HTP-C-SA02 view northeast, the smaller of the 2 arrangements

Plate 9.89 AHIMS #37-6-3714 context view south of entrance to rockshelter within dense regrowth forest

Plate 9.90 AHIMS #37-6-3714 a sample of white hand stencils, tally marks and charcoal figures

Plate 9.91 AHIMS #37-6-3714 a sample of white and yellow hand stencils and tally marks on the western wall of rockshelter

Plate 9.92 AHIMS #37-6-3714 context view east of rockshelter western wall with various art motifs

Plate 9.93 HTP-S-CS01 a contemporary wishing well used as a water source by Aboriginal people prior to colonisation

Plate 9.94 HTP-S-CS01 context view west of steep hillslope with sandstone boulders and dense regrowth forest on western verge of Martinsville Hill Road

Plate 9.95 HTP-S-GG01 five grinding grooves on a sandstone boulder

Plate 9.96 HTP-S-GG01 context view north east of grinding grooves on sandstone boulder within a 3rd order tributary of Watagans Creek. Site is situated within a steep gully and regrowth forest

Plate 9.97 HTP-S-RS19 sandstone rockshelter with sandstone outcropping, view southwest

Plate 9.98 HTP-S-RS19 sandstone rockshelter facing north-east, situated southwest of Jilliby Jilliby Creek

Plate 9.99 HTP-S-RS20 sandstone rockshelter view northwest situated west of Jilliby Jilliby Creek

Plate 9.100 HTP-S-RS20, sandstone rockshelter facing north-east, situated southwest of Jilliby Jilliby Creek

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9.2.4 Synthesis of field survey results

Across the entire project impact area, around 643 kilometres of linear survey was undertaken, totalling around 2259 hectares (see Table 9.2 and Table 9.6; Figure 9.1). These values indicate substantial coverage of the project impact area (around 2351 hectares), and many locations were visited and/or investigated on multiple occasions over the field program. Survey coverage therefore equates to around 72% of the project impact area being inspected, with much of the remaining 28% inaccessible at the time of the field survey and/or the result of project impact area refinements following completion of the field activities (see Figure 9.1). Of the 28% of the project impact area not surveyed, this includes 4% (85.8 hectares) comprising hardstand roads and road verges to access the project; and 3% (73 hectares) comprising precipitous terrain too dangerous for the field teams to access.

Across the project impact area, these activities identified 195 Aboriginal sites and places, broken down as around 156 newly identified sites and 39 previously documented sites which were validated by the field survey (see Table 9.3 and Table 9.7). A further 82 previously documented sites were visited but could not be located and are assumed destroyed. Desktop analysis of the 13 sites that were documented within the project impact area, but not subject to field investigation as they were identified following the field program found that 9 are documented as having been previously destroyed.

The cultural assemblage identified during the field survey aligned closely with the desktop and archaeological information gathered in Chapters 5 to 8 inclusive, and the predictive model outlined in *section 8.4*. In HTP North, sites were dominated by various densities of stone artefacts frequently in association with major watercourses or their lesser tributaries. Parnells Creek, Wollombi Brook, Loder Creek, and Monkey Place Creek all exhibited extensive cultural materials during the field investigations. Within HTP Central and HTP South, sites were dominated by rockshelters, culturally modified trees and grinding grooves sites. Spatially these patterns where harder to discern and very much dependent on the location condition of the geological substrate and vegetation present at any given location. Many of them appeared to be present on or near high ground, but this may reflect an investigative bias with the project constrained to such locations. There does, however, seem to be general aggregations of sites, which when ratified in *Chapter 10 (The archaeological assemblage of the project impact area)* of the report are contained within localised cultural landscapes, notably in the vicinity of Trig Road and Flat Rock (see *Chapter 10 (The archaeological assemblage of the project impact area*). Several of these site recordings were considered tentative at the time of recording, and further analysis and/or specialist investigations have resulted in declassification of some of these places (see Appendix F.3). Various other site types were also encountered within HTP Central and HTP South, including places of cultural importance to the contemporary community.

It is also worth highlighting that as a result of the close engagement the project undertook with RAPs, the project was subject to ongoing refinement throughout the field investigation. This ultimately resulted in field survey of areas that are now outside the project impact area (see *section 12.2*). When incorporating these activities, around 1045 kilometres of field survey was undertaken for the project and around 7702 discrete points of observation and recording were documented (see Figure 9.2). A further 180 Aboriginal sites and places were documented in these areas (see Table 9.10), including 137 newly identified and 43 previously documented and re-validated. Of these, 123 were recorded within 200 metres of the project impact area. A further 48 previously documented sites outside the project impact area were also revisited but could not be validated and are assumed to be destroyed. While not further outlined in this report, these sites have all been added/updated on the Heritage NSW AHIMS database.

Table 9.10 Synthesis of sites identified within and outside the project impact area recorded during the field survey, including both newly identified and previously documented and validated

Site type	Within the project impact area	Outside project impact area but within 200 m	Outside the project impact area and beyond 200 m
Aboriginal ceremony and dreaming, Aboriginal resource and gathering	1	-	1
Aboriginal ceremony and dreaming, rockshelter	-	3	-
Aboriginal resource and gathering	2	-	-
Cultural place	2	-	-
Culturally modified tree (carved or scarred)	16	8	5
Culturally modified tree (carved or scarred), isolated find	-	1	-
Grinding groove	3	10	3
Grinding groove, isolated find	-	-	1
High density artefact scatter (>50)	2	1	1
High density artefact scatter (>50), PAD	2	-	-
Isolated find	59	22	12
Isolated find, PAD	3	1	-
Low density artefact scatter (≤20)	49	33	9
Low density artefact scatter (≤20), PAD	6	-	-
Moderate density artefact scatter (21–50)	1	2	2
Moderate density artefact scatter (21–50), PAD	2	-	1
Rockshelter (no cultural markers)	41	26	10
Rockshelter, art (pigment or engraved)	1	2	9
Rockshelter, art (pigment or engraved), grinding groove, low density artefact scatter (≤20)	-	-	2
Rockshelter, art (pigment or engraved), grinding groove, PAD	-	-	1
Rockshelter, art (pigment or engraved), PAD	5	2	-
Rockshelter, stone arrangement	-	1	-
Rockshelter, PAD	-	7	-
Stone arrangement	-	4	-
Total	**195**	**123**	**57**

Note: For consistency, these values include the 45 rockshelters and 19 culturally modified trees that have been declassified through additional analysis and/or investigations outlined in Section 9.2.3ii and Appendix F.6. Values exclude previously documented sites that could not be validated and those previously documented sites that were only identified following the field program.

9.3 Test excavations

9.3.1 Approach

A small, targeted program of test excavation was undertaken over a 4-week period between 21 October and 26 November 2024. These works were undertaken by EMM archaeologists (including Mikhaila Chaplin, Phillipa O'Brien-Pounde, Amber Morgan, Taylar Reid and Cameron Neal), with the participation of 15 locally-based Wonnarua and Awabakal traditional owners (see Table 9.11).

Given the 110-kilometre length of the project impact area and the development of the project's concept design in parallel with the initial steps of the ACHA process, the test excavations were undertaken to supplement and support the findings of the field survey, rather than implement a broader exploratory approach that may be employed on smaller sites. The test excavations focussed on proposed project elements that may intersect with the Warkworth sand system and/or areas identified as having potential subsurface cultural materials during the field investigation. Specifically, the test excavations were undertaken at locations where proposed transmission line tower locations and/or construction support site areas were considered probable and planned based on concept designs at the time of the archaeological program. As project design will be refined further during detailed design, there may be opportunities to further reduce potential impacts.

The proposed archaeological test excavation program is presented in Figure F.1 (see *Appendix F (Field investigation)*).

Within the above parameters, the primary aims of the excavations were to:

- further refine, map and characterise the nature, age, extent, integrity and significance of the cultural materials within the project impact area
- collect data to answer the following research questions:
    - Are Warkworth sand system deposits present within the project impact area and if so, is the evidence of past occupation within them? What proximity are these deposits to the Hunter River, Wollombi Brook and their immediate tributaries (usually within 5 to 10 kilometres of their intersection) and how can this inform on the potential and period of occupation of past human activities for the region?
    - A number of specific landform features and/or places are identified based on detailed review of previous assessments (see *section 8.2* and Appendix E.2), and which highlighted watercourses such as Hunter River, Loder Creek and Wollombi Brook as documented to contain significant cultural assemblages. The results of the survey also found that Monkey Place Creek had high potential for cultural materials. What is the nature of cultural materials within the project impact area in close proximity to these watercourses? What is the evidence and nature of past human activity in other identified areas?
    - What are the environmental characteristics associated with the distribution of cultural materials within the project impact area? Can the formative processes of the stratigraphic profile provide information on the nature and/or survivability of the archaeological resources? Are there other key factors in the distribution and extent of the material culture within the project impact area?
- better assess the significance and historical meaning of the cultural materials that exist within the project impact area so that future archaeological investigation can advance our understanding of past Aboriginal cultural behaviour and environmental adaptation
- direct future heritage activities and mitigation measures (if required) for the project.

Each test excavation location visited during the program was further assessed prior to completing the test excavations, and several of the original targeted areas were not completed following observations of localised impacts.

Table 9.11 Aboriginal participants involved in the test excavations

Organisation and/or individual	Personnel
HTP North	
Wanaruah LALC	[redacted]
Ungooroo Aboriginal Corporation	[redacted]
Thomas Dahlstrom	[redacted]
Aliera French Trading	[redacted]
Long Gully Cultural Services	[redacted]
HTP Central	
Awabakal LALC	[redacted]
Mindaribba LALC	[redacted]
Marrung-Ta Aboriginal Corporation/Culturally Aware	[redacted]
Awabakal Descendants Traditional Owners Aboriginal Corporation	[redacted]
Kiray Putjung Aboriginal Corporation	[redacted]
Gomeroi Namoi Traditional Owners	[redacted]

i Completion of test excavations

It is highlighted that the proposed excavation program was incomplete prior to the finalisation of this ACHA. This is most evident in HTP North due to landowner and access constraints at the time of the assessment. Further test excavations are currently being conducted in HTP North focussing on proposed project elements that may intersect with the Warkworth sand system and/or areas identified as having potential subsurface cultural materials during the field investigation. Further test excavations are planned along the HTP corridor in HTP North, specifically:

- adjacent to the Hunter River and Loder Creek
- intersecting Warkworth Sands.

The findings of these additional investigations either underway or planned at the time of finalising this report will be provided in either an Addendum or revised ACHA with the Submissions Report.

Recommendations outlined in *Chapter 13 (Management strategy and recommendations)* identify areas that would require these excavations to be completed prior to the project being implemented.

This approach to address the outstanding excavation program was agreed upon in consultation with Heritage NSW (*section 4.2*).

9.3.2 Methods

The project Secretary's environmental assessment requirements (SEARs) included the following clause in direct relation to any test excavations proposed for the project:

> if the test excavations do not conform with the Code of Practice, then the excavations may only be carried out with the written endorsement of Heritage NSW following consultation with the Registered Aboriginal Parties

As highlighted in *Chapter 8 (Archaeological context)* and further validated in *section 9.2*, the desktop assessment and field survey identified a range of diverse site types including rockshelters, artefact scatters, and areas of potential archaeological deposit (PAD). As a result, an Archaeological Research Design (ARD) was developed in advance of the field program to enable 3 key types of investigation:

1. to further examine and validate potential rockshelter sites where cultural materials or engravings/art was not observable, primarily in the southern portions of the project (see *section 9.2*)

2. to provide increased flexibility in the quantum and size of test pits where the Warkworth sand system was encountered, and which may have required deep excavations unachievable through standard approaches (see *section 5.2.2*)

3. in the event of encountering Contact and/or massacre-related cultural materials in the northern portion of the project impact area following concerns by specific Aboriginal parties (see *Chapter 6 (Ethnographic context)*).

In the case of (1) and (3), neither can be investigated under the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (Code of Practice) guidelines, which specifically require further approvals for excavations of rockshelters and post-Contact sites. While in the case of (2), the methods similarly may deviate from the maximum dimensions of excavation permissible under the guidelines. This prompted the need to develop an ARD for approval from Heritage NSW to allow the implementation of some parts of the program. The ARD also included a range of excavations proposed that did align with established Code of Practice guidelines and were included to provide a single point of reference for all subsurface archaeological investigations proposed for the project. The ARD is presented in Appendix B.6.

Regardless of the site type or location, the proposed methods outlined in the ARD aligned closely with Code of Practice approaches and methods (e.g. systematic grid, 0.25 square metre test pits, manual excavation, etc.), while also allowing for more refined investigations (rockshelters) and deeper investigations (deep alluvial deposits), where needed.

Following feedback from Aboriginal stakeholders on the document, proposed investigation of rockshelters was removed from the final version of the document, which was approved by Heritage NSW in late November 2024. As such, no rockshelter sites were investigated as part of the program, and any sites of this nature remaining in the project impact are to be avoided by the project (see *Chapter 12 (Impact assessment)*). Further, no post contact sites were encountered during the test excavation program. The Warkworth sand system was encountered within the Singleton Military Area, but modifications to the Code of Practice methods was not required due to their shallow depth in this location.

As such, all excavations here were undertaken in accordance with Requirements 16 and 17 of the Code of Practice, which included:

- all test excavation pits were spatially located using a differential GPS device

- manual excavation of 0.25 square metre test pits, which were expanded to 1 square metre in certain contexts
- all excavation used hand tools, such as shovels, mattocks and trowels
- excavation of the first unit was in 5-centimetre spits, with subsequent excavation in 10-centimetre spits
- manual excavation continued to either: i) the base of the cultural deposits; ii) to the depth of the underlying geology; or iii) to the maximum depth possible via hand excavation (around 1 to 1.5 metres)
- wet sieving of all manually excavated material through a 5-millimetre sieve
- soil profiles were recorded in accordance with the Code of Practice, including scaled drawings, photographs, and written descriptions
- soil samples were collected for description, sedimentological and chronological analysis where such analysis was considered likely to contribute significant information.

9.3.3 Results

This section provides a summary of the excavations and subsequent analysis (see Plate 9.101 to Plate 9.121; Figure 9.8 and Figure 9.9), with further detail provided in Appendices F.7 to F.12. This includes a full catalogue of the excavated test pits (see Appendix F.7) photographic catalogue of the excavated test pits (see Appendix F.9) and detailed lithic analysis report and catalogue (see Appendices F.10 and F.11). Appendix F.12 includes the results of chronological dating of the soil profile. A summary of the post excavation analysis, including stratigraphy, chronology and lithics analysis, from the excavations is provided below.

Overall, 100 x 0.25-square metre test pits, plus an additional 4 x 1-square metre test pits, were excavated across the project impact area within HTP North and HTP Central (Figure 9.9).[7] The excavation program excavated around 27.5 square metres or 13.1 cubic metres. Spatially, these excavations focussed on indicative tower locations within the Singleton Military Area (HTP North) and proposed construction support site at Wollombi Road (HTP Central).

i HTP North

Excavations were conducted over 9 days between 12 to 22 November 2024 at indicative tower locations within the Singleton Military Area and included a total of 47 x 0.25-square metres test pits and an additional 3 x 1-square metre test pit being excavated (see Figure 9.8). The program in this area excavated ~14.25 square metres or 4.76 cubic metres. Spatially, these were distributed across ten proposed tower locations in a 20-metre x 20-metre grid close to areas of high archaeological potential, including Monkey Place Creek and its associated tributaries (see Plate 9.101 and Plate 9.102). Based on the findings of the potential for the Warkworth sand system, field survey and the potential archaeological deposits noted around a grinding groove site (HTP-N-GG01), as well proximity to Monkey Place Creek and Nine Mine Creek (less than 200 metres), additional test pits were added to the grid in these areas.

[7] It is highlighted that a number of the test pits within the Singleton Military Area are now outside the project impact area following project refinement. This re-design was in part following the finding of the Warkworth sand system in these test pits and the preferred avoidance of this deposit despite limited cultural materials being recovered.

Test pits were on average around 30 centimetres deep, with deepest excavations of 80 to 100 centimetres near the confluence of a drainage channel and Monkey Place Creek (5th Order) south of Cessnock Road and now immediately to the east of the project impact area (see Plate 9.103). There was some variation in soil profiles extending across the excavation program (see Plate 9.103 to Plate 9.110), however, the test pits were typically shallow and were characterised as a duplex or fabric contrast soil profile. Specifically, they all encompassed a shallow A1 horizon (topsoil), which was generally <20 centimetre in depth, highly organic, moderately dark in colour (black, dark grey brown, grey), and either a clay or sandy loam composition (see Plate 9.104). In most cases, this immediately overlaid a compact to indurated heavy clay subsoil (B2 horizon) that was brown or orange brown in colour (see Plate 9.105); and which was considered culturally sterile. The interface between these 2 units was either sharp in the case of duplex soils (see Plate 9.105), or gradual in the case of fabric contrast soils (see Plate 9.106). Depending on location, there are various other units between the A1 and B2 units, including (from north to south along the project impact area):

1. colluvial deposits from movement of sediments upslope of the test pit, and typically shallow friable coarse sand and small gravels atop clay (see Plate 9.107)

2. alluvial deposits generally within less than 50 metres of watercourses in deeper and well-drained soil profiles and often a friable pale grey/brown clayey sandy (see Plate 9.103)

3. colluvial deposits from movement of sediments upslope of the test pit, and typically deep, diffuse layers of friable coarse sandy clay atop dense clay of the same colour (see Plate 9.108 to Plate 9.110).

In many cases, the subsoil showed greyed colouring and/or frequent manganese and iron panning (usually in the form of small pebble and gravel precipitates), which suggests repeated inundation and/or waterlogging. In all cases, the excavations demonstrated that the soil profiles were typically shallow, even where potential alluvial and colluvial units were encountered. Notably, a deposit considered to reflect the Warkworth sand system was encountered in a small number of test pits either side of Monkey Place Creek, including TP82-6 and TP83-8. The deposit consisted of a brown clayey sand with no inclusions. However, in neither location did the deposits extend into surrounding test pits. This suggests only small discrete pockets of the deposit are present within the Singleton Military Area and would be less than 1.6 hectares based on the test excavation program. Based on this, cultural materials would be expected to occur only in the upper 70 centimetres across the project impact area, and typically less than 20 centimetres. Chronological samples recovered from both of these test pits indicate that this deposit began forming between ~12,000 to 14,000 years ago, an age that broadly aligns with the findings of W14 Sandsheet (#37-6-0946) (see *section 8.2.1*). However, the cultural materials were generally deposited between ~3000 years ago and the mid-20th century.

Only 12 (24%) of the 50 test pits contained artefacts (see Appendices F.7, F.10 and F.11), with a total of 101 Aboriginal objects recovered. When extrapolating each 0.25 square metre test pit to 1 square metre, which is more commonly how artefact densities are discussed in the archaeological literature, an extrapolated average density of 1.1 per square metre was found across the project impact area (see Figure 9.9; Appendix F.7). Of these 12 test pits, only 2 exhibited values greater than 5 artefacts (TP83-6/C and TP83-11/6) with both located less than 30 metres of a small drainage line connected to Monkey Place Creek around 120 metres southwest of the test pits (see Figure 9.9). TP83-6/C contained 63 artefacts (63% of the assemblage) and TP83-11/6 included 21 artefacts (21% of the total assemblage). When extrapolating these 2 test pits, which were both expanded to 1 square metre, they return artefact density values of 42 per square metre and may reflect areas of more intense and/or repeated visitation in these locales. Neither were within the identified Warkworth sand system deposit, despite being in close proximity to both test pits. Further, following project refinement, both test pits are now outside the project impact area.

Cultural materials were primarily recovered from the upper 40 centimetres of the soil profile within test pits, and the majority of the assemblage (n= 86, 86%) recovered from the upper 2 spits (i.e. 0 to 20 centimetres). Most of the artefacts were made from fine-grained silcrete (n=38), coarse silcrete (n=27), and indurated mudstone (n=14), with lesser occurrences of chert (n=6), chalcedony (n=5) and other macro- and microcrystalline quartzes (n=11). The assemblage was dominated by flakes, both complete (n=38) and broken (n=43), with lesser occurrences of cores/core fragments (n=3) and tools (n=14). The presence of split flakes (n=2, part of broken flake total) highlights that core reduction occurred at the site as they occur early in the manufacture process usually as a production error. Of note, 48.5% of the assemblage (n=49) of artefact have no cortex, which suggests that the raw material types were procured from a secondary source, potentially some distance from their current location. The limited presence of tools across the site included a backed artefact and processing tools (e.g. scrapers) with their identification in the assemblage indicating that the site can be dated to the mid late Holocene (<5000 years ago) – a finding validated by the chronological ages recovered from the deposits. There is evidence of heat treating (n=3) in the form of shattering noted in some silcrete artefacts. Additionally, two sets of conjoined artefacts were identified from Spits 1 and 2 in TP83-6/C demonstrating movement, albeit limited, in the upper soil profile. Further lithics analysis is provided in Appendix F.10.

While the test excavation was relatively limited in its extent, the findings reinforce the results of the extensive field survey outlined in *section 9.2*. Specifically, they demonstrate that the majority of the cultural materials are encountered near the surface of the soil profile, which can be regularly observed in exposures resulting from soil movement (e.g. cultivation, erosion, etc.), and that these deposits are typically shallow. The deepest soil profiles encountered at the base of a slope were 1.2 metres in depth (TP83-8-SMA/W; Plate 9.99). Spatially, the findings also continue to demonstrate the importance of creek lines extending across the project impact area. In particular, as demonstrated by both the survey and excavation, Monkey Place Creek appears to be a focus of activity in this area. However, while encountered, significant buried cultural materials were not encountered within the project impact area along this creekline. A small portion of the Warkworth sand system may have been encountered at TP82-6, however no cultural materials were encountered in this location.

Plate 9.101 TP83-8/W showing the flat plain surrounding the Monkey Place Creek Tributary, view north

Plate 9.102 TP94-5 demonstrating the light forested area surrounding Nine Mile Creek, view north

Plate 9.103 TP83-8/W deep alluvial stratigraphy with sondage, north section

Plate 9.104 TP83-6/C showing shallow grey topsoil common throughout the region, north section

Plate 9.105 TP82-6/W demonstrating the orange clay subsoil commonly noted, north section

Plate 9.106 TP81-9/W example of diffuse horizons in the stratigraphy, north section

Plate 9.107 TP94-5 demonstrating colluvial deposits typical of the area surrounding Nine Mile Creek, north section

Plate 9.108 TP80-10/C showing diffuse layers on a terrace landform, view north

Plate 9.109 TP77-8 located on a gentle hillslope close to Pokolbin State Forest, view north

Plate 9.110 TP77-8 showing diffuse layers of friable coarse sandy clay, north section

Plate 9.111 Example of conjoin artefacts identified in TP83-6/C

ii HTP Central

Excavations were conducted over 10 days between 21 October and 1 November 2024 at the proposed construction support site at Wollombi Road on the southern bank of Congewai Creek. A total of 53 x 0.25 square metre test pits and an additional 1 square metre test pit were excavated in a 20 to 40-metre grid across the proposed impact area (see Figure 9.8); and totalling 14.25 square metres or 9.5 cubic metres. Spatially, these were distributed across the proposed construction support site in a grid pattern, but with specific focus on the land south of Congewai Creek outside the main flood zone, greater than 70 metres from the creek's edge (see Plate 9.112 and Plate 9.113). Based on the findings of the field survey and the higher elevation noted on the southern side of Wollombi Road, test pits were extended to this locale, resulting in coverage at least 200 metres from Congewai Creek (see Plate 9.114). Test pits were on average around 40 centimetres deep, with deeper soil profiles of 60 to 100 centimetres encountered across the western portion of the construction support site closest to Congewai Creek (see Plate 9.115). These areas appear to be within the active flood zone of Congewai Creek and were considered to reflect potential modern or historical deposition.

There was some variation in soil profiles extending across the excavation area (see Plate 9.115 to Plate 9.120), however the soil profile was typically a duplex or fabric contrast soil profile. Specifically, they all encompassed a shallow A1 horizon (topsoil), which was generally less than 20 centimetre in depth, highly organic, moderately dark in colour (black, dark grey brown, grey), and either a clay or sandy loam composition. In most cases, this immediately overlaid a compact to indurated heavy clay subsoil (B2 horizon) that was brown or orange-brown in colour (see Plate 9.117). The interface between these two units was either sharp in the case of duplex soils (see Plate 9.118), or gradual in the case of fabric contrast soils (see Plate 9.119). Depending on location, there are various other units between the A1 and B2 units, including:

1. alluvial deposits generally within <50 metres of creeks in deeper and well-drained soil profiles and often a friable pale grey/brown clayey sandy (see Plate 9.115)

2. colluvial deposits from movement of sediments upslope of the test pit, and typically deep friable coarse sand and small gravels above clay (see Plate 9.120).

In many cases, the subsoil showed gleying and/or frequent manganese and iron panning (usually in the form of small pebble and gravel precipitates), both of which indicate extended inundation and/or waterlogging. In all cases, the excavations demonstrated that the soil profiles were typically shallow, even where potential alluvial and colluvial units were encountered. It is highlighted that despite some suggestion in the geotechnical data that this locale contained modern fill/overburden, this was not encountered during the excavations, but some localised disturbance may be present.

Chronological samples recovered from two of the test pits (TPCSS-2 and TPCSS-117) across the excavations and indicate the initial formation of the deposits occurred between ~3000 to 5000 years ago. The soil profile then appears to accumulate until the mid-19th century.

Based on this soil profile, cultural materials would be expected to occur only in the upper 80 centimetres across the excavation area, and typically <40 centimetre. Only 27 of the 54 test pits (50%) contained artefacts (see Appendices F.10 and F.11) with a total of 98 Aboriginal objects recovered. When extrapolating each 0.25 square metre test pit to 1 square metre, which is more commonly how artefact densities are discussed in the archaeological literature, an extrapolated average density of 0.6 per square metres was found across the project impact area (see Figure 9.9). Of these 27 test pits, only six exhibited values greater than five artefacts (TPCSS-2, TPCSS-10, TPCSS-56, TPCSS-58, TPCSS-72 and TPCSS-96), with all located >100 metres from Congewai Creek and a small cluster between TPCSS-56, TPCSS-58 and TPCSS-72 (see Figure 9.9). When extrapolating these test pits, they return artefact density values of between 19 and 32 per square metre and have been identified as three discrete subsurface stone artefact deposits – each ~0.1 to 0.6 hectare in size. Test pits containing higher densities were typically between 100 and 200 metres from Congewai Creek.

Cultural materials were recovered from the upper 40 centimetres of the soil profile, and the majority of the assemblage (n= 51, 52%) was found in the upper two spits (i.e. 0 to 20 centimetres). A small peak of cultural materials (n=16, 16%), potentially indicative of an earlier phase of use was found between 30 to 40 centimetres below surface. Most of the artefacts were made from white, milky quartz (a macrocrystalline variety) (n=22), with lesser occurrences of fine-grained silcrete (n=19), quartzite (n=12), indurated mudstone (n=11), chert (n=9), chalcedony (n=9), cryptocrystalline quartz (n=8), matrix-dominated silcrete (n=7) and volcanic material (n=1). The assemblage was primarily formed of flakes, both complete (n=16) and broken (n=49), with lesser occurrences of cores/core fragments (n=2) and tools (n=7). The presence of split flakes (n=4, part of broken flake total) highlights that core reduction occurred at the site as they typically reflect errors early in the manufacture process. Importantly, these flakes were identified across four test pits (TPCSS-44, TPCSS-72, TPCSS-88 and TPCSS-96), demonstrating artefact production was occurring across the broader locale; and which may reflect repeated visitation of the site through time. A limited presence of tools across the site were recovered, including backed artefact and processing tools (e.g. scrapers) (see Plate 9.121). Their identification suggests that the assemblage dates to the mid-late Holocene (<5000 years ago) – a finding validated by the chronological ages, which suggests deposition between ~3000 to 110 years ago. It is probable that several watercourses throughout the locale, including Congewai Creek itself, may have formed important sources of raw materials in the use of artefact production, and account for the cultural materials recovered. Additional basalt outcrops within 10 kilometres southwest of this locale are documented as probable sources for the procurement of primary and secondary volcanic sources (Hawley, Glen, and Baker 1995). Further lithics analysis is provided in Appendix F.10.

The findings reinforce the results of the extensive field survey outlined in *section 9.2* in this location. Specifically, they demonstrate that the majority of the cultural materials is encountered near the surface of the soil profile, which can be regularly observed in exposures from cultivation, creek erosion, etc. and that these deposits are typically shallow. Spatially, the findings also continue to demonstrate the importance of watercourses extending across the project impact area. However, they further suggest that on larger watercourses, such as Congewai Creek, distances of between 100 to 200 metres from the creek's edge are most significant for the presence and/or retention of cultural materials. Where encountered, cultural deposits were fairly small less than 100 metres x 100 metres in size. Overall, three discrete areas were shown to contain high densities of cultural materials (HTP-C-FA01 [#37-6-4490], HTP-C-FA02 [#37-6-4489], and HTP-C-FA03 [#37-6-4491]), and these are identified as specific sites for management in *Chapter 13 (Management strategy and recommendations)*.

Plate 9.112 Floodplain south of Congewai Creek, with watercourse depression on the left near the tree line, view east

Plate 9.113 Floodplain landform with dam in the foreground and creekline in background, view northwest

Plate 9.114 Elevated landscape south of Wollombi Road 200 m from Congewai Creek, view southeast

Plate 9.115 TPCSS-113 showing deep alluvial soil profile, north section

Plate 9.116 Context of TPCSS-2 (1 m^2) in the low hills south of Wollombi Road, view east

Plate 9.117 TPCSS-2 showing example of grey topsoil common across the area, north section

Plate 9.118 TPCSS-32 showing example of shard horizons in duplex soils, north section

Plate 9.119 TPCSS-15 showing example of fabric contrast soils and diffuse stratigraphy, north section

Plate 9.120 TPCSS-34 showing example of course gravels in clay, north section

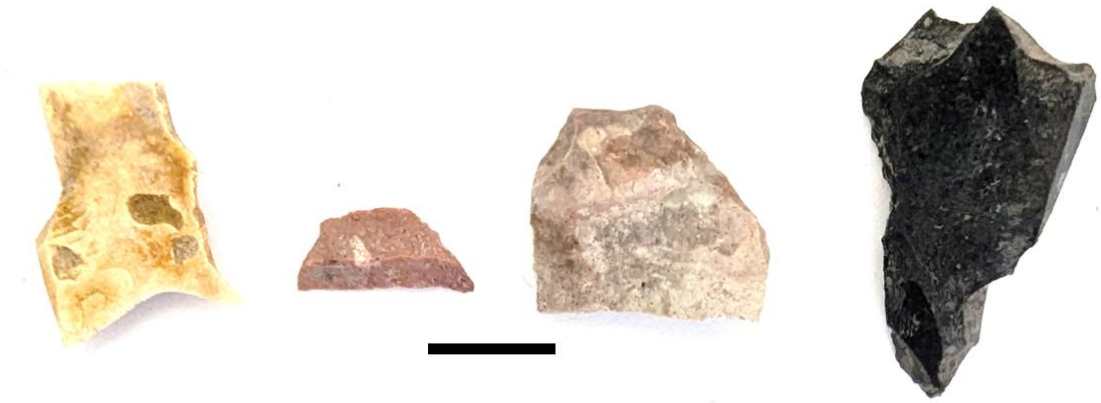
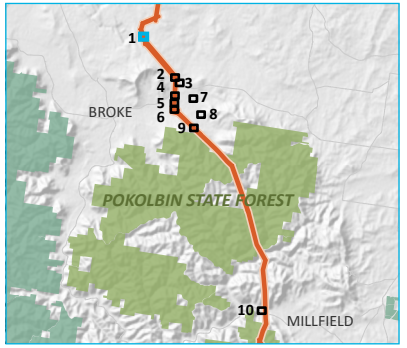


Plate 9.121 Example of stone tools (backed artefact and scrapers) recovered at Wollombi Road



KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0
- 1

Project impact area

- HTP corridor
- Access track

Existing environment

- Named watercourse

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

Test excavation results
Map 1 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities

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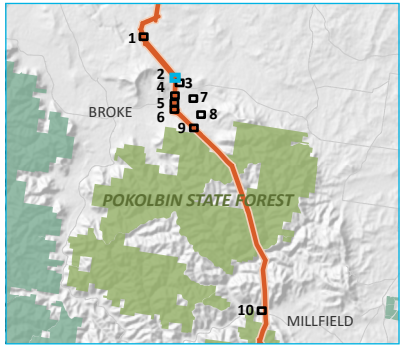

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0

Project impact area

- HTP corridor
- Access track

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

Test excavation results
Map 2 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities

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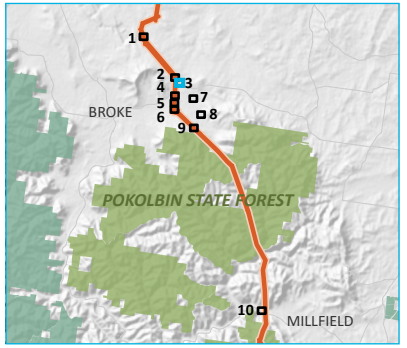

KEY

Proposed test pit (not excavated)

Excavated test pit- artefact count

0

Existing environment

Vehicular track

INSET KEY

Major road

HTP corridor

NPWS reserve

State forest

Test excavation results
Map 3 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

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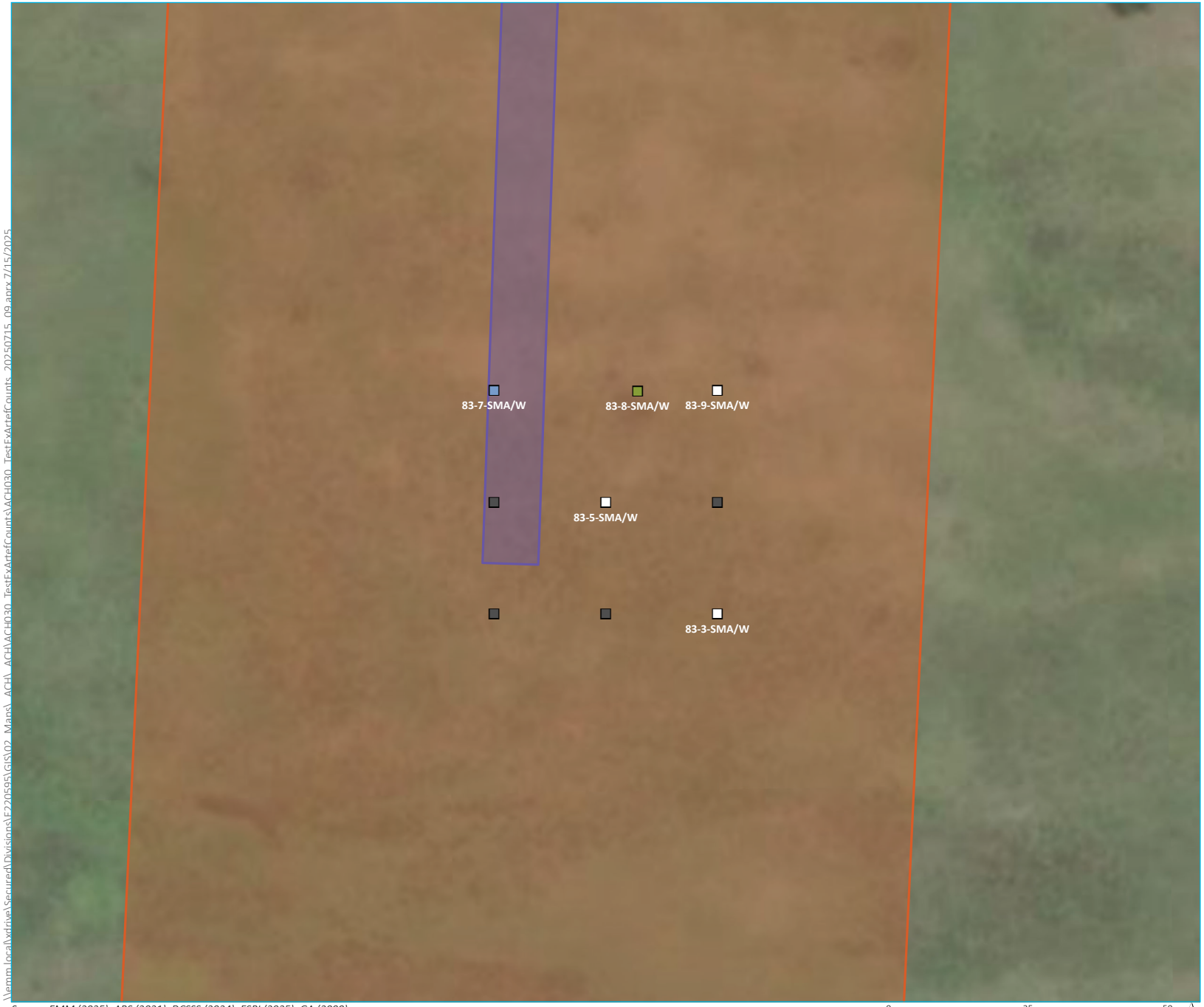

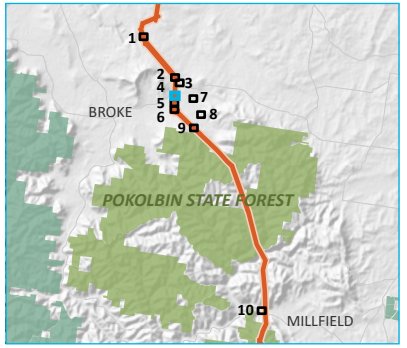

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0
- 1
- 5

Project impact area

- HTP corridor
- Access track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

Test excavation results
Map 4 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities

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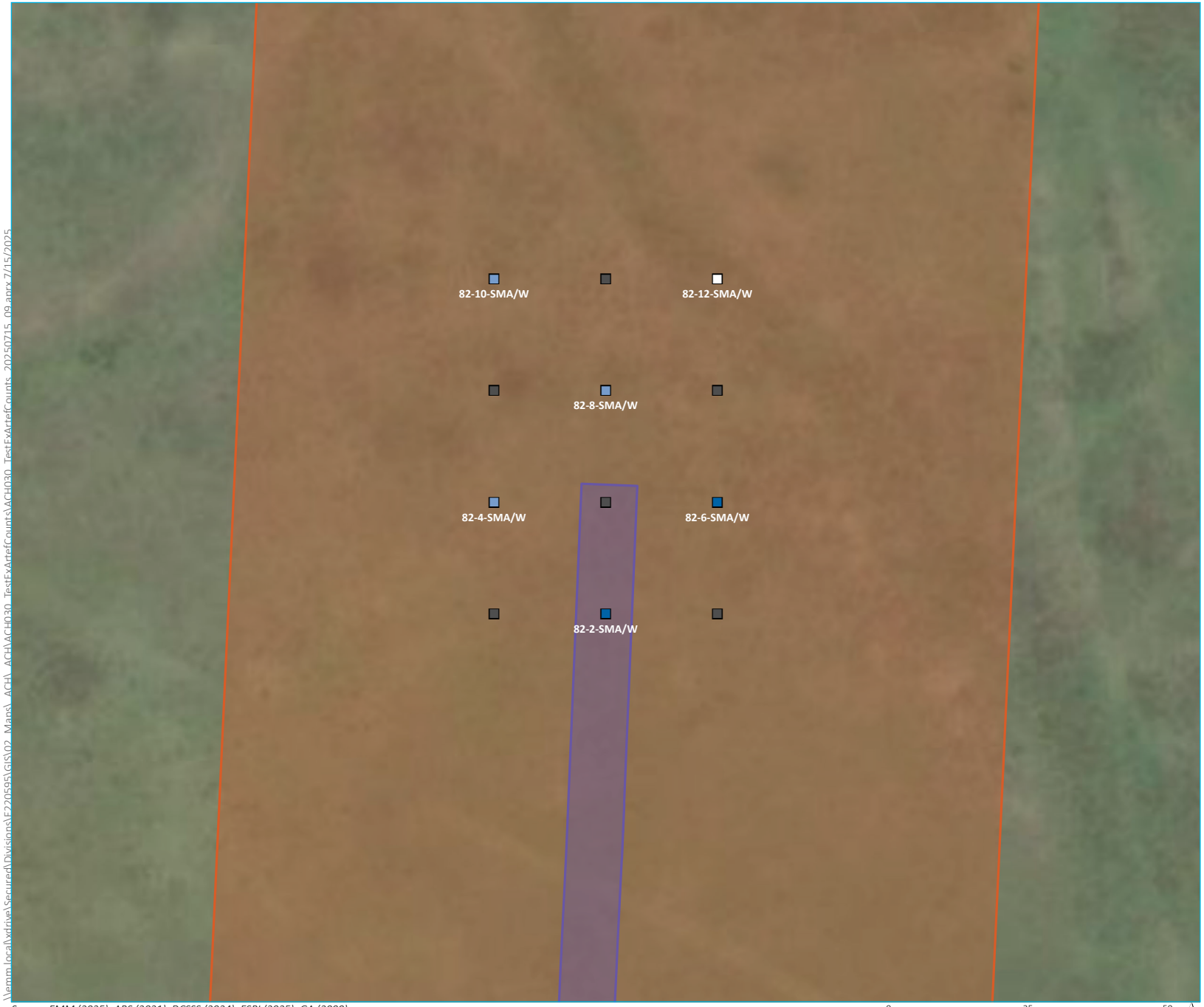

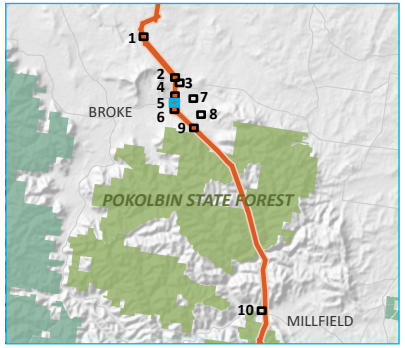

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0
- 1
- 2

Project impact area

- HTP corridor
- Access track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

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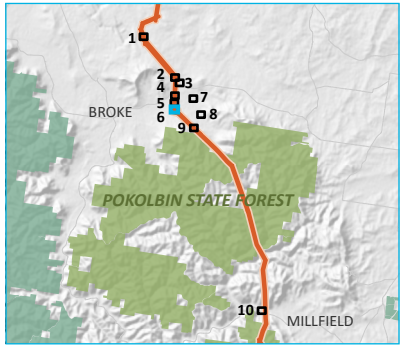
Test excavation results
Map 5 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities



KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0

Project impact area

- HTP corridor
- Access track

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

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Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

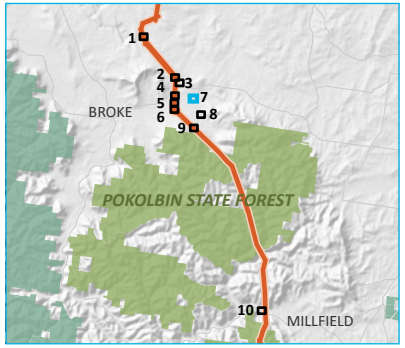
GDA2020 MGA Zone 56

N

Test excavation results
Map 6 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities



KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0
- 21
- 63

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

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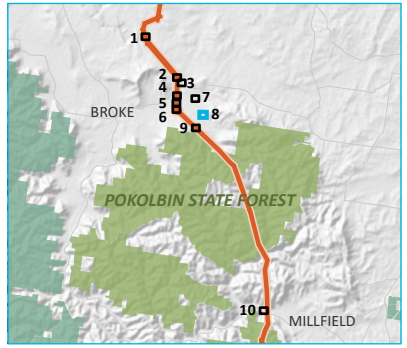
Test excavation results
Map 7 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities



KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0

Existing environment

- Minor road
- Named watercourse

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

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Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

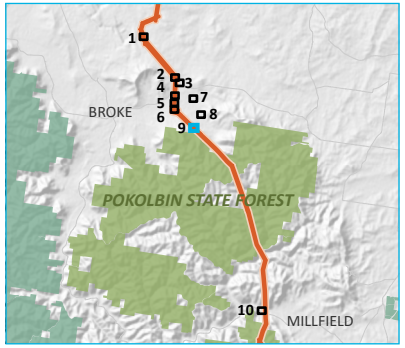
GDA2020 MGA Zone 56

N

Test excavation results
Map 8 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities



KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0
- 1

Project impact area

- HTP corridor
- Access track

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

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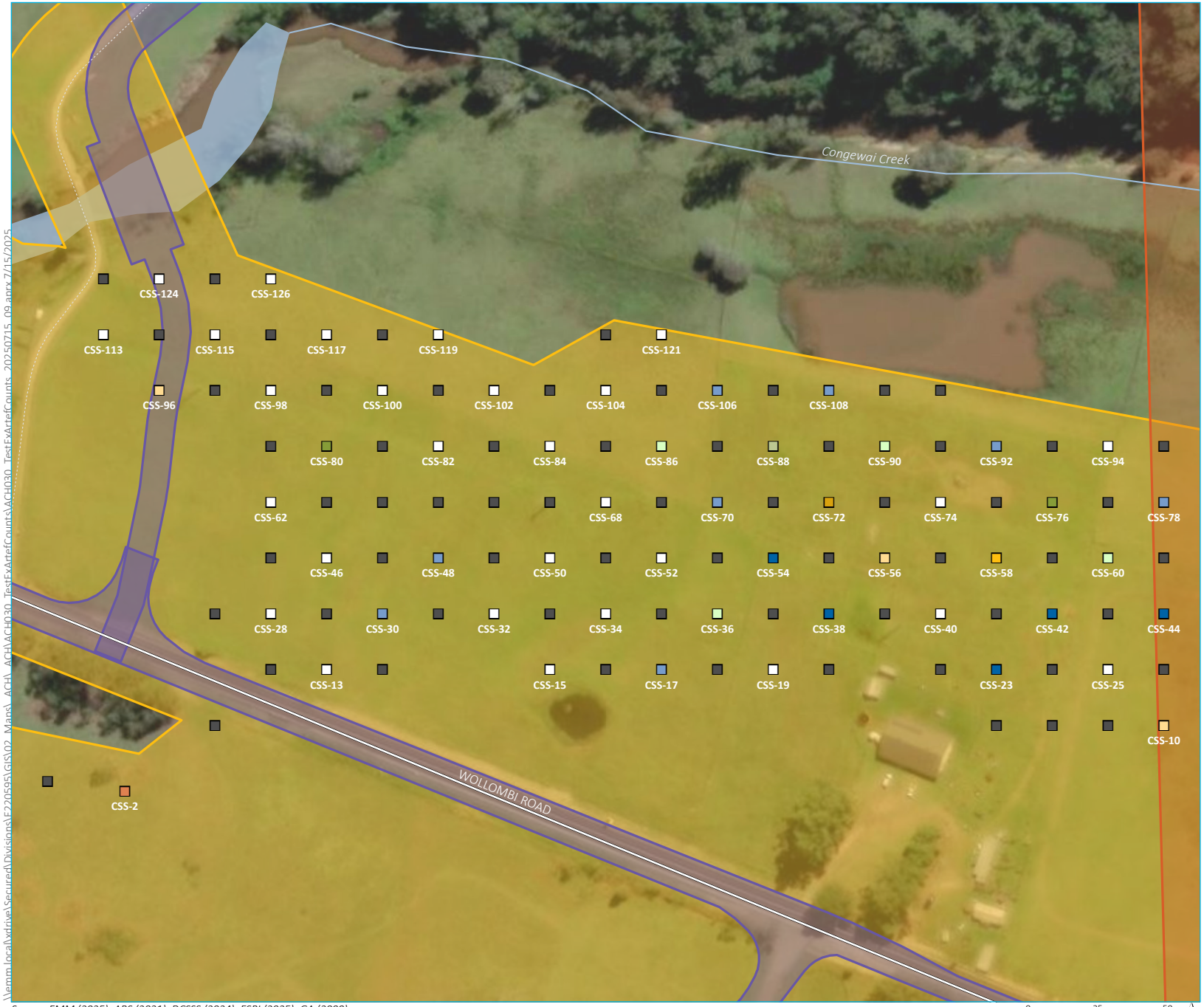
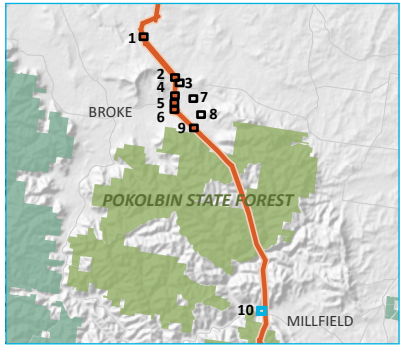
Test excavation results
Map 9 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities





KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 19

Project impact area

- HTP corridor
- Construction support site
- Access track

Existing environment

- Major road
- Vehicular track
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Test excavation results
Map 10 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.8

EMM
creating opportunities

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m
GDA2020 MGA Zone 56
N

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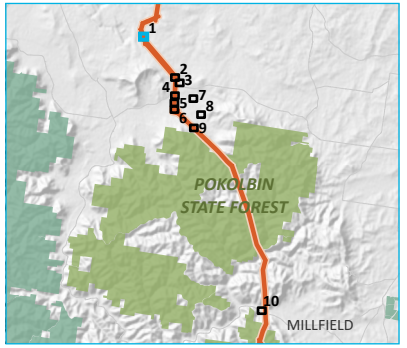

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0
- 4

Project impact area

- HTP corridor
- Access track

Existing environment

- Named watercourse

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

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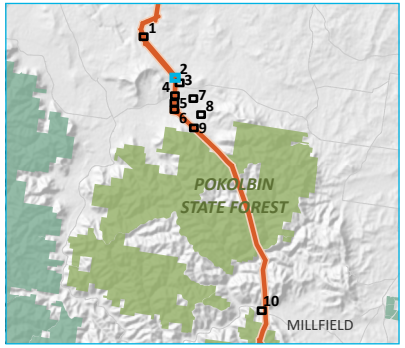
Test excavation results per m²
Map 1 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

EMM
creating opportunities



KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0

Project impact area

- HTP corridor
- Access track

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

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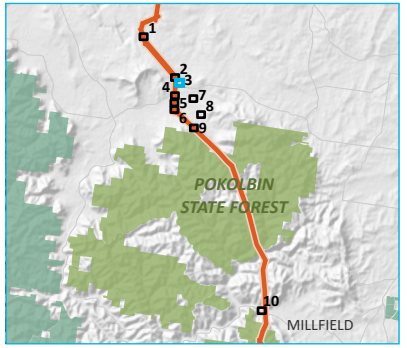
Test excavation results per m²
Map 2 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

EMM
creating opportunities



KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

Test excavation results per m²
Map 3 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

EMM
creating opportunities

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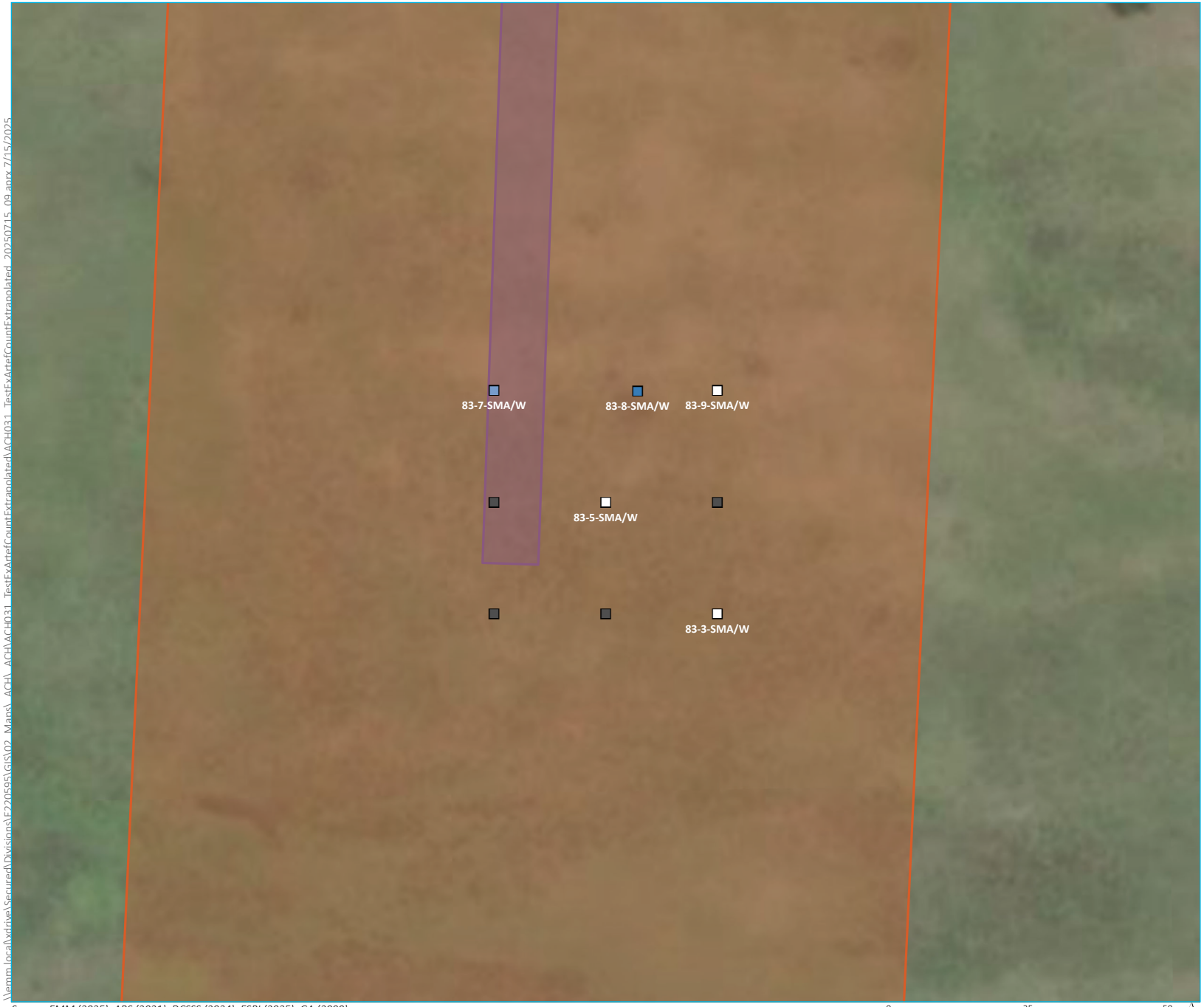

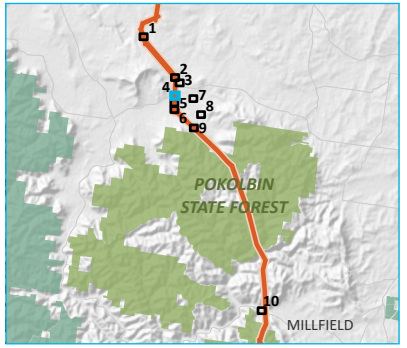

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0
- 4
- 5

Project impact area

- HTP corridor
- Access track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Test excavation results per m²
Map 4 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

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creating opportunities

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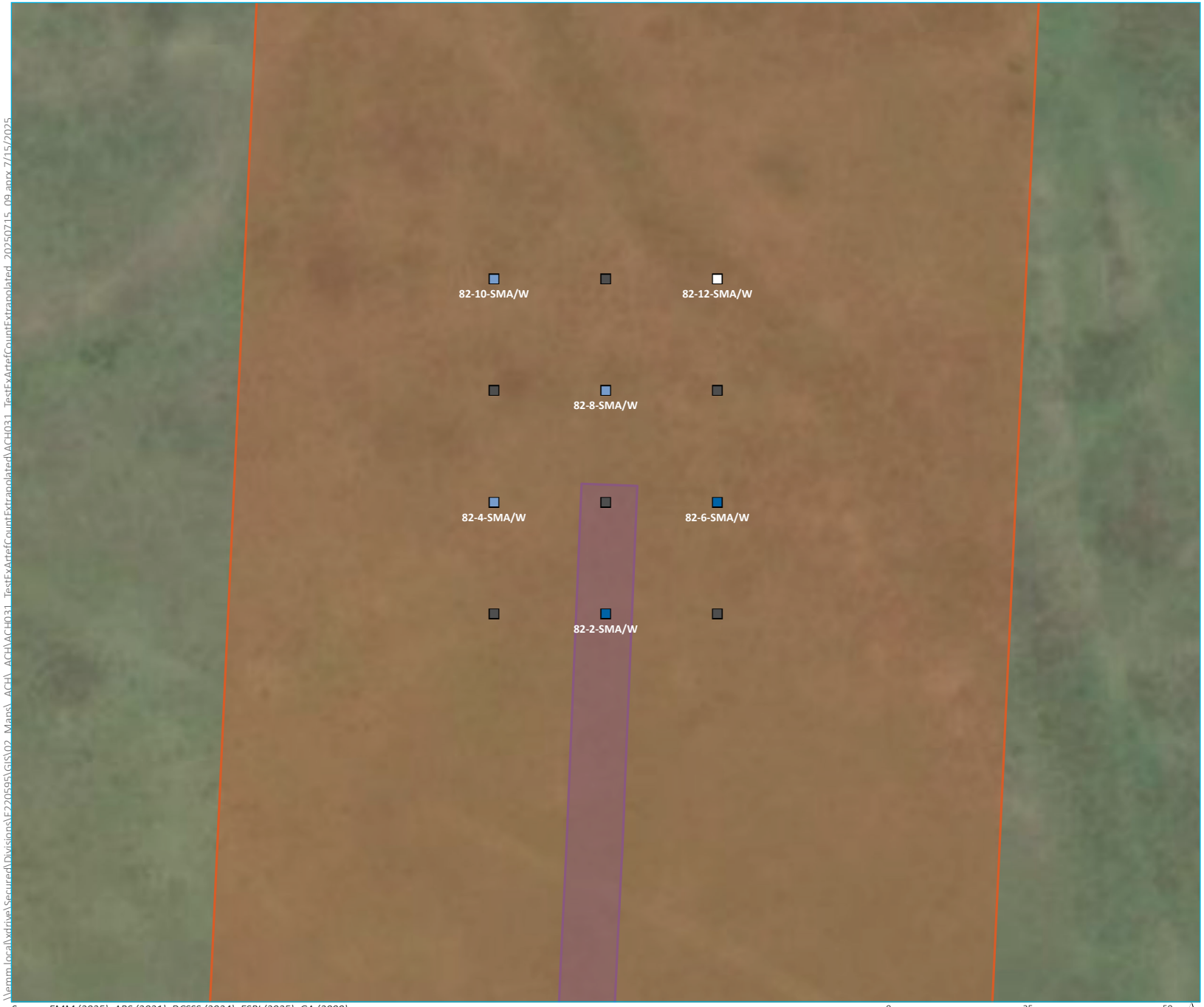

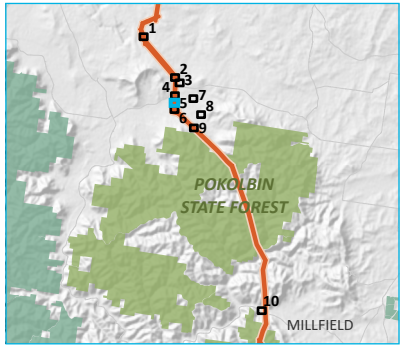

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0
- 4
- 8

Project impact area

- HTP corridor
- Access track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

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GDA2020 MGA Zone 56

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Test excavation results per m²

Map 5 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

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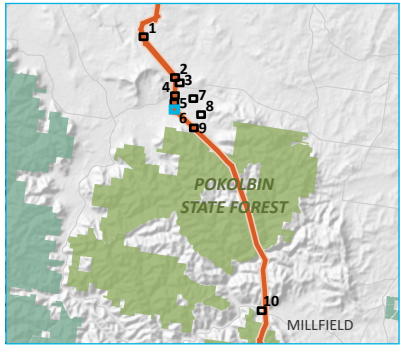

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0

Project impact area

- HTP corridor
- Access track

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

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Test excavation results per m²
Map 6 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

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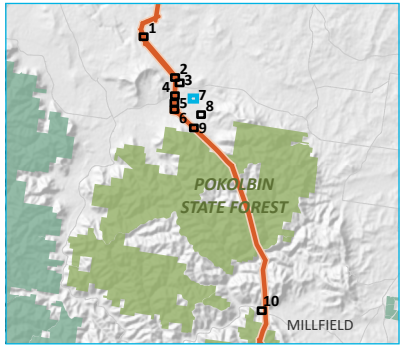

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0
- 21
- 63

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

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Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

Test excavation results per m²
Map 7 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

EMM
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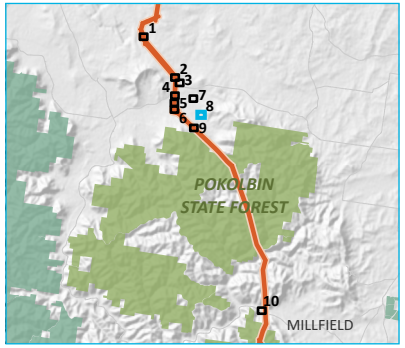

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0

Existing environment

- Minor road
- Named watercourse

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

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Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

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GDA2020 MGA Zone 56

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Test excavation results per m²
Map 8 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

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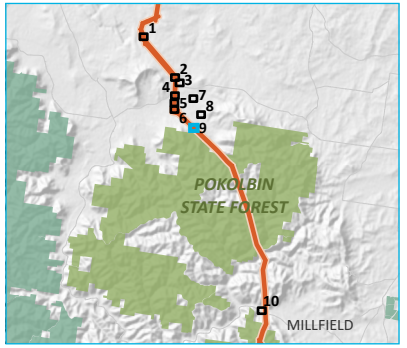

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0
- 4

Project impact area

- HTP corridor
- Access track

Existing environment

- Vehicular track

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Test excavation results per m²
Map 9 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

EMM
creating opportunities

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

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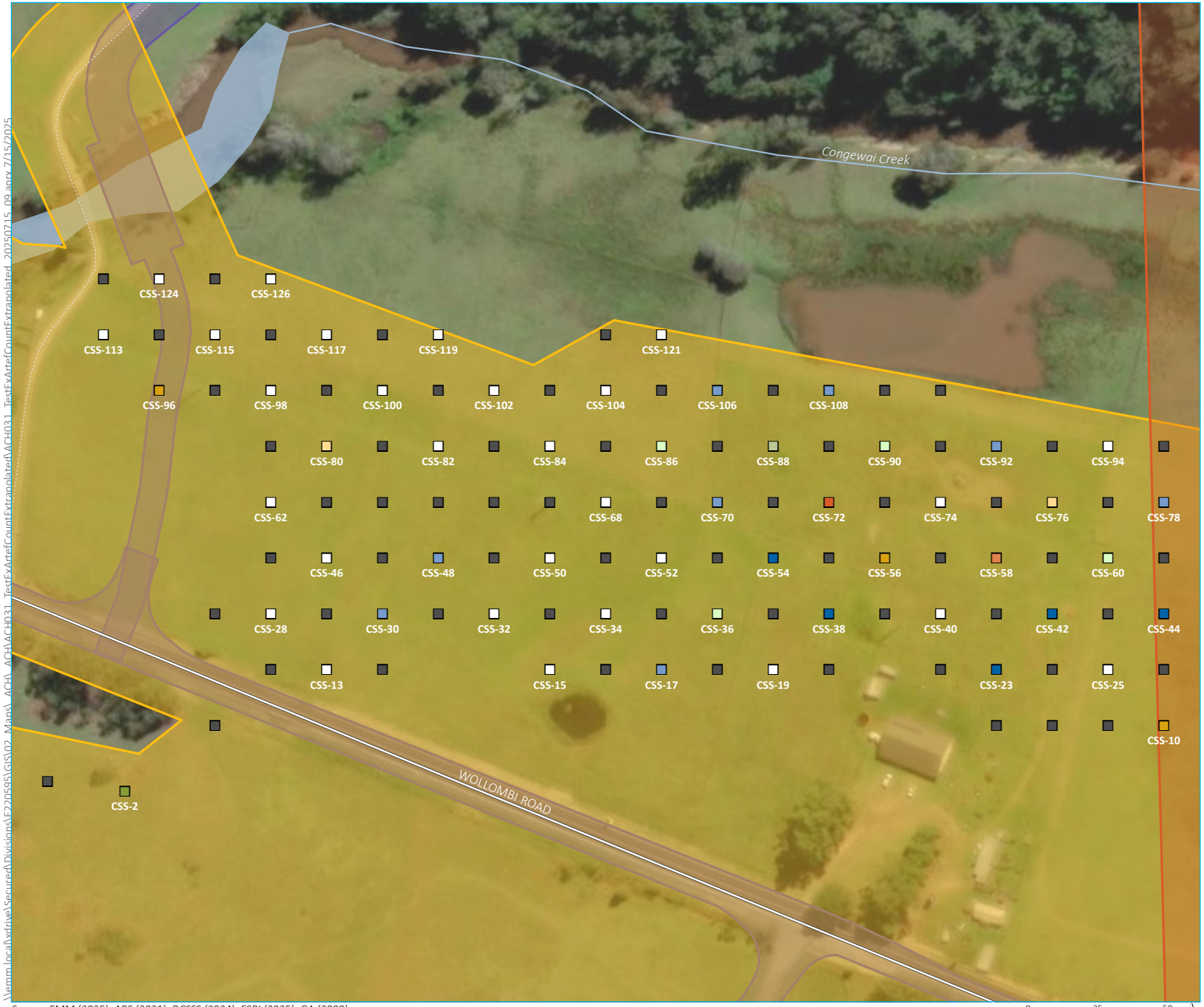

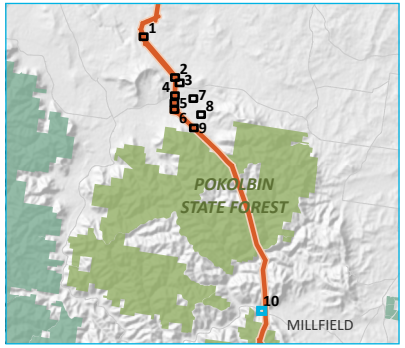

KEY

- Proposed test pit (not excavated)

Excavated test pit- artefact count per m²

- 0
- 4
- 8
- 12
- 16
- 19
- 20
- 24
- 28
- 32

Project impact area

- HTP corridor
- Construction support site
- Access track

Existing environment

- Major road
- Vehicular track
- Named watercourse
- Named waterbody

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 25 50 m

GDA2020 MGA Zone 56

N

Test excavation results per m²

Map 10 of 10

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 9.9

EMM
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10 The archaeological assemblage of the project impact area

10.1 Summary of this chapter

As outlined in preceding sections, there have been numerous assessments encompassing the Hunter Transmission Project (HTP, the project) impact area, as well as different phases of field investigation for the project. As a result, there is a need to ratify the site listings to develop an overall archaeological assemblage or resource for the project. This chapter presents a summary of the preceding sections, to outline the archaeological resource of the project impact area, to allow for nuanced assessment of proposed impacts to this resource and outline management and mitigation measures proposed to avoid or offset these impacts. In summary:

- The assessment included archaeological field survey and test excavations to explore and document the Aboriginal objects, sites and places within the project impact area, and to align them within the regional context. Overall, the findings have found the project to be situated within a rich cultural landscape with evidence of extensive but disparate past human activity along the project impact area, notably in the vicinity of Parnells Creek, Doctor Creek, Loder Creek, Sandy Hollow Creek, Monkey Place Creek and the Hunter River in HTP North, in the vicinity of Broken Back Trail, Jacobs Road, Crumps/Trig Road, and Langans Road in HTP Central, and Walkers Forest Ridge Road, Watagan Forest Road and Martinsville Hill Road in HTP South. In HTP North, cultural materials were dominated by various surface and shallowly buried stone artefacts, while in HTP Central and HTP South rockshelters, grinding grooves and culturally modified trees were more prevalent.

- The cultural values mapping study for the project identified a rich, complex and ceremonial landscape within which the project is proposed to be situated. A total of 32 discrete places of archaeological, traditional, historical and/or contemporary value to the local Aboriginal community were identified across the general region. These highlighted the importance of major promontories and several water sources in the region, as well as focusing on a number of archaeological sites either known and/or identified through the field program.

- Previous investigations across the region and the multiple activities for the project identified a large number of Aboriginal and cultural sites and places within or near the project. This section of the report undertakes a ratification process applying administrative (e.g. removal of destroyed recordings, removal of duplicate recordings, etc.) and analytical (e.g. aggregation of closely located site recordings, further consideration of field activity findings, and amalgamation of isolated stone artefacts and low-density artefact scatters into a broader background scatter) methods to provide an overall archaeological resource for the project to manage and where necessary mitigate. This ratification reveals that 32 Aboriginal and cultural sites and places are within the project impact area. These include high and moderate artefact scatters (n=10), subsurface cultural deposits (n=3), rockshelters (n=5), grinding grooves (n=3), stone arrangements (n=1), culturally modified trees (n=1), cultural places (including resource and gathering places) (n=6), and a background scatter (n=3). Across these values is the amalgamation of several hundred discrete site recordings of isolated Aboriginal objects and low-density artefact scatters (<20 per square metre) into a broader low density background scatter known to extend across the region.

- In addition to discrete Aboriginal sites and places, a number of broader cultural landscapes were identified. These include the Warkworth sand system – a geological unit known to contain significant cultural materials and found in HTP North; view-lines and view-scapes between major promontories in HTP Central and South; and a series of localised cultural landscapes encompassing clusters of significant archaeological sites in the vicinity of Trig Road, Flat Rock lookout, Abbot Falls and the Dora Pinnacles. The project bisects and/or is in close proximity to several of these, notably through Corrabare and Watagan State forests.

- An extensive program of ground-truthing was undertaken as part of this assessment, including archaeological field survey and test excavations of the project impact area. Survey covered around 662 kilometres and identified 195 sites, primarily located in HTP North and HTP Central. In many instances, survey findings validated, corrected and often expanded on previous site listings.

10.2 Results and synthesis

10.2.1 Previous studies and investigations

In HTP North, past studies have focussed on cultural heritage management and compliance activities associated with coal mining developments. In most cases within the project impact area, these largely began in the 1980s and 1990s as baseline investigations prior to establishment of mining, and then subsequently through expansion and modification activities in more recent decades. Of note was the investigations by Phil Hughes and Peter Hiscock of the Hunter Valley Operations, which identified a number of important Aboriginal sites, including CM-CD1 (#37-2-1877), Malabar Burnham Wood Site I (#37-6-0166) and Hunter Valley 1: Maryville Malabar Site N (#37-5-0063). These all consisted of deep colluvial and/or alluvial deposits, known as the Warkworth sand system, in which stratified, or potentially stratified cultural materials were observed; and, with the exception of CM-CD1, have now been destroyed.

Subsequent investigations have continued to demonstrate the importance of the Warkworth sand system as a cultural deposit. Notably an expansion of the Mount Thorley Warkworth mining complex prompted the large-scale excavation of a portion of the deposit in 2009 (Scarp Archaeology 2009), located at W14 Sandsheet (#37-6-0946) situated south of Wollombi Brook. These are some of the most comprehensive investigations of the deposit and show that cultural materials were typically found in the upper 1.3 metres, and reflect intermittent, but repeat activity over the last 14,000 years. Similar ages were recently demonstrated for CM-CD1 as part of the Hunter Valley Operations mining complex Continuation project assessment (EMM 2023).

However, to date, no comprehensive analysis of the distribution of the Warkworth sand system, nor the distribution of cultural materials within it, has been undertaken, and this limits the certainty of its distribution in the landscape. As part of the Hunter Valley Operations mining complex continuation project, further attempts to explore the deposit were undertaken, including archaeological excavations identifying an additional portion of the deposit near the confluence of Hunter River and Bowmans Creek (HVOCP TR213-AS1; #37-3-1626), and undertaking a specific geomorphological study of the locale (Fluvial Systems Pty Ltd 2023). The latter highlights a number of disparate locations running along the banks of the Wollombi Brook, in the vicinity of Archerfield Road, and notably west of Mount Thorley Warkworth mining complex. Most recently, AECOM undertook archaeological salvage of several sand bodies south of Singleton (Andrew McLaren pers comm), and which may suggest a more widespread occurrence of these deposits.

While the Warkworth sand system has formed a focus of investigations over recent decades, and is widely considered a regionally significant cultural deposit, a range of cultural materials have been encountered across the locale. These are dominated by various densities of stone artefacts typically found on or near the current land surface. More disparately, grinding grooves and culturally modified trees are also documented, both limited by environmental constraints (e.g. the presence of sandstone platforms) and survivability (e.g. impacts from vegetation clearing). Indeed, culturally modified trees are often considered highly significant in the Hunter Valley due to the extensive loss of such a site type over the last 230 or so years.

This pattern of cultural materials continues southwards, with numerous studies showing comparable site types along the Hunter River and into the Broke area. Of note has been numerous and repeated excavations along the banks of Loder Creek that has been shown as a focus of activity in the past. This most notably has included the survey, test and salvage excavations by Margrit Koettig in the early 1990s (now within the Bulga coal mine open cut), and which recovered several thousand stone artefacts probably dated to the last few thousand years. Koettig's (1991) model suggested a continuous cultural deposit is present 50 metres from the top of the bank, with disparate materials found up to 120 metres away. Unfortunately, the understanding of the Singleton Military Area is more constrained with information on the site being typically confidential. Access to recent studies by Umwelt (2023c) have indicated a transitional landscape, with stone artefactual material still common, but increasing evidence of grinding grooves and other rockshelters as the terrain changes in the south of the Singleton Military Area.

As part of a review of the Hunter Valley Operations mining complex continuation project, EMM (2023) concluded that stone cultural materials in low densities should be expected near continuously across the landscape, but that significant Aboriginal sites would typically be comprised of high densities of stone artefacts (n=>30 per square metre), cultural materials stratified in aeolian/colluvial units, and/or culturally modified trees. The Hunter Valley Operations project area did not include any grinding grooves, but the careful relocation and conservation of Loder Creek Axe Grinding Grooves (#37-6-0148) as recently as 2019 indicates that such sites are similarly of significance.

When considering HTP Central and HTP South, the level of investigation has been significantly less than in HTP North. These locales are dominated by State forests and National parks, which have not required extensive assessments or archaeological excavations. However, through opportunistic activities including bush-walking and amateur clubs, as well as some efforts relating to the forestry activities, an extensive record of cultural materials has been documented. These records are dominated by rockshelters usually with art and/or engravings. A review of the 36 closest rockshelters to the project (see *section 8.4.1* and Appendix E.8) indicate that they are frequently in elevated positions on steep upper slopes or ridgelines, which may reflect both the practicality of avoiding low-lying flash flood prone gorge country and offer important view-lines towards major culturally significant promontories, such as Mount Yengo. Notable sites are considered those that contain significant numbers of ochre and charcoal motifs, often of animals and/or hand stencils, such as Corrabare A (#37-6-0604), DEEP CK MOTHER SWA (#37-6-3714) and Warrawolong SFA (#45-3-3059). There is limited broader spatial patterning of these sites with them found disparately across the region. However, there does appear several concentrations, notably in the vicinity of Roberts Road and Langans Road.

A review of the Aboriginal Heritage Information Management System (AHIMS) database indicates that there are some 571 previously documented sites are within (n=132) and/or within 200 metres (n=439) of the project impact area (see *section 8.3*). Of these, 112 have been destroyed by authorised impacts. Some 91% of these are found within HTP North and are predominantly low densities of stone artefacts or isolated Aboriginal objects. Within HTP Central and HTP South, some 47 sites are recorded within and/or within 200 metres of the project impact area. Here, values are dominated by low density stone artefacts, totalling 22% (n=10) of this assemblage. However, increasing numbers of rockshelters (n=10) and grinding grooves (n=10) are present in equal portions in this part of the project impact area (i.e. comprising ~44% of all sites in this subset).

When considering the project impact area, some 132 sites have been previously documented. Of these, 18 have previously been destroyed or de-classified, resulting in 114 extant sites within the project impact area.[8] These include several significant sites, including:

- a rockshelter with over 140 art motifs (DEEP CK MOTHER SWA; #37-6-3714) located [redacted]

[8] This reduction in number includes the removal of a previously documented culturally modified tree (CORROBARE STATE FOREST CABANS RD; #37-6-2779) located near Cabans Road in the Corrabare State Forest. This site was declassified as a cultural site as part of the fieldwork activities undertaken for this project (see Appendix F.6), and the site card was updated as part of this assessment.

- an Aboriginal ceremonial and resource site (Watagan Creek ACD; #45-3-4623) encompassing [redacted] and recorded as part of a broader cultural values study by the Cessnock City Council. The details of the site are limited and reflect the importance of the creek for visitation and resources. While the location of the site is outside of the project impact area, [redacted]
- a high-density artefact scatters (HVO-1258; #37-6-3376) located [redacted].

Of those extant sites within the project impact area, 107 are isolated Aboriginal objects or low-density artefact scatters. None of these sites would meet the threshold as an area of past foci or significance based on the criteria outlined above, namely the presence of the Warkworth sand system or high densities of stone artefacts (20 per square metre).[9] As such, all these discrete site recordings have been amalgamated into a single background scatter listing in *section 10.2.4* for the purpose of this report, and are proposed to be managed as part of a broad discontinuous low density of stone artefacts that is found across the project impact area.

10.2.2 On-site investigations and validation

An extensive program of ground-truthing was undertaken as part of this assessment, including archaeological field survey and test excavations of the project impact area. The aim of these works was to both validate the regional models specific to the project impact area and identify any previously undocumented cultural sites, places and/or material. The investigations included revisiting and validating previously documented sites within the project impact area (see *section 9.2* and *section 10.2.1*).

Overall, around 643 kilometres of field survey was undertaken across and beyond the project impact area. These ultimately identified some 195 discrete site recordings, including rockshelters, culturally modified trees, grinding grooves, resource and gathering places, and various densities of stone artefactual material. This value includes validation of 39 previously documented sites that are also included in the values in *section 10.2.1*. A further 82 previously documented sites were inspected but could not be relocated, and in most instances are assumed destroyed.

Spatially, these sites were primarily found in HTP North (n=118) and HTP Central (n=61), with fewer noted in HTP South (n=16). Site types align closely with regional models, with all of the site recordings in HTP North reflecting stone artefactual material. Within HTP Central, a large number of the observations were of rockshelters (n=35), and culturally modified trees (n=15). Similarly in HTP South, some 12 of the 16 sites were identified as potential rockshelters. There was also greater variation of site types in these latter areas, including resource and gathering, and grinding groove sites being documented.

Cultural materials were found across the project impact area, although there are some apparent concentrations near:

- Parnells Creek, south of Wollombi Brook in HTP North
- Doctors Creek, a tributary of Loder Creek near Bulga mining complex in HTP North
- in the vicinity of Broken Back Trail, Jacobs Road, Crumps/Trig Road, and Langans Road in HTP Central
- Watagan Creek Road in HTP South.

[9] While EMM (2023) who undertook a similar review to that presented here opted for a threshold of 30 per square metre, here a more conservative value of 20 per square metre is selected to account since the project extends through a range of environments that differ from the Hunter Valley Operations mining complex, which formed the focus of that study.

In many instances, the findings of the survey both validated, corrected and often expanded on previous site listings. For example, #45-3-2456, was documented as an extensive grinding groove site, but was spatially ~150 metres south of its documented position, and additional grinding grooves were observed. (This site is no longer in the project impact area following subsequent refinement). A number of newly identified sites were also encountered, the most significant of which was a series of previously undocumented stone arrangements, including HTP-C-SA01, HTP-C-SA02 and HTP-C-SA04 in the vicinity of Trig Road, and which the project has also been re-designed to avoid (see Section 12.2). In HTP North, HTP-N-AS30, consisting of over 300 artefacts on a tributary of Loder Creek, was observed.

Similarly to the previously documented sites, a significant number of the site recordings reflect low density stone artefact scatters and/or isolated Aboriginal objects. Here too, these fail to meet thresholds and have been amalgamated into the broader background scatter considered to extend disparately across the project impact area (see *section 10.2.4*).

In addition, further review and/or specialist studies have been undertaken of sites identified as of tentative classification in the field investigations, namely rockshelters and culturally modified trees. In the case of the former, there are significant numbers of the sites that contain no evidence of past use. As outlined in *section 8.4.1*, the presence of art and/or engravings is typically a pre-requisite to identifying such sites as having been used in the past. Of the 46 'rockshelters' identified through the field survey within the project impact area, only HTP-C-RS02, HTP-C-RS16, HTP-S-RS19 and HTP-S-RS20 meet the criteria outlined in *section 8.4.1*, and the remaining have been de-classified as natural features (see *section 10.2.4*; Appendices F.4 and G.1). While these sites may have been used in the past, there is no evidence or even ability, due to lack of testable deposit, to undertake investigations to robustly determine this. In relation to culturally modified trees, they are all found in existing State forests that have been historically logged in most instances. The potential for both natural phenomena and post-Contact activities resulting in the observed scars is considered high. As, such an arboriculturist revisited each of the identified sites with Aboriginal participants and undertook further consideration of their formation. Of the 19 culturally modified trees (16 of which are in the project impact area), only 1 (HTP-C-CMT05) was ultimately concluded to be of cultural origin.

In the case of test excavations, only a small number were achieved, focussing on Congewai Creek and the Singleton Military Area, as agreed upon in consultation with Heritage NSW (see *section 9.3.1i*). Importantly, the activities in the latter identified possible areas of the Warkworth sand system deposited up to 14,000 years ago, and which has in part been avoided through refinement (see *section 12.2*). Overall, these investigations identified three discrete locales where high densities of buried stone artefactual material were encountered, with the remaining test pits indicative of the broader background scatter. These sites reflect fairly small discrete camping episodes in the past on the southern bank of Congewai Creek and consisted of stone artefacts in the upper 50 centimetres of the soil profile; and deposited in the last few thousand years. For management purposes, they have been divided into three discrete sites, typically 0.12 to 0.6 hectares in size, and labelled as TPCSS-10 (HTP-C-FA01), TPCSS-72, TPCSS-58 and TPCSS-56 (HTP-C-FA02), and TPCSS-96 (HTP-C-FA03).

10.2.3 Summary of cultural values and ethnographic data

In the case of cultural or intangible values, an extensive study with Elders and knowledge-holders was undertaken as part of this project. The summary of the findings relevant to this assessment is presented in *Chapter 7 (Cultural values mapping*), and the full report is provided in *Appendix D (Supplementary cultural values information)*.

There were 3 main explorations of these values: a study undertaken as part of the Hunter Valley Operations mining complex continuation project (see *section 7.2*), an early exploration of the project (see *section 7.3.1*), and a more detailed investigation lead by an anthropologist (see *section 7.3.2*). All of these studies have strong overlap, with additional sites being documented and/or highlighted through the archaeological program (see *Chapter 9 (Field investigations)*).

A study by Tocomwall (see *section 7.2*) was also undertaken and highlighted many of the same places, with only limited references to a gold ochre quarry in the vicinity of Loder Creek being not noted elsewhere. The spatial location of this site cannot be robustly determined, but suggests it is in close proximity to Loder Creek near the Mount Thorley Warkworth mining complex rail loader, and which is at least 200 metres from the project impact area.

Some 32 places and values were identified as part of these investigations across the broader region (see *section 7.3.2ii*). These included:

- archaeological sites both known to the Aboriginal participants and/or identified during the field program, which was being undertaken concurrently at times with the cultural values mapping study
- traditional places associated with the Dreaming and/or ceremonial activities, such as the Wallaby Scrub Bora ground and Freeman's Waterhole
- historical and contemporary places important to the current Aboriginal community, including the Ravensworth Homestead Estate complex, Flat Rock cultural landscape, a specific culturally modified tree (HTP-C-CMT05), Laguna Ceremony ground, and the Trig Road cultural landscape.

While a significant number of important places and values were articulated across the broader region, many are a substantive distance from the project impact area and unlikely to be adversely impacted. These include the Wallaby Scrub Bora ground, a highly significant place to the Wonnarua people, but located several kilometres away from the project. Lizard Rock and associated values are also outside the influence of the project based on discussions with the Wonnarua traditional owners at the site itself in early 2024 (see *section 7.3.1*). Similar discussions and conclusions were reached in relation to the nearby Three Warriors site (HTP-N-CVM04). The Ravensworth Homestead Estate complex is also discounted since, while some ancillary activities for the project (road intersection upgrade works) are within a buffer boundary created for a now rejected application under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, the location of the complex itself is some distance from the project impact area.

When considering those sites and places within or near the project impact area, the following remain relevant:

- HTP North
  - Hunter River crossings (HTP-N-CVM01) – a general reference to the potential for ancestral remains to occur in the vicinity of the Hunter River. The project crosses the river in three locations, all within the Hunter Valley Operations site.
- HTP Central
  - Flat Rock cultural landscape (HTP-C-CP01) – the natural landscape surrounding a number of closely spaced and significant archaeological sites, primarily rockshelters, and areas of good vantage. None of the archaeological sites are within the project impact area, but the project impact area would bisect the cultural landscape which is substantively larger than the discrete sites.
  - HTP-C-AR01 – a patch of established grass trees likely identified as an analogy for the broader traditional and contemporary resources within the State forests.
  - HTP-C-AR02– a patch of native hibiscus likely identified as an analogy for the broader traditional and contemporary resources within the State forests.

- HTP-C-CMT05 – a traditional boundary marker identified as a ring tree, near Congewai Creek. A site identified by the contemporary Aboriginal community, where there is limited corroborating evidence of such site types in the historical and local record. The tree has however been validated as having been scarred by Aboriginal people in the past (see Appendix F.6)

- HTP-C-CVM08 – [redacted]

- Trig Road cultural landscape – the natural landscape surrounding a number of closely spaced and significant archaeological sites, including rockshelters and grinding grooves. None of the archaeological sites are within the project impact area, but the project impact area would bisect the cultural landscape which is substantively larger than the discrete sites.

- Watagan Creek ACD (#45-3-4623) – the identification of Watagan Creek as a probable resource and gathering region for the local Aboriginal community in the past, documented in an unrelated study for the Cessnock local government area. Limited details provided in the AHIMS database and not raised as part of the cultural values for this project. The specific location documented is outside the project impact area, but indicates the entire creek should be considered, and hence its inclusion.

- View-lines and view-scapes – a series of important view-lines between major promontories of the region, including Mount Yengo, Mount Sugarloaf, Mount Warrawalong and others. While the exact value of these view-lines and/or view-scapes is poorly understood, despite extensive consultation, it is concluded that there is a perception of impact to some of these by the Aboriginal community (see *section 7.3.3*).

• HTP South

- Dora Creek – a culturally significant creekline in HTP South. The project largely avoids the creekline, but ancillary activities will result in impacts in the vicinity of Alton Road and Freemans Drive.

- Dora Pinnacles – a series of distinctive rock outcrops and surrounding archaeological sites adjacent to Watagan Road. The site features are outside, but within 200 metres, of the project impact area.

- Wishing well (HTP-S-CS01) – a modern day wishing well that may have been situated over a historical natural spring used by Aboriginal people in the past, and on a sharp bend on Martinsville Hill Road.

10.2.4 Summary and ratification of Aboriginal sites and places

As outlined in preceding sections, there have been numerous assessments encompassing the project impact area, as well as different phases of field investigation for the project. As a result, there is a need to ratify the site listings to develop an overall archaeological assemblage or resource for the project. Ratification of the cultural assemblage outlined below has been undertaken using the following tools and approaches:

• Administrative issues, including:

- removal of destroyed sites, which while important in understanding the regional cultural record and cumulative impacts, are not needed for inclusion in the subsequent management of the project

- removal of duplicate recordings that have been identified either through previous assessments visiting and re-recording the same sites and places, and/or by the field program where the same situation has occurred. This is most evident in the cultural values mapping study, which identified sites already documented as part of the archaeological program and hence resulted in 2 names for the same place

- removal of sites that are outside the project impact area. The project was subject to ongoing refinement and was modified throughout the Aboriginal cultural heritage assessment (ACHA) process and as such some parts of the earlier project impact area are now a significant distance from the current designs. These sites have been documented in the AHIMS database but are no longer included in the report being outside potential direct and indirect impact zones of the project.

- Analytical issues, including:

  - consolidation of discrete site recordings that reflect the same archaeological site or place, but have been recorded separately, resulting in multiple listings. This typically focussed on stone artefactual material where lots of discrete recordings may reflect part of a larger site or complex but can include other sites

  - the removal of sites that were identified in the field investigations, but which through additional investigation and/or interpretation are considered to be non-cultural. For this project, this primarily relates to potential rockshelters that lack diagnostic features and/or culturally modified trees that were assessed by an arboriculturist

  - aggregation of isolated Aboriginal objects and low-density artefact scatters into a single recording to reflect the broader background scatter well-documented to be present across the project and environs, which enables more extensive and significant cultural material to be presented. Based on the findings of Hunter Valley Operations mining complex continuation project and the average number of artefacts encountered on the sites during the field program undertaken for this project, the value of 20 artefacts per square metre has been adopted as a threshold indicative of more extensive and/or significant sites. This is a slightly more conservative value than other projects (including the Hunter Valley Operations mining complex continuation project) to account for the changing environments along the project.

Appendix G.1 provides a list of *all* discrete site listings identified through the desktop information (see *Chapter 8 (Archaeological context)*), cultural values studies (see *Chapter 7 (Cultural values mapping)*), and field investigations (see *Chapter 9 (Field investigations)*) within the project impact area (see Figure G.1 of *Appendix G (Summary of all site recordings and archaeological resource formulation*)). Explanations are provided in Appendix G.1 as to whether a site is included or excluded from the eventual archaeological resource produced here. Table 10.1 and Figure 10.1 presents the cultural assemblage of the project once ratification of these individual site recordings has been undertaken in accordance with the steps above.

Overall, this demonstrates that 32 Aboriginal sites and/or places are within the project impact area, and includes:

- ten moderate or high-density surface artefact scatters – HVO-1258 (#37-6-3376), HVOCP TR47-AS3 (#37-2-6514), BOP-OS8 (#37-6-2842), HVO-1267 (#37-6-3384), 2010-HVOSE-15 (#37-6-4023), HTP-N-AS01 (#37-2-6667), HTP-N- AS15 (#37-2-6666), HTP-N-AS30 (#37-6-4488), HTP-N-AS32 (#37-6-4487), and HTP-N-AS71 (#37-2-6665), all within HTP North

- three subsurface stone artefact deposits associated with Congewai Creek – HTP-C-FA01 (#37-6-4490), HTP-C-FA02 (#37-6-4489), and HTP-C-FA03 (#37-6-4491) in HTP Central

- three grinding groove sites –HTP-C-GG03 (#37-6-4484), and HTP-C-GG05 (#45-3-5006) in HTP Central, and HTP-S-GG01 (#45-3-5005) in HTP South
- five rockshelters – DEEP CK MOTHER SWA (#37-6-3714), HTP-C-RS02 (#37-6-4492) in HTP Central, and HTP-S-RS16 (#45-3-5007), HTP-S-RS19 (#45-3-5008), and HTP-S-RS20 (#45-3-5004) in HTP South
- six cultural places and/or resource and gathering sites – Hunter crossings (HTP-N-CVM01 [#37-6-4493]) in HTP North; Watagan Creek ACD (#45-3-4623), HTP-C-AR01 (#37-6-4486), HTP-C-AR02 (#37-6-4485), Flat Rock lookout (HTP-C-CP01 [#45-3-5003]) in HTP Central; and a wishing well (HTP-C-CS01 [#45-3-5009]) in HTP South
- one culturally modified tree –HTP-C-CMT05 (#37-6-4483) in HTP Central
- [redacted] – HTP-C-CVM08 (#45-3-5010) in HTP Central
- a broader background scatter of isolated Aboriginal objects and/or low-density artefact scatters (<20 per square metre) found disparately across the project (HTP-N-BS1 [#TBC]; HTP-C-BS1 [#TBC]; HTP-S-BS1 [#TBC]). This is presented as 3 discrete listings that cumulatively incorporate 191 previously documented and/or newly identified site recordings.

While not within the project impact area, it is also highlighted that several significant sites and places are within 10 metres of the project curtilage. These include 3 high or moderate density artefact scatters, 4 grinding grooves, 2 stone arrangements, 3 resource and gathering sites, and 2 culturally modified trees (see Figure 10.1). Further, Table G.2 includes the archaeological resource that extends immediately beyond the project impact area, and which includes 90 discrete sites and places, as well as a background scatter containing 289 discrete listings of isolated objects and/or low density stone artefact sites.

In addition to specific Aboriginal and/or cultural sites and places listed above, a number of broader landscape values are also within the project impact area. These include:

- Warkworth sand system – a geological deposit known to contain significant cultural materials and found in the general vicinity of Wollombi Brook. Investigations of the deposit were limited as part of this ACHA, but desktop information and field investigations suggest the deposit is likely to be present within the southern portions of the Hunter Valley Operations mining complex and along the Hunter River east of the Mount Thorley Warkworth mining complex. There is some evidence that the deposit may be more widespread in the region, with recent observations south of Singleton, and the findings of excavations within the Singleton Military Area.
- Cultural view-lines and view-scapes – a number of view-lines and/or view-scapes between major regional promontories are bisected by the project impact area. These are noticeably between Mount Yengo and Mount Sugarloaf and bisect the project impact area in the vicinity of Flat Rock but include a range of other vicinities and locations. There are differing views within the local Aboriginal community as to the specific value of these view-lines and/or view-scapes or the potential impact that the project would have upon them. However, it was generally concluded that the project may adversely affect the local Aboriginal community's ability to undertake cultural education (i.e. by blocking or obstructing the views across Country from the top of one or more of these promontories) and/or by impacting a 'connection' between Dreaming places.

- Dora Pinnacles, Dora Creek, Flat Rock and Trig Road cultural landscapes – where numerous significant archaeological sites were encountered, typically in the form of rockshelters with art motifs and stories and/or stone arrangements, also related to ceremonial activities. The local Aboriginal community have sought to encompass these sites within a localised 'cultural landscape', which is considered to retain natural resources, view-lines, view-scapes and other connections between the sites. These sites were identified during the project field investigations in the vicinity of Trig Road, Flat Rock lookout, across Dora Creek, and the Dora Pinnacles near Watagan Road, of which 2 (Flat Rock and Trig Road cultural landscapes) extend into the project impact area.

Table 10.1 Sites which comprise the archaeological resource of the project impact area

Site ID	AHIMS ID	Site type	Number of stone artefacts (where available)	Status	Notes
HTP North					
HVOCP TR47-AS3	37-2-6514	High density artefact scatter (>50)	>40	Valid	A high-density artefact scatter comprising >40 mudstone and silcrete flakes and core fragments in [redacted]. Artefacts are highly likely to extend beyond areas of exposure but could not be identified due to poor visibility. Areas surrounding [redacted] identified as retaining subsurface archaeological potential and subject to test excavation. Test excavations by EMM (2023) confirmed moderate density of subsurface deposits, which declines with increasing distance from [redacted]. Artefact density of 9.2/m^2 were encountered. Could not be relocated as part of the field investigations.
BOP-OS8	37-6-2842	Moderate density artefact scatter (21–50)	23	Valid	A stone artefact scatter comprising more than 20 artefacts of various materials including silcrete, IMT and dark volcanic materials. The site is located [redacted]
HVO-1258	37-6-3376	High density artefact scatter (>50)	55	Valid	A high-density artefact scatter (n=55) comprising 30 mudstone flakes and 25 silcrete flakes situated on a plain [redacted]. Could not be relocated as part of the field investigations.
HVO-1267	37-6-3384	Moderate density artefact scatter (21–50)	23	Valid	A stone artefact scatter comprising 40 mudstone flakes and 5 silcrete flakes along [redacted] The site is considered to contain sub-surface cultural material.
2010-HVOSE-15	37-6-4023	High density artefact scatter (>50)	65	Valid	Sixty-five artefacts comprising 26 mudstone flakes, and 38 silcrete flakes including 1 with retouch and 1 fine-grained volcanic flake located in [redacted]
HTP-N-AS01	37-2-6667	High density artefact scatter (>50)	57	Valid	Fifty-seven artefacts scattered across an area approximately 500 m x 200 m on gently inclined footslope [redacted]. Artefacts have been exposed by sheet wash erosion, vehicle and animal tracks.

Site ID	AHIMS ID	Site type	Number of stone artefacts (where available)	Status	Notes
HTP-N-AS15	37-2-6616/ 37-2-6666	High density artefact scatter (>50)	224	Valid	A large artefact scatter (n=224) covering an area measuring approximately 280 m x 250 m. Artefacts were identified on areas of exposure due to sheet wash and animal tracks across a very gently inclined hillslope. Artefact material predominantly mudstone and silcrete with very few artefacts displaying evidence of retouch. Nearest watercourses comprise a [redacted].
HTP-N-AS30	37-6-4488	High density artefact scatter (>50)	323	Valid	A very high-density artefact scatter (n=323) identified on large exposure (30 m x 40 m). The site is located [redacted]. Disturbance from the creation of a water management contour and from sheet wash processes.
HTP-N-AS32	37-6-4487	High density artefact scatter (>50), potential archaeological deposit	126	Valid	High density artefact scatter (n=126) with potential archaeological deposit, located [redacted] atop eroded wash. The soil profile comprises a brownish white sandy clay.
HTP-N-AS71	37-2-6665	Moderate density artefact scatter (21–50)	>30	Valid	This site is associated with AHIMS #37-2-2021. Approximately 30 artefacts identified on an embankment within a sheet wash exposure, [redacted]. This site may be associated with a quartz knapping site according to registered Aboriginal parties (RAPs) and notable basalt artefacts identified. Potential archaeological deposit (PAD) identified within the site (10 m x 5 m) with brown/orange sandy clay prevalent along the lake edge.
HTP-N-CVM01 (Hunter crossings)	37-6-4493	Cultural place	-	Valid	Areas where [redacted]. Consultations indicated that Aboriginal burials may be located in these areas.
HTP-N-BS1	See Note 1	Background scatter	-	Valid	A stone artefact background scatter that is predicted to occur intermittently across [redacted] within which disparate low to moderate artefact densities of ≤20/m^2 may be expected intermixed with culturally sterile zones.

Site ID	AHIMS ID	Site type	Number of stone artefacts (where available)	Status	Notes
HTP Central					
DEEP CK MOTHER SWA	37-6-3714	Rockshelter, art (pigment or engraved)	-	Valid	A large shelter [redacted]. At least 146 motifs were recorded and include white (n=26) and yellow (n=13) hand stencils, white (n=2) and yellow (n=1) boomerangs, 2 white axes, 1 snake, 4 lizards, 2 men, and 1 bird. A large number of tally marks were also noted in both white pigment and charcoal.
HTP-C-AR01	37-6-4486	Aboriginal resource and gathering	-	Valid	A patch of established grass trees likely identified as an analogy for the broader traditional and contemporary resources within the State forests.
HTP-C-AR02	37-6-4485	Aboriginal resource and gathering	-	Valid	A patch of native hibiscus likely identified as an analogy for the broader traditional and contemporary resources within the State forests.
HTP-C-CMT05	37-6-4483	Culturally modified tree	-	Valid	A traditional boundary marker identified as a ring tree, near [redacted]. A site identified by the contemporary Aboriginal community, where there is limited corroborating evidence of such site types in the historical and local record. The tree has however been validated as having been scarred by Aboriginal people in the past.
HTP-C-CP01 (Flat Rock lookout)	45-3-5003	Cultural place	-	Valid	A cultural place, identified by RAPs as "Flat Rock". The site is a wide, flat sandstone outcrop on a ridgeline with views across the valley to the east. [redacted].
HTP-C-CVM08	45-3-5010	[redacted]	-	Valid	[redacted]
HTP-C-GG03	37-6-4484	Grinding groove	-	Valid	Three grinding grooves on a sandstone platform [redacted]. Another grinding groove site, HTP-C-GG05, is located [redacted].
HTP-C-GG05	45-3-5006	Grinding groove	-	Valid	A single grinding groove on a sandstone platform [redacted]. This site is located [redacted] from HTP-C-GG03 and may be related.

Site ID	AHIMS ID	Site type	Number of stone artefacts (where available)	Status	Notes
HTP-C-RS02	37-6-4492	Rockshelter (no cultural markers)	-	Valid	A rockshelter with no art or deposits located [redacted]. The rockshelter is on a ridge with an east facing opening and is ~6 m long x 1.5 m high x 2 m deep.
HTP-C-FA01 (CSS-10)	37-6-4490	Subsurface cultural deposit	~32	Valid	An area of past foci containing high densities of sub-surface stone artefacts (approximately 0.32 ha) and located [redacted].
HTP-C-FA02(CSS-72, CSS-58 & CSS-56)	37-6-4489	Subsurface cultural deposit	~84	Valid	An area of past foci containing high densities of sub-surface stone artefacts (approximately 0.6 ha) and located [redacted].
HTP-C-FA03 (CSS-96)	37-6-4491	Subsurface cultural deposit	~24	Valid	An area of past foci containing high densities of sub-surface stone artefacts (approximately 0.12 ha) and located [redacted].
HTP-C-BS1	See Note 2	Background scatter	-	Valid	A stone artefact background scatter that is predicted to occur intermittently across [redacted] and extending beyond its limits within which disparate low to moderate artefact densities of ≤20/m^2 may be expected intermixed with culturally sterile zones.
HTP South					
Watagan Creek ACD	45-3-4623	Cultural place	-	Valid	Information on this site is limited. Recorded during the Cessnock local government area's Cultural Mapping Project, identified Watagan Creek as a cultural landscape with many known resources and gathering places. The specific site data presents this as more than [redacted], but the description indicates it reflects resources along the entirety of the creek, which bisects the project impact area.
HTP-S-CS01 (Wishing well)	45-3-5009	Cultural place	-	Valid	A historical and modern day wishing well near [redacted]. Participants suggested that the well may be the modification of an earlier spring used by Aboriginal people in the past.
HTP-S-GG01	45-3-5005	Grinding groove	-	Valid	Five grinding grooves on a sandstone boulder within a [redacted].
HTP-S-RS16	45-3-5007	Rockshelter (no cultural markers)	-	Valid	South facing sandstone overhang located [redacted]. The rockshelter measures 6 m wide x 3 m deep, with an estimated height of 2 m.

Site ID	AHIMS ID	Site type	Number of stone artefacts (where available)	Status	Notes
HTP-S-RS19	45-3-5008	Rockshelter (no cultural markers)	-	Valid	A north-east-facing sandstone overhang located [redacted]. The rockshelter measures 5 m wide x 2 m deep, with an estimated height of 2 m. Some shallow deposit (<30 cm) was observed and which may allow further validation of this site. The condition of the shelter is unstable and is cracked, on verge of collapse.
HTP-S-RS20	45-3-5004	Rockshelter (no cultural markers)	-	Valid	A north-east-facing sandstone overhang situated nearby to ridgeline with good views, [redacted]. Evidence of partial roof collapse and wind erosion. The rockshelter measures 4 m wide x 2 m deep, with an estimated height of 2 m. Some shallow deposit (<30 cm) was observed and which may allow further validation of this site.
HTP-S-BS1	See Note 3	Background scatter	-	Valid	A stone artefact background scatter that is predicted to occur [redacted] and extending beyond its limits within which disparate low to moderate artefact densities of ≤20/m^2 may be expected intermixed with culturally sterile zones

Notes: 1. HTP-N-BS1 within the project impact area incorporates: (isolated Aboriginal objects) #37-2-0815, #37-2-6496, #37-2-6498, #37-2-6501, #37-5-0568, #37-6-2833, #37-6-3040, #37-6-3080, #37-6-3097, #37-6-3100, #37-6-3160, #37-6-3346, #37-6-3352, #37-6-3353, #37-6-3354, #37-6-3357, #37-6-3358, #37-6-3359, #37-6-3373, #37-6-3473, #37-6-3478, #37-6-3479, #37-6-3480, #37-6-3481, #37-6-3482, #37-6-3487, #37-6-3491, #37-6-3492, #37-6-3493, #37-6-3494, #37-6-3496, #37-6-3498, #37-6-3499, #37-6-3500, #37-6-3501, #37-6-3503, #37-6-3504, #37-6-3506, #37-6-3507, #37-6-3510, #37-6-3516, #37-6-4049, #37-6-4069, #37-6-4070, #37-6-4071, #37-6-4080, #37-6-3116, #37-6-3157, #37-6-3158, #37-6-3159, #37-6-3161, #37-6-3162, #37-6-3505, #37-6-3509, HTP-N-IF01, HTP-N-IF02, HTP-N-IF03, HTP-N-IF04, HTP-N-IF05, HTP-N-IF06, HTP-N-IF08, HTP-N-IF11, HTP-N-IF14, HTP-N-IF15, HTP-N-IF16, HTP-N-IF17, HTP-N-IF19, HTP-N-IF21, HTP-N-IF22, HTP-N-IF23, HTP-N-IF26, HTP-N-IF31, HTP-N-IF32, HTP-N-IF33, HTP-N-IF34, HTP-N-IF35, HTP-N-IF#37, HTP-N-IF38, HTP-N-IF39, HTP-N-IF41, HTP-N-IF47, HTP-N-IF49, HTP-N-IF50, HTP-N-IF51, HTP-N-IF52, HTP-N-IF53, HTP-N-IF56, HTP-N-IF57, HTP-N-IF58, HTP-N-IF59, HTP-N-IF60, HTP-N-IF63, HTP-N-IF65, HTP-N-IF66, HTP-N-IF68, HTP-N-IF69, HTP-N-IF70, HTP-N-IF71; and (low density artefact scatters) #37-2-0501, #37-2-0549, #37-2-0810, #37-2-0817, #37-2-2796, #37-2-6282, #37-2-6285, #37-2-6495, #37-2-6497, #37-2-6502, #37-2-6503, #37-3-1614, #37-5-0946, #37-6-3038, #37-6-3039, #37-6-3156, #37-6-3344, #37-6-3345, #37-6-3347, #37-6-3348, #37-6-3349, #37-6-3350, #37-6-3351, #37-6-3374, #37-6-3375, #37-6-3378, #37-6-3379, #37-6-3380, #37-6-3383, #37-6-3474, #37-6-3477, #37-6-3484, #37-6-3485, #37-6-3486, #37-6-3488, #37-6-3514, #37-6-3515, #37-6-4035, #37-6-4038, #37-6-4042, #37-6-4043, #37-6-4068, #37-6-4073, #37-2-0814, #37-6-3005, #37-6-3163, #37-6-3502, #37-6-3508, HTP-N-AS03, HTP-N-AS06, HTP-N-AS08, HTP-N-AS17, HTP-N-AS20,HTP-N-AS24, HTP-N-AS26, HTP-N-AS27, HTP-N-AS31, HTP-N-AS37, HTP-N-AS38, HTP-N-AS45, HTP-N-AS47, HTP-N-AS50, HTP-N-AS51, HTP-N-AS56, HTP-N-AS57,HTP-N-AS59,HTP-N-AS60, HTP-N-AS61, HTP-N-AS62, HTP-N-AS63, HTP-N-AS64, HTP-N-AS66, HTP-N- AS67, HTP-N-AS69,HTP-N-AS72, HTP-N-AS73, HTP-N-AS74, HTP-N-AS75, HTP-N-AS76, HTP-N-AS02, HTP-N-AS05, HTP-N-AS33.

2. HTP-C-BS1 within the project impact area incorporates: (isolated Aboriginal objects) HTP-C-IF01, HTP-C-IF02, HTP-C-IF03; and (low density artefact scatters) #37-6-0724, #37-6-0725, HTP-C-AS02, HTP-C-AS55.

3. HTP-S-BS1 within the project impact area incorporates: (isolated Aboriginal objects) #45-3-2467, #45-7-0311; and (low density artefact scatters) #45-3-2454.

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11 Significance assessment

11.1 General

All Aboriginal objects in New South Wales (NSW) are protected under the *National Parks and Wildlife Act 1974* (NPW Act). It is recognised that the impact or destruction of sites may be necessary to allow activities or developments to occur. For the consent authority to make informed decisions on such matters, an important element of cultural resource management is determining the significance of cultural heritage places and objects to understand what may be lost; and how best it can be avoided or mitigated. However, it is highlighted that something can be of little or no significance and still be protected under the NPW Act.

Cultural significance is outlined in Article 1.2 of the *Burra Charter* - the best practice document for managing cultural heritage – as 'aesthetic, historic, scientific, social or spiritual value for past, present or future generations' (Australia ICOMOS 2013). These values are reiterated in the NSW guidelines, which determines cultural significance of a place can be assessed by identifying the values that are present across the subject area and assessing what is important and why (OEH 2011). In assessing the scientific significance of sites, aspects such as rarity and representativeness and the integrity must be considered. Generally speaking, a site or object that is rare will have a heightened significance, although a site that is suitable for conservation as 'representative' of its type will also be significant. Conversely an extremely rare site may no longer be significant if its integrity has been sufficiently compromised.

The criteria for assessing cultural significance that has been adopted for this Aboriginal cultural heritage assessment (ACHA) is defined in Table 11.1. The management implications of the significance of these sites are discussed in subsequent sections.

Table 11.1 A summary of criteria used to assess cultural significance (OEH 2011, p.8–10)

Criterion	Definition
Cultural/social value - Does the place have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons?	Social (or cultural) value refers to the spiritual, traditional, historical or contemporary associations and attachments the place or area has for Aboriginal people. Social or cultural value is how people express their connection with a place and the meaning that place has for them. Social or cultural value can only be identified through consultation with Aboriginal people.
Historic value - Is the place important to the cultural or natural history of the local area and/or region and/or State?	Historic value refers to the association of a place with a historically important person, event, phase or activity. Historic places do not always have physical evidence of their historical importance (such as structures, planted vegetation or landscape modifications). They may have 'shared' historic values with other (non-Aboriginal) communities.
Scientific (archaeological) value - Does the place have potential to yield information that will contribute to an understanding of the cultural or natural history of the local area and/or region and/or State?	Scientific (archaeological) value refers to the importance of a landscape, area, place or object because of its rarity, representativeness and the extent to which it may contribute to further understanding and information. Information about scientific values is gathered through archaeological investigation undertaken in this report.
Aesthetic value - Is the place important in demonstrating aesthetic characteristics in the local, regional, and/or State environment?	Aesthetic value refers to the sensory, scenic, architectural and creative aspects of the place. It is often linked with social value, and can consider form, scale, colour, texture and material of the fabric or landscape, and the smell and sounds associated with the place and its use. This value is only relevant to archaeological sites on only rare occasions, such as rock shelters that contain art, or culturally modified trees in prominent positions, etc.

Assessment of scientific (archaeological) significance considers:

- **Research potential:** the potential of a site to contribute to the present understanding of society and the human past. This is commonly linked to rarity, representativeness, site integrity, research themes and the potential extent of data retrievable for further analysis and interpretation. The research potential of archaeological sites is often only realised through archaeological investigation methods. A site with high research potential would be able to provide information about the past that is not obtainable from any other source, or supplements written and oral sources.

- **Rarity and representativeness:** the frequency of a site type and how the sites relate to the wider archaeological record. The significance may be due to sites being uncommon because of the related activity that created them, or preservation, or they are uncommon now because of ongoing site destruction through development and change. Sites with high representative value would typically need to be a pivotal example of its type that demonstrates the key characteristics of a site.

- **Integrity:** the level of disturbance or intactness of a site and how this may affect research potential. For example, artefacts identified in heavily cultivated areas would be unsuited to addressing research questions of site structure, but it may still be useful to characterise the artefact types and raw materials used in the region.

- **Educational value:** the potential of a site to be used as an educational tool. This usually includes sites with easily identifiable and accessible characteristics that are good representative examples. Sites with high educational value can have aesthetically distinctive or iconic qualities.

11.2 Statement of significance

This assessment identified 32 discrete Aboriginal sites and places located within the Hunter Transmission Project (HTP, the project) impact area (see Table 11.1). The results align with the broader regional archaeological picture (see *section 8.4*), which is dominated by stone artefact sites to the north and rockshelters to the southeast, or their potential to occur, and highlights the importance of major watercourses to Aboriginal visitation and occupation in the past. In addition, the project impact area was characterised by a low-density background artefact scatter (≤20 per square metre) interspersed with occasional areas of denser material associated with past foci and/or repeat occupation (see Table 11.2). These continuous buried deposits were documented as part of the field survey and test excavations and within the project impact area encompass 191 low-density stone artefact sites or isolated objects. These locales and sites have now all been integrated into the broader background scatter identification for management purposes.

At a general level, when considering scientific significance, a number of the sites can be considered to have moderate (local) or high (regional) significance with the ability to provide information on the past activities of the area (research potential). With specific reference to the cultural assemblage of the project impact area, rarity and aesthetic values are also prevalent in determining a site's significance. These sites can primarily be divided into the following main categories:

- Rockshelters that would have been used for habitation in the past. These sites form the foundational information for past Aboriginal populations, behaviour and activity across Australia, and are therefore of high scientific significance. Commonly, they include art and other cultural deposits that make them extremely important to the local Aboriginal community as well. This is indeed the case for the 'Deep Ck Mother SWA' (#37-6-3714) rockshelter, which has over 146 art motifs, and which has significant opportunity to explore social, economic and ceremonial activities at this location, as well as opportunities to explore relative and absolute chronologies from the art. However, in the case of HTP-C-RS02 and HTP-C-RS16, these sites consist of low overhang with no cultural activity and no deposit, and as such can provide limited further understanding of its use, or the broader region's use, by people in the past. Indeed, these sites only meet the size requirements associated with the criteria to define them as having the potential to

be used in the past. This is a similar case for HTP-S-RS19 and HTP-S-RS20, although here some deposits in the base of the sites were observed, and which may be subject to further investigation to allow further validation. Although, it is highlighted that some Aboriginal participants consider that all overhangs and caves encountered during the field program were considered to have been used in the past, irrespective of material evidence, and therefore retain significance.

- Grinding grooves reflect the maintenance and curation of stone tools, primarily spears and/or hand axes, used by the local Aboriginal people. While historically of limited research value aside from determining the types of tools that may have been sharpened (through size and shape of the groove), more recent chemical extractive processes (e.g. Fullagar R, Stephenson B, Hayes E 2017; Smith MA, Hayes E, Stephenson B 2015) have enabled more extensive resource exploitation to be obtained (e.g. the recovery of microscopic blood of animals hunted by the sharpened tool for example). As such, these sites increasingly have significant research value that can contribute to our understanding of the past use and visitation of a region. They also meet a number of other significance criteria. They commonly have some form of aesthetic values, being prevalent on sandstone platforms and near running water or natural billabongs and lakes, etc. – all environmental factors that are critical to their formation and, therefore, contribute to this value. They are also frequently highlighted as important to the local Aboriginal community, being one of the few enduring site types that visually demonstrate the longevity of Aboriginal people's use and visitation to a place. In the case of the project impact area, grinding grooves have some level of ranking based on the above factors, as well as their rarity and representativeness. Both HTP-N-GG01 and TRGG (#45-3-2456) consisting of impacted grinding grooves in the Singleton Military Area and some 70 grooves near Trigg Road in the Corrabare State Forest, respectively, were both avoided through project redesign (see *section 12.2*) due to their local rarity and/or regional representativeness. Three grinding groove sites are within the project impact area, HTP-C-GG03, HTP-C-GG05, and HTP-S-GG01, all of which consist of a small number of grooves (≤5). These are found in locales where significant numbers of groove sites are documented, many with substantially more grooves and/or other cultural materials present. As such, these sites are classified as having moderate scientific values when compared in the broader context, being of limited representative or research potential, but acknowledging the general rarity of these sites more generally. In the cases of both HTP-C-GG03 and GTP-C-GG05, Aboriginal community views considered them of greater value, and their significance has been elevated in Table 11.2.

- Stone arrangements relate to either hunting activities (e.g. hunting hides) or ceremonial activities often associated with Dreaming places and stories. In other parts of Australia, they may also relate to habitation (e.g. stone huts (McNiven I, Dunn JE, Crouch J. 2017)). Given the cultural landscape the project impact area is within (see *Chapter 4 (Aboriginal consultation)*), encountered stone arrangements are considered to more likely reflect ceremonial activities. As such, these sites have strong cultural importance to the local Aboriginal community, being one of the few anthropogenic structures that can be connected back to pre-contact Aboriginal societies and their ceremonial activity. Such sites also have various research potential, either directly where the nature of their construction and/or where cultural deposits are present and can be explored for activities and timing, and/or indirectly through their spatial location, view-lines and connection to/from other places. In the case of the project impact area, only HTP-CVM08 is within the project impact area, which is only known because of traditional knowledge and a contemporary use of the site, and is hence considered of high cultural value. The general sparsity of such features in the broader region also results in the site having high research values, being both rare and representative of the locale.

- Culturally modified trees indicate the use and manipulation of the cultural landscape by Aboriginal people in the past. While typically of limited scientific significance, they are increasingly rare in the region due to land clearance, especially in HTP North. Following further specialist investigations, only a single culturally modified tree remains within the project impact area that is indicative of traditional scarring. These site types are typically important to the local Aboriginal community and have a moderate level of cultural value.

- Cultural places are highly variable and encountered across the project impact area. They include archaeological, traditional, historical and contemporary places and values, some of which have a physical place, some reflect an analogy of a broader landscape feature, and others have limited spatial definition. Many have some level of research value from an anthropological perspective in understanding the behaviours, concerns and/or views of contemporary Aboriginal people. In the case of the project impact area, Flat Rock Lookout (HTP-C-CP01) comprises a place of substantial significance to the contemporary Aboriginal community largely due to a density of archaeological findings and reported association with the ritual domain, as well as opportunities to investigate pre-contact behaviours. The Hunter River crossings (HTP-N-CVM01) may also retain some research value, although this identification is based on a prediction of ancestral remains in these areas, rather than necessarily knowledge of their presence. The remaining sites reflect analogies to broader resources and gathering activities, which are widely known, and which likely have comparable flora and fauna across the region and/or reflect contemporary places (e.g. HTP-S-CS01), which has no specific cultural knowledge, but a modern belief it may have been used in the past. Such sites are identified as having cultural importance but limited, if any, research value.

- High and moderate density artefact scatters – both surface and sub-surface – that indicate the occupation and/or repeat visitation of a locale by people in the past. A significant portion of the cultural assemblage consisted of surface and/or subsurface stone artefactual material (>20 per square metre), which encompassed 10 (31%) of the 32 discrete sites within the project impact area. In most instances, these sites only just exceed thresholds above the background scatter, and are frequently in disturbed areas, such as 2010-HVOSE-15 (#37-6-4023) which is truncated by an existing transmission easement. Of note is the prevalence of moderate and high-density sites in the vicinity of Parnells Creek which, while individually reflect only moderate research value, collectively may suggest a more important cultural assemblage reflecting more extensive use in the past. Several have indications of buried cultural deposits, such as HVOCP TR47-AS3 (#37-2-6514), HVO-1267 (#37-6-3384) and HTP-N-AS71 (#37-2-6665), and which can be explored to inform procurement, technological behaviours, and inform temporal change if *in situ*. None of the sites encountered may be considered rare, primarily being in HTP North where the regional assemblage is dominated by stone artefact sites and, given the general disturbance along the project, none hold representative qualities. Given this, most of these sites are assigned a moderate research value, being more marginal in what types of information can be obtained.

The remaining identified sites, including the broader background artefact scatter (divided between the 3 sections of the project for management purposes, but ultimately the same site), are considered to have limited, if any, research potential (see Table 11.2). While important in demonstrating the longevity and continued use of the region by Aboriginal people in the past, it is considered that little further information can be obtained from additional investigation of these sites, places and objects.

In addition to the discrete sites and places, a number of cultural landscapes, view-lines and view-scapes were identified through the field activities. These are typically associated with important cultural places, Dreaming stories, and/or places of contemporary practises. These cannot be easily encompassed within Table 11.2 since they are spatially poorly defined and both their values and meanings are variable within the Aboriginal community. These values are perhaps best assessed as having both significant aesthetic and cultural significance to the broader Aboriginal community, being associated with prominent landforms, views, and dense bushland.

Table 11.2 provides a summary of the significance values for each of the 32 Aboriginal objects and/or sites identified within the project impact area.

Table 11.2 Significance of Aboriginal objects and/or sites identified within the project impact area

Site	AHIMS #	Site type	Brief description	Site status	Significance				
					Scientific	Aesthetic	Historical	Cultural/ social	Overall
HTP North									
HVOCP TR47-AS3	37-2-6514	Moderate density artefact scatter (21–50)	A high-density artefact scatter comprising >40 mudstone and silcrete flakes and core fragments in areas of exposure on [redacted]. Artefacts are highly likely to extend beyond areas of exposure. Test excavations for the Hunter Valley Operations mining complex continuation project confirmed moderate density of subsurface deposits, which declines with increasing distance from [redacted]. Artefact density of 9.2/m^2 were encountered.	Valid	Moderate	Low	Low	High	Moderate*
BOP-OS8	37-6-2842	Moderate density artefact scatter (21–50)	A moderate density artefact scatter (n=23) recorded along [redacted] toward the intersection with an ephemeral creekline.	Valid	Moderate	Low	Low	Moderate	Moderate
HVO-1258	37-6-3376	High density artefact scatter (>50)	A high-density artefact scatter (n=55) comprising 30 mudstone flakes and 25 silcrete flakes situated on [redacted].	Valid	Moderate	Low	Low	Moderate	Moderate
HVO-1267	37-6-3384	Moderate density artefact scatter (21–50)	Twenty-three artefacts located on an eroded exposures on a north facing lower hillslope, [redacted].	Valid	Moderate	Low	Low	Moderate	Moderate
2010-HVOSE-15	37-6-4023	High density artefact scatter (>50)	Sixty-five artefacts located in [redacted].	Valid	Moderate	Low	Low	Moderate	Moderate

Site	AHIMS #	Site type	Brief description	Site status	Significance				
					Scientific	Aesthetic	Historical	Cultural/ social	Overall
HTP-N-AS01	37-2-6667	High density artefact scatter (>50)	Some 57 artefacts scattered across an area ~500 m x 200 m on a gently inclined footslope to the [redacted]. Artefacts have been exposed by sheet wash erosion, vehicle and animal tracks.	Valid	Moderate	Low	Low	Moderate	Moderate
HTP-N-AS15	37-2-6666	High density artefact scatter (>50)	Some 224 artefacts scattered across an area ~280 m x 250 m on a [redacted]. Artefacts were identified on areas of exposure due to sheet wash and animal tracks across a very gently inclined hillslope.	Valid	Moderate	Low	Low	Moderate	Moderate
HTP-N-AS30	37-6-4488	High density artefact scatter (>50)	A very high-density artefact scatter (n=323) identified on a large exposure (30 m x 40 m) located [redacted].	Valid	Moderate	Low	Low	Moderate	Moderate
HTP-N-AS32	37-6-4487	High density artefact scatter (>50), potential archaeological deposit	A high-density artefact scatter (n=126) with potential archaeological deposit, located within the eroding banks of a gully of [redacted].	Valid	High	Low	Low	Moderate	Moderate
HTP-N-AS71	37-2-6665	Moderate density artefact scatter (21–50)	Approximately 33 artefacts identified on an embankment within a sheet wash exposure, [redacted].	Valid	Moderate	Low	Low	Moderate	Moderate
Hunter crossings (HTP-N-CVM01)	37-6-4493	Cultural place	Areas where the project impact area crosses [redacted]. Consultations indicated that Aboriginal burials may be located in these areas.	Valid	Moderate	Moderate	Low	Moderate	Moderate

Site	AHIMS #	Site type	Brief description	Site status	Significance				
					Scientific	Aesthetic	Historical	Cultural/ social	Overall
HTP-N-BS1	See Note 6	Background scatter	A stone artefact background scatter that is predicted to occur intermittently [redacted] and extending beyond its limits within which disparate low to moderate artefact densities of ≤20/m^2 may be expected intermixed with culturally sterile zones.	Valid	Low	Low	Low	Low	Low
HTP Central									
DEEP CK MOTHER SWA	37-6-3714	Rockshelter, art (pigment or engraved)	A large rockshelter (art dimensions are provided as 10 m x 3 m) located [redacted]. At least 146 motifs were recorded.	Valid	High	Moderate	Low	High	High
HTP-C-AR01	37-6-4486	Aboriginal resource and gathering	A group of mature grass trees (*Xanthorrhoea australis*) considered to reflect a resource that would have been used by Aboriginal people in the past. The site is considered to reflect a visual observation of a broader resource found across the State forests, rather than reflecting a specific place of value.	Valid	Low	Moderate	Low	Moderate	Moderate
HTP-C-AR02	37-6-4485	Aboriginal resource and gathering	An area of native hibiscus (Hibiscus sp.) considered to reflect a resource that would have been used by Aboriginal people in the past. The site is considered to reflect a visual observation of a broader resource found across the State forests, rather than reflecting a specific place of value.	Valid	Low	Moderate	Low	Moderate	Moderate
HTP-C-CMT05	37-6-4483	Culturally modified tree	A eucalypt tree with a single east facing scar recorded at the base of a gully [redacted].	Valid	Moderate	Moderate	Low	Moderate	Moderate
HTP-C-CP01 (Flat Rock lookout)	45-3-5003	Cultural place	A large sandstone platform located [redacted] and providing extensive views towards Mount Sugarloaf.	Valid	Moderate	High	Low	High	High

Site	AHIMS #	Site type	Brief description	Site status	Significance				
					Scientific	Aesthetic	Historical	Cultural/ social	Overall
HTP-C-CVM08	45-3-5010	[redacted]	[redacted] Information was provided by an Awabakal traditional owner who indicated the site had been disturbed in recent years but continued to be used by traditional owners.	Valid	High	Moderate	Low	High	High
HTP-C-GG03	37-6-4484	Grinding groove	Three grinding grooves on a sandstone platform [redacted]. Another grinding groove site, HTP-C-GG05, is located [redacted].	Valid	Moderate	Moderate	Low	High	High
HTP-C-GG05	45-3-5006	Grinding groove	A single grinding groove on a sandstone platform [redacted]. This site is located [redacted].	Valid	Moderate	Moderate	Low	High	High
HTP-C-RS02	37-6-4492	Rockshelter (no cultural markers)	A rockshelter with no art or deposits located [redacted]. The rockshelter is on a ridge with an east facing opening, and is some 6 m long x 1.5 m high x 2 m deep.	Valid	Low	Moderate	Low	Moderate	Moderate
HTP-C-FA01 (CSS-10)	37-6-4490	Subsurface cultural deposit	An area of past foci containing high densities of sub-surface stone artefacts (approximately 0.32 ha) and located [redacted].	Valid	Moderate	Moderate	Low	Moderate	Moderate
HTP-C-FA02 (CSS-72, CSS-58 & CSS-56)	37-6-4489	Subsurface cultural deposit	An area of past foci containing high densities of sub-surface stone artefacts (approximately 0.6 ha) and located [redacted].	Valid	Moderate	Moderate	Low	Moderate	Moderate
HTP-C-FA03 (CSS-96)	37-6-4491	Subsurface cultural deposit	An area of past foci containing high densities of sub-surface stone artefacts (approximately 0.12 ha) and located [redacted].	Valid	Moderate	Moderate	Low	Moderate	Moderate

Site	AHIMS #	Site type	Brief description	Site status	Significance				
					Scientific	Aesthetic	Historical	Cultural/ social	Overall
HTP-C-BS1	See Note 6	Background scatter	A stone artefact background scatter that is predicted to occur [redacted] and extending beyond its limits within which disparate low to moderate artefact densities of ≤20/m^2 may be expected intermixed with culturally sterile zones.	Valid	Low	Low	Low	Low	Low
HTP South									
Watagan Creek ACD	45-3-4623	Cultural place	Information on this site is limited. Recorded during the Cessnock local government area's Cultural Mapping Project, identified Watagan Creek as a cultural landscape with many known resources and gathering places.	Valid	Low	Moderate	Low	Moderate	Moderate
HTP-S-CS01 (Wishing well)	45-3-5009	Cultural place	A historical and modern day wishing well [redacted]. Participants suggested that the well may be the modification of an earlier spring used by Aboriginal people in the past.	Valid	Low	Low	Low	Moderate	Moderate
HTP-S-GG01	45-3-5005	Grinding groove	Five grinding grooves on a sandstone boulder [redacted].	Valid	Moderate	Moderate	Low	Moderate	Moderate
HTP-S-RS16	45-3-5007	Rockshelter	South facing sandstone overhang located [redacted]. The rockshelter measures 6 m wide x 3 m deep, with an estimated height of 2 m.	Valid	Low	Moderate	Low	Moderate	Moderate

Site	AHIMS #	Site type	Brief description	Site status	Significance				
					Scientific	Aesthetic	Historical	Cultural/ social	Overall
HTP-S-RS19	45-3-5008	Rockshelter	A north-east-facing sandstone overhang located [redacted]. The rockshelter measures 5 m wide x 2 m deep, with an estimated height of 2 m. Some shallow deposit (<30 cm) was observed which may allow further validation of this site. The condition of the shelter is unstable and is cracked, on verge of collapse.	Valid	Moderate	Moderate	Low	Moderate	Moderate
HTP-S-RS20	45-3-5004	Rockshelter	A north-east-facing sandstone overhang situated nearby to ridgeline with good views, [redacted]. Evidence of partial roof collapse and wind erosion. The rockshelter measures 4 m wide x 2 m deep, with an estimated height of 2 m. Some shallow deposit (<30 cm) was observed which may allow further validation of this site.	Valid	Moderate	Moderate	Low	Moderate	Moderate
HTP-S-BS1	See Note 6	Background scatter	A stone artefact background scatter that is predicted to occur [redacted] and extending beyond its limits within which disparate low to moderate artefact densities of ≤20/m^2 may be expected intermixed with culturally sterile zones.	Valid	Low	Low	Low	Low	Low

* Significance values based on existing information associated with these site recordings.

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). Further details are presented in Chapter 7 (Cultural values mapping) and Appendix D (Supplementary cultural values information).

3. Where relevant, cultural sites rankings are based on the cultural mapping report presented in Appendix D (Supplementary cultural values information). 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. Sites requiring further investigation and/or validation, are ranked based on the assumption the site proves valid. However, their significance should be revisited when further analysis and classification of them occurs. These values are presented in red to demonstrate their tentative status.

5. The overall significance is comparable with the highest ranking achieved in any of the four main criteria.

6. The background artefact scatter incorporates some 191 discrete site recordings of isolated Aboriginal objects and/or low-density artefact scatters of ≤20 per square metre. These sites are outlined in Table 10.1.

12 Impact assessment

12.1 Summary of this chapter

This chapter outlines the proposed impacts associated with the Hunter Transmission Project (HTP, the project), and the specific impacts this would have on the archaeological resources of the project impact area as described in the preceding chapters. It also highlights where the project has avoided, and will avoid, significant Aboriginal heritage sites and/or places identified in this assessment. In summary:

- The project would result in localised ground disturbance and vegetation clearance within the construction impact area. Following completion of construction, there are impacts that would continue throughout the operation and maintenance of the transmission line, primarily in the form of vegetation management in the easement.

- The project has been subject to ongoing refinements to avoid or minimise harm to cultural materials. Through information provided by Aboriginal participants and the field investigations, multiple refinements have occurred to avoid and minimise impacts to cultural materials. This has included avoidance of a significant culturally modified tree in Hunter Valley Operations mining complex, and multiple significant rockshelters and stone arrangements in Corrabare and Watagan State forests. Broader design principles minimising visual prominence wherever feasible (and notably in the vicinity of Flat Rock Lookout) and locating the switching station in Olney State Forest to avoid impacts within Martinsville have all been informed by reducing impacts to cultural heritage.

- There are 32 identified Aboriginal sites and places in the construction impact area. Of these, 5 highly significant sites with this assemblage, comprising a cultural place (HTP-C-CP01), rockshelter (DEEP CK MOTHER SWA #37-6-3714), [redacted] (HTP-C-CVM08), and two grinding grooves sites (HTP-C-GG03 and HTP-C-GG05) are committed for avoidance. A further 13 sites are located within parts of the construction impact area where impacts are expected to be minor (i.e. between proposed tower locations and/or in deep gorges and ravines within the State forests) and/or are only partially within the construction impact area. The remaining 19 sites are proposed for varying levels of potential impact depending on specific project elements disturbance. Around ~88 hectares of the Warkworth sands system may also be adversely affected, but similarly extensive portions of the deposit are located between proposed transmission towers where deep ground disturbance would not be expected.

- While variable, discussions with Aboriginal participants generally suggest that obstruction and/or general interruption of view-lines and view-scapes between major promontories associated with Dreaming stories and/or contemporary traditional practises would occur as a result of the project. Potential impacts are also probable to localised cultural landscapes surrounding key archaeological sites at Trig Road, Dora Pinnacles and Flat Rock; and/or where values relate to broader Dreaming stories.

- The project would result in cumulative impacts to some components of the regional cultural assemblage, notably a culturally modified tree in HTP Central, and through the potential disturbance of some 88 hectares of the Warkworth sand system documented to contain significant cultural materials. Any impacts to the 5 high significant sites currently committed for avoidance would also result in regionally significant impacts. Potential impacts on sightlines, scenic landscapes, and localised cultural areas would contribute to the region's increasing urbanisation, which in turn may alter traditional practices and teaching. This is expected to lead to some loss of cultural knowledge across generations. Mitigation measures in *Chapter 13 (Management strategy and recommendations)* are proposed to offset some of these impacts.[10]

12.2 Avoidance and minimisation of impacts through design refinements

Since initial discussions with traditional owners in late 2023, refinements to the project have been ongoing to avoid and/or minimise harm to cultural materials wherever feasible. This is most evident in the limited potential impacts outlined in subsequent sections compared with the thousands of Aboriginal sites and objects documented across the region (see *section 8.3*). It is highlighted that around 155 Aboriginal sites and places (which incorporates several hundred discrete site listings) (see Appendix E.3) are within 200 metres, but outside the construction impact area, in part through refinements made to the project. During the Aboriginal cultural heritage assessment (ACHA) process, at least 6 major workshops were undertaken between the project's design team and EMM Consulting Pty Limited (EMM) to explore modifications and/or movement of elements to reduce potential direct impacts.

In tandem with constructability, community and ecological values, specific refinement and avoidance measures have included (see Figure 12.1):

- HTP North
    - realigning the construction impact area in the Hunter Valley Operations mining complex to avoid a culturally modified tree (#37-6-3024) identified as significant by EMM (2023)
    - maximising the use of existing tracks and disturbance in the vicinity of the Hunter River and Wollombi Brook confluence to minimise disturbance to potential Warkworth sand system
    - undertaking the crossing of Loder Creek in the vicinity of the Hunter River, rather than in the vicinity of Putty Road (where numerous tributaries would have been adversely affected)
    - moving ancillary activities in the vicinity of Putty Road to maximise project distance from the banks of Loder Creek
    - co-sharing/abutting the transmission easement east of the Bulga mining complex to avoid impacting sites surrounding this locale within the Singleton Military Area; and avoiding the documented Vere rockshelter to the west
    - ensuring the project impact area immediately south of the Singleton Military Area avoided the Three Warriors promontory and followed a gully to the east to minimise visual impacts

[10] This section addresses cumulative impacts as required by Heritage NSW *Code of Practise for Archaeological Investigation of Aboriginal Objects in NSW* guidelines. Aboriginal heritage cumulative impacts in accordance with broader EIS guidelines are addressed separately in Chapter 23 of the EIS.

- abandoning an easterly option for the project between Cessnock Road and Pokolbin State Forest following the discovery of the Warkworth sand system in test excavations along this potential alignment. This also resulted in the avoidance of HTP-N-GG01, one of the few grinding groove sites encountered within HTP North.

- HTP Central

  - relocating transmission towers off prominent ridge lines and hill tops onto upper slopes to reduce prominence and visual impacts, notably across Congewai Creek, and between Mount Sugarloaf and Mount Yengo

  - realigning the project impact area eastwards to increase distance from key rockshelters off Broken Back Trail (e.g. #37-6-3710)

  - realigning the project impact area eastwards within Corrabare Flora Reserve and northern Corrabrare State Forest to avoid impacts to several tentatively identified rockshelters (a number of which have been declassified; see *Chapter 9 (Field investigations)*)

  - realigning the project impact area eastwards in northern Corrabare State Forest to avoid impacts to a number of significant stone arrangements found north of Crumps Road (e.g. HTP-C-SA01; HTP-C-SA04)

  - realigning the project impact area eastwards, north of Langans Road to avoid significant archaeological sites with high cultural values (e.g. #45-3-3582; #45-3-3583) to maximise direct and indirect impacts. The sites are now >200 metres from the project impact area

  - refining road upgrades along Trig Road to avoid a significant grinding groove site (#45-3-2456) east of Corrabare State Forest

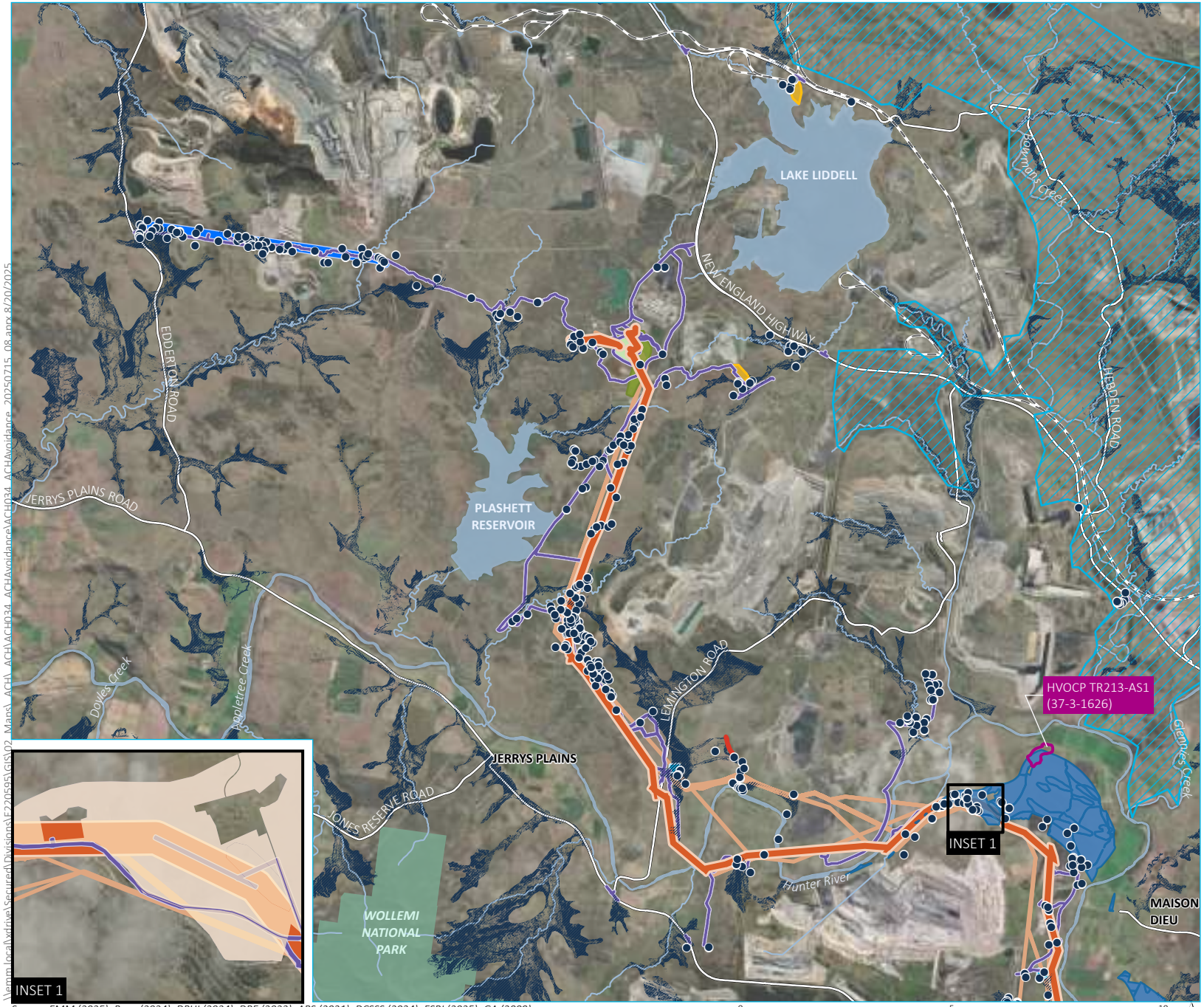
  - realigning the project impact area westwards, south of Langans Road to minimise indirect impacts to significant archaeological rockshelters (e.g. HTP-C-RS14, #45-3-2140) – now some 300 metres from the project impact area – and to views around Flat Rock lookout (HTP-C-CP01).

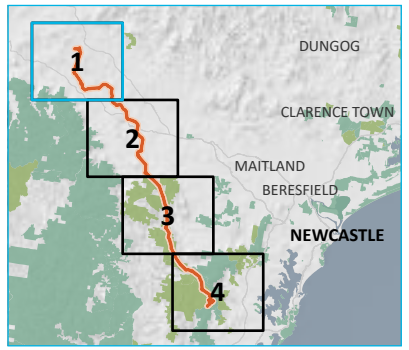
- HTP South

  - realigning the project impact area westwards near Wollombi Forest Road to minimise indirect impacts to the Abbotts Fall cultural landscape and associated significant grinding groove site

  - locating the Olney switching station at the junction of Watagan Forest Road and Prickly Ridge Road to remove direct and indirect impacts to important cultural landscape and places around Martinsville

  - connecting the project to the existing 500 kilovolt (kV) transmission line at Slump Point Road to reduce impacts to Martinsville and Jilliby State Conservation Area.





KEY

- Surveyed Aboriginal cultural site
- HVOCP TR213-AS1 (37-3-1626)
- CM-CD1 (37-2-1877) Curtilage
- Section 10 nomination under the ATSIHP Act 1984
- Potential Warkworth Sand (Gippel 2023)
- Potential Warkworth Sand (Umwelt 2023)
- Discontinued alignment option

Project impact area

- HTP corridor
- Bayswater South switching station
- Construction support site
- Laydown area
- Adjustment to existing transmission line (lines 31 and 32)
- Upgrades to existing transmission line (lines 5A3 and 5A4)
- Access track

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Previous alignments of the project showing where avoidance of cultural materials has been undertaken

Map 1 of 4

Hunter Transmission Project
Aboriginal cultural heritage assessment
Figure 12.1

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

0 5 10 km
GDA2020 MGA Zone 56
N

creating opportunities

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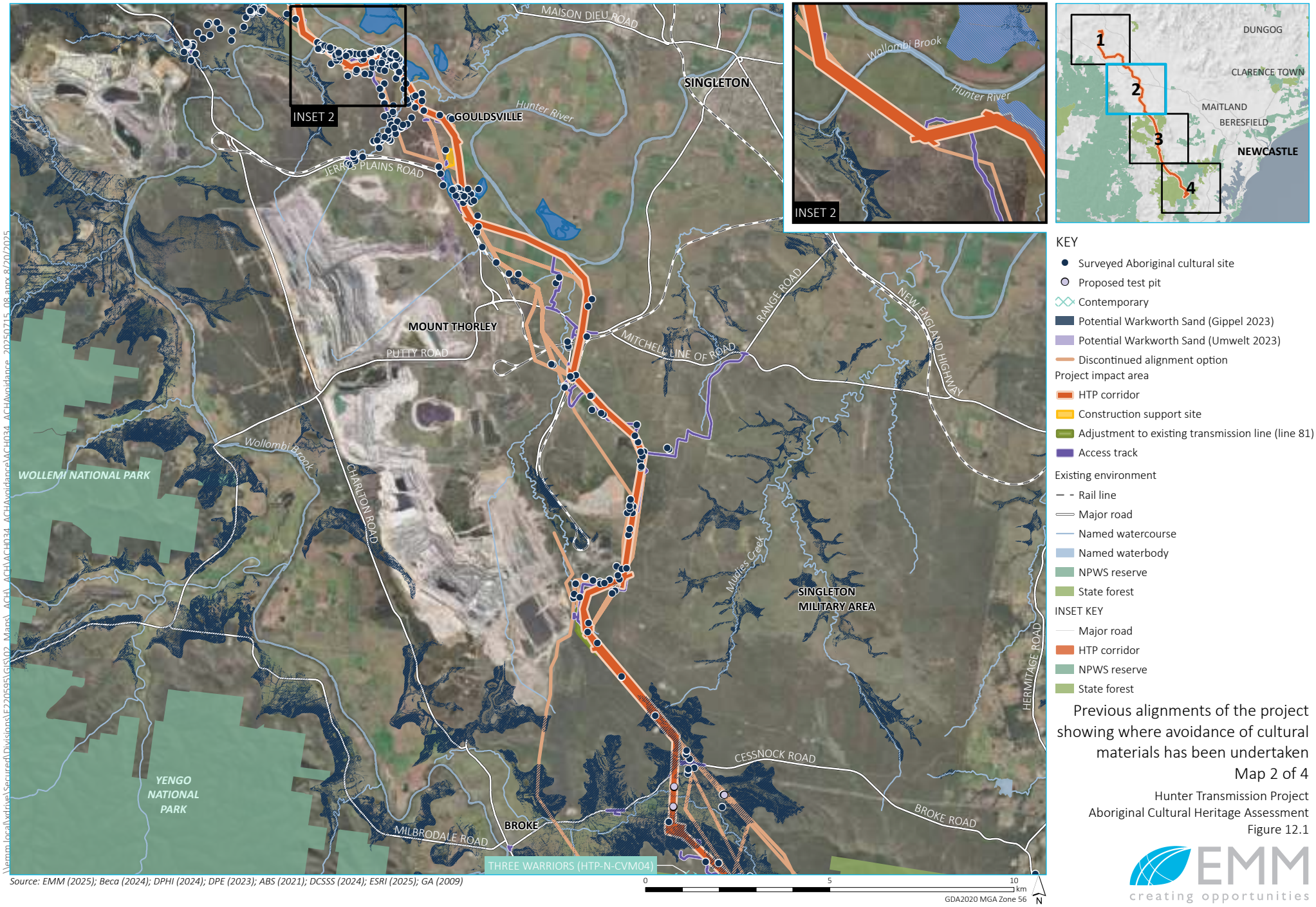

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Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

Previous alignments of the project showing where avoidance of cultural materials has been undertaken

Map 2 of 4

Hunter Transmission Project
Aboriginal Cultural Heritage Assessment
Figure 12.1

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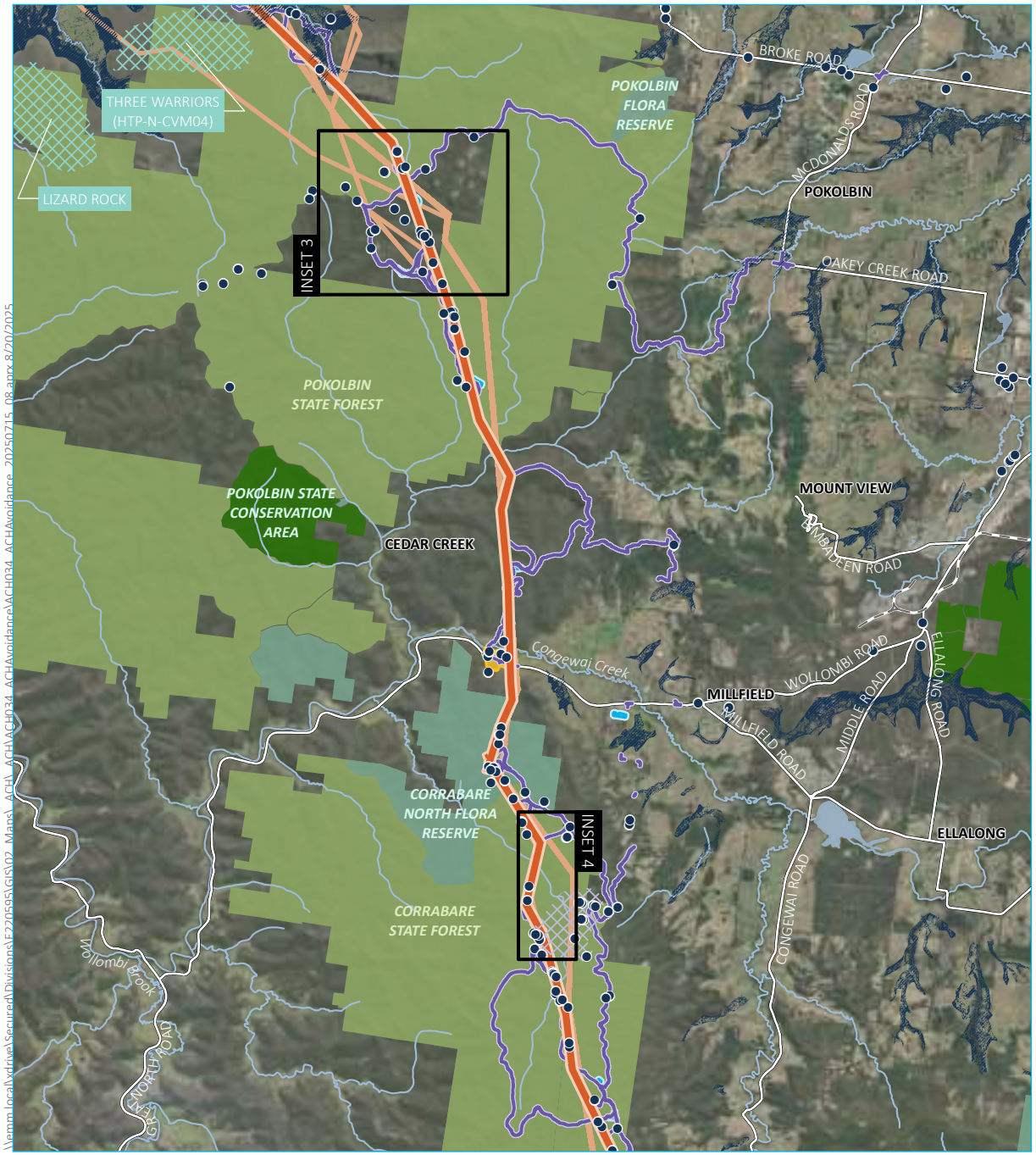

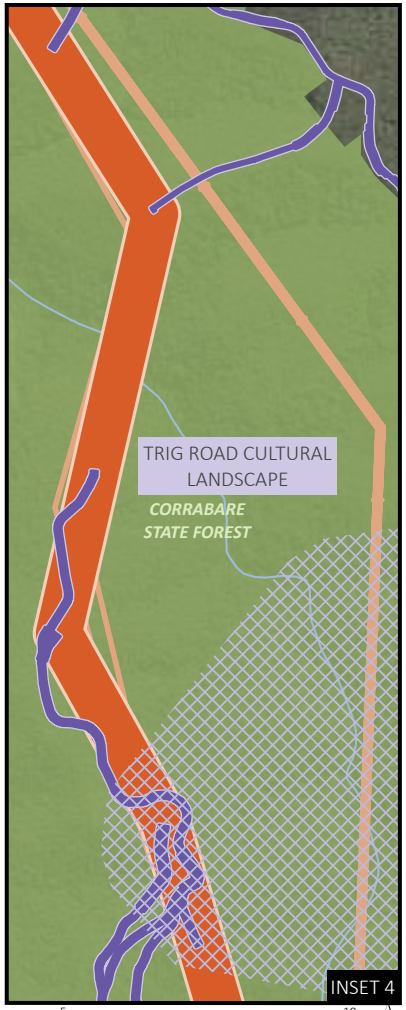

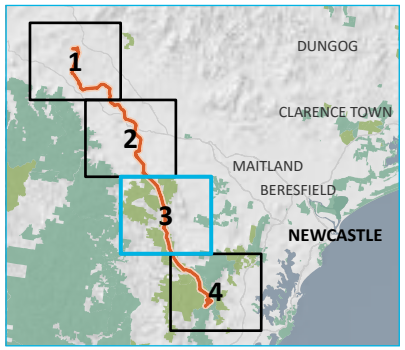

KEY

- Surveyed Aboriginal cultural site
- Contemporary
- Archaeological
- Potential Warkworth Sand (Gippel 2023)
- Discontinued alignment option

Project impact area

- HTP corridor
- Construction support site
- Laydown area
- Access track

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

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Previous alignments of the project showing where avoidance of cultural materials has been undertaken

Map 3 of 4

Hunter Transmission Project

Aboriginal Cultural Heritage Assessment

Figure 12.1

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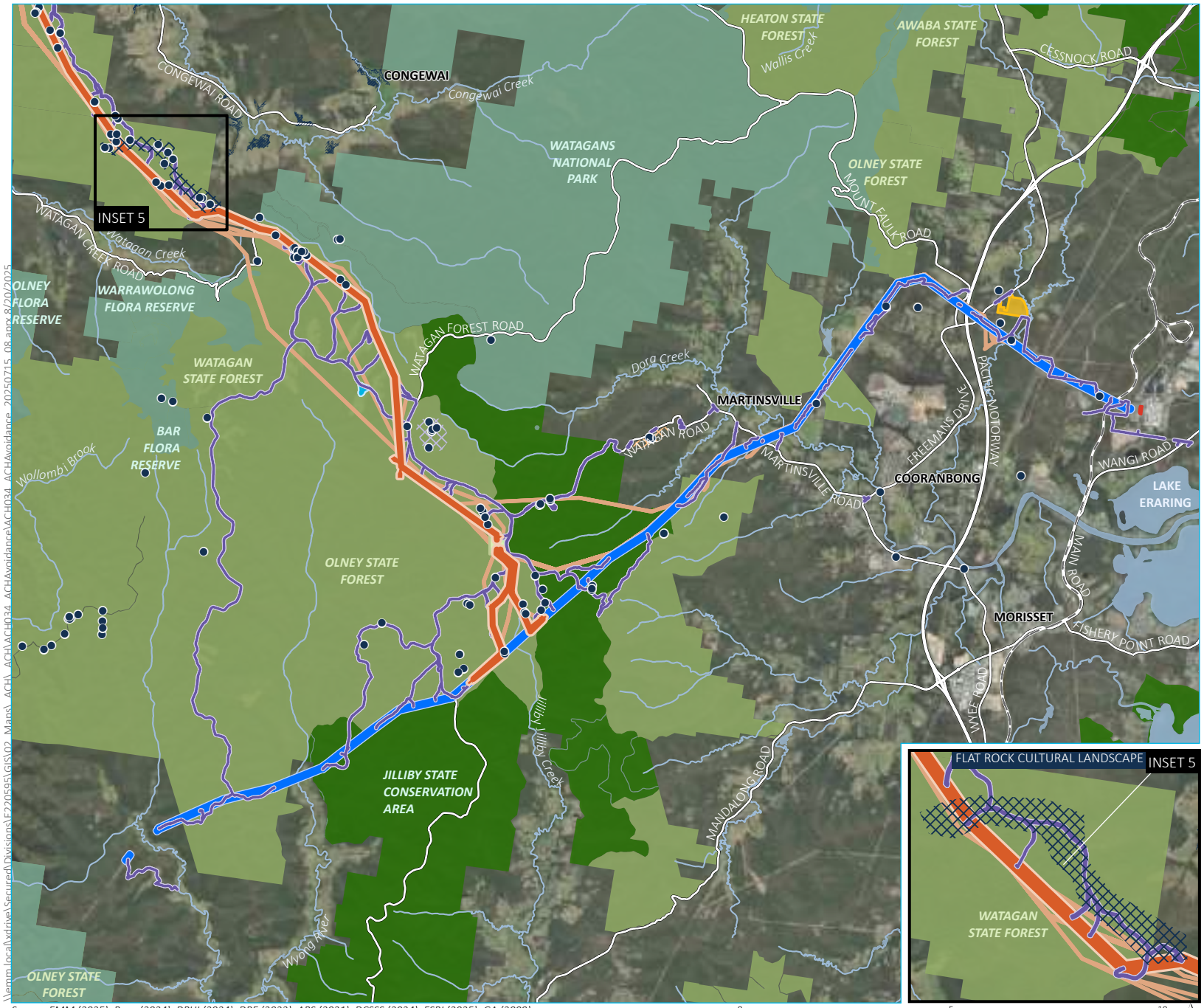

KEY

- Surveyed Aboriginal cultural site
- Traditional
- Archaeological
- Traditional, contemporary, archaeological
- Potential Warkworth Sand (Gippel 2023)
- Discontinued alignment option

Project impact area

- HTP corridor
- Olney switching station
- Construction support site
- Laydown area
- Eraring Substation upgrade
- Upgrades to existing transmission line (lines 5A1 and 5A2)
- Access track

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State conservation area
- State forest

INSET KEY

- Major road
- HTP corridor
- NPWS reserve
- State forest

Previous alignments of the project showing where avoidance of cultural materials has been undertaken

Map 4 of 4

Hunter Transmission Project
Aboriginal cultural heritage assessment
Figure 12.1

Source: EMM (2025); Beca (2024); DPHI (2024); DPE (2023); ABS (2021); DCSSS (2024); ESRI (2025); GA (2009)

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GDA2020 MGA Zone 56

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12.3 Potential impacts from the project

The details of the project are included in the environmental impact statement (EIS) and described in detail in *Chapter 2 (The Hunter Transmission Project)*. The project impact area can be divided into the construction impact area and the operation impact area. The former is around 2351 hectares, while the latter is smaller around 1261 hectares and wholly within the construction impact area encompassing the permanent project infrastructure and easement.

Table 12.1 provides a summary of the proposed development activities within the construction impact area, and how they may intersect with Aboriginal heritage. For the purposes of the assessment, the project is assessing potential complete impact to any cultural materials within the construction impact area, with the project committing to avoid discrete, high value sites. However, there are a range of activities proposed within the construction impact area, and some activities would have a lower likelihood of harming cultural materials during the construction and operation the project. This is most relevant between proposed transmission towers, where activities would be largely limited to vehicle movements for stringing purposes, and large-scale earthworks or ground disturbance are unlikely to be required. As such, cultural materials within these intervening gaps would be largely unaffected by the project. Similarly, there are numerous established public roads and access tracks where proposed ground disturbance activities would be negligible and/or localised, and where cultural materials can in most instances be avoided.

In contrast, laydown areas, switching stations, construction support sites and the foundations of proposed towers would require substantive ground disturbance for establishment and require the removal of the upper soil profile on or within which most cultural materials were documented. Vegetation clearance of the construction impact area would also be required for construction, with a 70-metre transmission line easement maintained during operation. These more substantial activities where ground surface disturbance is likely are the activities that have the potential to directly harm Aboriginal objects, sites and/or places where present. As the project is within State forests within HTP Central and HTP South, it is probable that deeper gorges and ravines, within which several sites are documented, would be unaffected being a significant distance below the project elements. The proponent has also committed to avoiding all highly significant sites, including DEEP CK MOTHER SWA (#37-6-3714), Flat Rock Lookout (HTP-C-CP01), HTP-C-CVM08 (#45-3-5010), HTP-C-GG03 (#37-6-4484), and HTP-C-GG05 (#45-3-5006).

Indirect impacts to Aboriginal cultural heritage are also likely to result from the project, particularly in the significant cultural landscape of HTP Central and HTP South. These include:

- vibration impacts that may result in de-stabilisation of cultural materials beyond the construction impact area. Applying the German Standard DIN 4150-2016 *Vibration in Buildings - Part 3: Effects on Structures* criteria for sensitive heritage structures – the closest comparison available to the identified cultural materials – would indicate values within 55 metres of the construction impact area may be subject to vibration impacts

- obstruction and/or interruption of important view-lines and view-scapes as a result of the project elements, including transmission towers which are proposed to be up to 85 metres in height

- impacts to the broader cultural landscape within which archaeological and cultural places are situated. While these areas are often in State forests, and have likely been subject to past clearing, these areas reflect a largely natural cultural landscape that inform the significance of key sites and places

- through the increased access to cultural materials as a result of maintaining an operational transmission line easement through vegetation clearance. Currently, many of the cultural materials are hard to access and this provides a form of protection from the general public. This inaccessibility may be compromised as a result of the project, leading to impacts to sites and places remaining within and/or near the project impact area.

Table 12.1 A general overview of potential activities and disturbances caused by the project and their potential impact on Aboriginal site types where present

Project elements	Description	Potential impacts to cultural materials
HTP corridor	The establishment of the HTP corridor would include vegetation removal where required, the establishment of construction pads, installation of the transmission tower foundations, the construction of towers, and stringing of the transmission line using tractors, helicopters and/or drones. The operation of the HTP corridor would require monitoring and repair of the infrastructure where needed and ongoing vegetation maintenance within a 70 m transmission line easement.	The construction of the HTP corridor would require: • the removal of vegetation within the construction impact area, which would adversely affect any culturally modified trees, cultural landscapes, and cultural places that have flora and/or fauna values where present • topsoil stripping and upper soil profile disturbance for the establishment of construction pads, laydown areas, and other temporary facilities, which would adversely affect surface and buried stone artefactual materials, grinding grooves, and rockshelters where present • deep excavation for the establishment of the transmission tower footings that would affect the upper soil profile, and which would adversely affect surface and buried stone artefactual materials, grinding grooves, and rockshelters where present. These activities may also have indirect impacts such as vibrations that extend beyond their footprint and that may destabilise sites such as rockshelters • with the exception of vegetation removal, negligible ground disturbance is anticipated between the towers (e.g. where powerlines span between two towers), meaning impacts to cultural materials where present, would be limited in these areas. The operation of the HTP corridor would involve: • ongoing indirect impacts to view-scapes and view-lines where project elements are prominent above the surrounding vegetation • vegetation maintenance along the alignment which may result in increased accessibility to cultural materials in close proximity to the project where present.

Project elements	Description	Potential impacts to cultural materials
Adjustments to existing transmission lines	The connection of the project to existing transmission lines and infrastructure typically include similar tasks and activities to the HTP corridor itself, including new transmission towers.	Adjustments to existing transmission lines would require: • the removal of vegetation within the construction impact area, which would adversely affect any culturally modified trees, cultural landscapes, and cultural places that have flora and/or fauna values where present • topsoil stripping and upper soil profile disturbance for the establishment of construction pads, laydown areas, and other temporary facilities, which would adversely affect surface and buried stone artefactual materials, grinding grooves, and rockshelters where present • deep excavation for the establishment of the transmission tower footings that would affect the upper soil profile, and which would adversely affect, where present, surface and buried stone artefactual materials, grinding grooves, and rockshelters. These activities may also have indirect impacts such as vibrations that extend beyond their footprint and that may destabilise sites such as rockshelters where present • with the exception of vegetation removal, negligible ground disturbance between the towers, meaning impacts to cultural materials would be limited in these areas. The operation of adjusted transmission lines would involve: • ongoing indirect impacts to view-scapes and view-lines where project elements are prominent above the surrounding vegetation • vegetation maintenance along the alignment which may result in increased accessibility to cultural materials in close proximity to the project, where present.
Bayswater South and Olney switching stations	The construction of new switching stations would include the establishment of construction pads, civil construction of the switching station and supporting structures, and connection to new and existing transmission lines. The operation of the switching stations would require monitoring and repair of the infrastructure and ongoing vegetation maintenance within asset protection zones around the structures.	The construction of new switching stations would require: • the removal of vegetation within the construction impact area, which would adversely affect, where present, any culturally modified trees, cultural landscapes, and cultural places that have flora and/or fauna values • topsoil stripping and upper soil profile disturbance for the establishment of construction pads, laydown areas, and other temporary facilities, which would adversely affect surface and buried stone artefactual materials, grinding grooves, and rockshelters where present • topsoil stripping, upper soil profile and levelling/excavation for the establishment of the switching stations, and which would adversely affect, where present, surface and buried stone artefactual materials, grinding grooves, and rockshelters. These activities may also have indirect impacts such as vibrations that extend beyond their footprint and that may destabilise sites such as rockshelters, where present. The operation of the Bayswater South and Olney switching stations would require: • vegetation maintenance around the switching stations which may result in increased accessibility to cultural materials in close proximity to the project, where present.

Project elements	Description	Potential impacts to cultural materials
Eraring and Bayswater substation upgrades	Modifications and upgrades are proposed to two existing substations. These are within highly urbanised areas, and would require little, if any, new ground disturbance or vegetation removal.	The upgrade of Eraring and Bayswater substations are considered to have negligible impacts to cultural materials, being within highly developed locations.
Ancillary works	Ancillary works include the establishment of temporary construction support sites (including accommodation facilities at some sites), laydown areas, stringing sites, and helipads. Construction activities would include the establishment of construction pads, and civil construction of the structures and facilities. The structures would be temporary and would be removed at the completion of the construction of the project.	The establishment of ancillary works would require: • the removal of vegetation within the construction impact area, which would adversely affect any culturally modified trees, cultural landscapes, and cultural places that have flora and/or fauna values • topsoil stripping and upper soil profile disturbance for the establishment of construction pads, laydown areas, and other temporary facilities, which would adversely affect surface and buried stone artefactual materials, grinding grooves, and rockshelters where present • topsoil stripping, upper soil profile and levelling/excavation for the establishment of the ancillary works, and which would adversely affect, where present, surface and buried stone artefactual materials, grinding grooves, and rockshelters. These activities may also have indirect impacts such as vibrations that extend beyond their footprint and that may destabilise sites such as rockshelters where present.
Access roads and tracks	The project proposes to use existing public roads and existing access tracks, and would also require the construction of new access tracks in some locations. Existing public roads require no additional construction, but some widening and/or upgrades may occur. Existing access tracks may require some widening and/or establishment of passing bays, and along with new access tracks would include vegetation clearance, establishment of laydown areas, levelling and grading followed by introduction of crushed rock.	Upgrades to public road and existing access tracks and the construction of new access tracks would require: • the removal of vegetation within the construction impact area, which would adversely affect, where present, any culturally modified trees, cultural landscapes, and cultural places that have flora and/or fauna values where present • topsoil stripping and upper soil profile disturbance for the establishment of laydown areas, roads and road upgrades/widening, which would adversely affect surface and buried stone artefactual materials, grinding grooves, and rockshelters where present • the operation of existing and/or new access tracks may result in increased accessibility to cultural materials in close proximity to the project where present.

12.4 An assessment of potential impacts to Aboriginal cultural heritage

For the establishment of the project, project elements and activities may extend within all parts of the construction impact area. It is therefore considered that harm to any identified cultural materials would potentially result from the project (with the exception of sites where the Energy Corporation of NSW (EnergyCo) has made a commitment to avoid). As such, up to 32 discrete Aboriginal sites and places identified in preceding sections would potentially be adversely affected by the project (see Table 12.2; Figure 12.2), as well as around ~88 hectares of the Warkworth sand system and parts of the broader background scatter that fall within the project area.

However, as outlined in Table 12.1, specific project activities would likely result in differing levels of impact across the construction impact area, with large tracts of land between proposed transmission towers subject to limited ground disturbance. As such, 12 (~38%) of the Aboriginal sites and places within these zones may be only partially impacted and/or unaffected by the project. A further site, HTP-N-AS15 is also substantively outside the construction impact area, and only a small portion of the site would be subject to harm within the construction impact area. It is noticeable that within HTP Central and HTP South, several of the sites (e.g. HTP-C-RS02, HTP-S-RS16, HTP-S-GG01) are within deep gorges and ravines where project activities are improbable due to vegetation clearance requirements being minimal. A further 4 sites that are proposed for impact are unlikely to have their significance adversely affected, including Watagan Creek ACD (#45-3-4623), HTP-N-BS1, HTP-C-BS1, and HTP-S-BS1.

In addition, 5 of the Aboriginal sites and places are committed for avoidance despite being within the construction impact area. These sites were all assessed as being of high scientific and/or cultural significance and include Deep Ck Mother SWA (#37-6-3714) rockshelter, Flat Rock lookout (HTP-C-CP01), HTP-C-CVM08, HTP-C-GG03 and HTP-C-GG05 (see Table 12.2). In relation to the Flat Rock lookout, the proposed works are likely to be constrained to the expansion of an existing road (Langans Road) that runs past the view point, and it is unlikely that the lookout would be lost or significantly affected by this activity. The other sites are between proposed transmission lines and/or in the vicinity of ancillary activities (primarily existing or proposed access tracks) where avoidance would be achievable.

While around 88 hectares of the Warkworth sand system are also predicted within the construction impact area, extensive tracts of these deposits are between proposed transmission towers. Similarly, avoidance of substantive parts of the soil profile are therefore probable where limited ground disturbance activities are proposed in these locales. It must also be emphasised that cultural materials are not encountered in all parts of the Warkworth sand system, for example only 80% of test pits in TR213-AS1 (#37-3-1626) within the Hunter Valley Operations mining complex contained stone artefacts, thereby reducing the significance of the deposit in these culturally sterile areas. Further archaeological test excavations planned for this project are expected to provide a clearer understanding of the sand system's distribution within the construction impact area, and further refine the location of cultural materials within the sand system that give the deposit its significance.

As outlined in *Chapter 10 (The archaeological assemblage of the project impact area)*, a number of cultural and intangible values are also documented within, or close to, the project impact area. These include view-lines and view-scapes between major promontories and localised cultural landscapes within which predominantly significant archaeological sites are encountered. In the case of the former, detailed visual impact assessments have shown that there would be no substantive obstruction of these view-lines, with the project not being visible in several instances (especially looking from east to west). However, ongoing discussions with Aboriginal participants have indicated that they perceive the project as impacting these view-lines and view-scapes, and that it will inhibit their ability to relay cultural information to others. As such, it is considered that the project would result in indirect impact to these culturally important view-lines and view-scapes (see section 7.3). Similarly, despite being within the working landscape of the State forest, Aboriginal participants consider that the project would impact the Trig Road, Dora Creek, Dora Pinnacles, and Flat Rock cultural landscapes.

Recommendations to manage these impacts in the event that they do occur are outlined in *Chapter 13 (Management strategy and recommendations)*.

12.5 Regional impact

Ecologically sustainable development, or intergenerational equity, is the principle whereby the current generation should maintain the health, diversity and longevity of the environment for the benefit of future society.[11] For Aboriginal heritage management, intergenerational equity can be considered primarily in terms of the cumulative impacts to Aboriginal objects, sites and/or places in a region. If few Aboriginal objects and places remain in a region (e.g. due to development impacts), there are fewer opportunities for future generations of Aboriginal people and the broader community to enjoy the cultural benefits. Understanding the integrity, rarity, and significance of Aboriginal objects, sites, and places that might be affected is important. This information helps explain how Aboriginal people used and occupied the land in the past and is essential for considering intergenerational equity and the project's cumulative impacts.

Despite a regional cultural assemblage of several thousand Aboriginal sites and places being documented in close proximity to the project impact area (*Chapter 8 (Archaeological context)*), only a small number are likely to be adversely affected. As outlined in *section 12.2*, extensive efforts have been made to avoid significant or rare sites where encountered near the construction impact area. In addition, the project has committed to avoiding 5 of the high significant Aboriginal sites and places documented, with a further 12 in locations where disturbance is considered to be low or improbable. With few exceptions, it is considered therefore that the overall impact from the project would be low.

In HTP North, the majority of encountered sites were composed of surface and/or shallowly buried stone artefact scatters, often in disturbed or eroding contexts. While development within the Hunter Valley is making such sites more infrequent, few of the identified sites would be considered representative or rare even in this context with many only just meeting thresholds above the broader background scatter. Indeed, the Aboriginal Heritage Information Management System (AHIMS) database (see *section 8.3*) indicates that around 1695 of such (extant) site types are present within the broader region. Further, many of these sites are only being partially impacted by the project, and portions of them would remain unaffected. It is, therefore, considered that limited cumulative impact would result to these types of sites across the project impact area. Although finding ancestral remains at the Hunter crossings (HTP-N-CVM01) would be rare in the Hunter Valley, and any impacts would likely have regional and cumulative significance, there is currently no evidence of such remains in these areas. This site is considered culturally significant due to the common presence of similar sites near major river systems, rather than because of previous discoveries or specific knowledge about these locations. At this stage, it is considered that cumulative impacts would not result from activity in these river crossings, but this would require re-consideration in the event that ancestral remains are encountered.

Conversely, in HTP North, the Warkworth sand system is a finite geological unit, which has been found to disparately contain significant cultural materials and some 88 hectares would be impacted by the project – although significant portions of these deposits are between proposed tower locations and unlikely to be substantively affected by the project. To put this in context, there is around 1600 hectares[12] predicted to be present within 1 kilometre of the project impact area, and recent excavations as part of the Singleton Bypass and the Singleton Military Area (see *section 9.3*) have shown it to be more extensive than initially hypothesised. Further at this stage, the scale of cultural heritage impacts is poorly defined due to an absence of available archaeological excavation in these zones within the construction impact area. It is noted that the project has committed to ongoing test excavations within the construction impact area as access to some areas of the alignment improves. It is however considered that at least some parts of this unit will not result in cultural

[11] While the use of 'ecologically sustainable development' here specifically references requirements outlined in *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011), it has equivalent meaning in other disciplines.

[12] This number is based on the analysis of the soil system as presented in Section 5.2.2.

heritage impacts. When reviewing major excavations of the Warkworth sand system, AMBS (2002) found 4 of 10 (40%) test pits to be culturally sterile, Scarp (2008) found minimal cultural materials in 2 of 4 (50%) open area excavations, and as outlined above EMM (2023) found some 20% of their test pits devoid of stone artefacts. As such, it can be hypothesised that around 20 to 50% of the Warkworth sand system may be culturally sterile at a general level, which suggests that the project may result in impacts to less than 88 hectares of cultural deposit based on these values. Despite this, the deposit is finite and regionally significant, and impacts are considered to have a regional cumulative impact. *Chapter 13 (Management strategy and recommendations)* provides mitigation measures to offset the loss of these deposits and to further inform any long-term management options.

The most significant sites within HTP Central and HTP South, including rockshelters, stone arrangements and grinding grooves, have been committed for avoidance. Impacts to any of these sites, and notably Deep Ck Mother SWA (#37-6-3714) – a rockshelter containing over 140 art motifs – would result in regionally significant impacts. Similarly in the case of HTP-C-CVM08 ([redacted]), only 3 previous sites of this type are within the AHIMS data. Acknowledging that several more such sites were found as part of the project– and in most cases avoided – the loss of HTP-C-CVM08 would still have a regional cumulative impact on an extremely rare site type in the region. It is also noted that the site is of significant value to the Awabakal traditional owners and as such, the site would be avoided. The potential loss of one culturally modified tree would reflect 11% of the regional assemblage of this site type based on the AHIMS data. While this site type comprises only a tenth of identified sites in the region, the rarity of this find within the State forest – a working landscape – would be considered a regionally significant loss, and as such the site would be avoided.

With the exception of Flat Rock Lookout (HTP-C-CP01), none of the cultural places proposed for impact within the construction disturbance area would result in cumulative impact. Both HTP-C-AR01 and HTP-C-AR02 are patches of natural flora resources used by Aboriginal people in the past but reflect species that would be expected to occur across the State forests and broader region. Their loss reflects the Aboriginal participants interest in traditional ecological knowledge, but neither site is rare. Nevertheless, recommendations made in *Chapter 13 (Management strategy and recommendations)* recommend the collection of these plants prior to project impacts, to offset the potential impact of their destruction. In the case of Flat Rock Lookout, this site relates to a unique Dreaming story within a highly ceremonial landscape and, therefore, any impacts would result in intergenerational loss. However, the works are not likely to destroy the Flat Rock Lookout, which extends beyond the project impact area, and the views to Mount Sugarloaf are unlikely to be changed by the project. While recommendations are, therefore, proposed to minimise impacts in this location (see *Chapter 13 (Management strategy and recommendations)*), it is considered that the values of the site would ultimately be relatively unaffected and, therefore, not likely to result in cumulative impacts.

In the case of HTP South, only a historical wishing well (HTP-S-CS01) would be impacted by the project. Here to, like HTP-S-AR01 and HTP-S-AR02, the site reflects a former spring that may have been used by Aboriginal people in the past. The site does not reflect specific knowledge of a past activity, and the presence of other springs and water sources across the State forests is considered probable. As such the loss of this site is not considered to result in cumulative impact.

The project would also have impacts on broader intangible values, such as view-lines and view-scapes, and localised cultural landscapes. It must be highlighted that few of these landscapes are pristine nor reflect pre-contact environments, with historical conurbations and other infrastructure, including transmission lines, present throughout the region. However, consultation with Aboriginal participants has indicated that ongoing development, which would include the project, is having an impact on their ability to practise and teach traditional lifeways. Based on this, it must be concluded that the project would result in some intergenerational loss to the local Aboriginal community through impacts to view-lines and view-scapes.

Given this, the project would result in cumulative impacts to the regional cultural assemblage, including important sites and places primarily in HTP Central, and result in some intergenerational loss. However, management and mitigation measures outlined in *section 12.2* and further in *Chapter 13 (Management strategy and recommendations)* would minimise or avoid such impacts wherever feasible.

Table 12.2 Summary of potential impacts to Aboriginal objects and/or sites by the project. Those in red are in locations where low impact activities would occur (i.e. between tower locations) and the sites may be unaffected by the project

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HTP North									
HVOCP TR47-AS3	37-2-6514	High density artefact scatter (>50)	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Partial	Partial loss of value	This site extends into, and beyond the construction impact area, and some of the cultural deposit would remain following the project. This site is partially within the construction impact area, in areas associated with spanning activities between towers which are anticipated to require minimal ground disturbance or vegetation clearance. Therefore, it is anticipated that this site would be minimally affected by the project.
BOP-OS8	37-6-2842	Moderate density artefact scatter (21–50)	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities between towers which are anticipated to require minimal ground disturbance or vegetation clearance. Therefore, it is anticipated that this site would be minimally affected by the project.

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HVO-1258	37-6-3376	High density artefact scatter (>50)	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities between towers which are anticipated to require minimal ground disturbance or vegetation clearance. Therefore, it is anticipated that this site would be minimally affected by the project.
HVO-1267	37-6-3384	Moderate density artefact scatter (21–50)	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Partial	Partial loss of value	This site extends into, and beyond the construction impact area, and some of the cultural deposit would remain following the project. This site is partially within the construction impact area, in areas associated with spanning activities between towers and anticipated to require minimal ground disturbance. Therefore, it is anticipated that this site would be minimally affected by the project.
2010-HVOSE-15	37-6-4023	High density artefact scatter (>50)	Valid	Moderate	Direct	Within a proposed access track upgrade	Complete	Complete loss of value	Due to the potential ground disturbance activities associated with access track upgrades within the construction impact area, this site is expected to be wholly impacted by the project.
HTP-N-AS01	37-2-6667	High density artefact scatter (>50)	Valid	Moderate	Direct	Potential transmission tower construction and surrounding activities	Complete	Complete loss of value	Due to the intrusive nature of tower construction activities, this site is expected to be impacted by the project.

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HTP-N-AS15	37-2-6666	High density artefact scatter (>50)	Valid	Moderate	Direct	Ancillary activities associated with potential transmission tower construction	Partial	Partial loss of value	This site extends into, and beyond the construction impact area, with most of the cultural deposit remaining outside the construction impact area following the project. As such, it is anticipated that this site would be partially impacted by the project.
HTP-N-AS30	37-6-4488	High density artefact scatter (>50)	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	Due to the potential ground disturbance activities associated with stringing sites within the construction impact area, this site is expected to be impacted by the project.
HTP-N-AS32	37-6-4487	High density artefact scatter (>50), potential archaeological deposit	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Partial	Partial loss of value	This site extends into, and beyond the construction impact area, and >90% of the cultural deposit would remain following the project. This site is partially within the construction impact area, in areas associated with spanning activities between towers which area anticipated to require minimal ground disturbance or vegetation clearance. Therefore, it is anticipated that this site would be minimally affected by the project
HTP-N-AS71	37-2-6665	High density artefact scatter (>50)	Valid	Moderate	Direct	Within the curtilage of a proposed Construction support site	Complete	Complete loss of value	Due to the potential ground disturbance activities associated with construction support sites within the construction impact area, this site is expected to be wholly impacted by the project.

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HTP-N-CVM01 (Hunter crossings)	37-6-4493	Cultural place	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities between towers which are anticipated to require minimal ground disturbance. In addition, this site is located along the banks of the Hunter River, where ground disturbance is not anticipated. Therefore, it is anticipated that this site would be minimally affected by the project.
HTP-N-BS1	See Note 3	Background scatter	Valid	Low	Direct	Entire construction impact area – all activities	Partial	No loss of value	This site represents part of a broader scatter of cultural materials extending across the region, and a loss of a portion of the cultural deposit is considered to have limited impact to its value.
HTP Central									
DEEP CK MOTHER SWA	37-6-3714	Rockshelter, art (pigment or engraved)	Valid	High	None	EnergyCo has committed to avoiding direct impacts on this site of high significance	NA	No loss of value	This site and surrounding environment (≥55 m) are committed for avoidance by the project. This is incorporated into mitigation measures in *section 13.4.*

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HTP-C-AR01	37-6-4486	Aboriginal resource and gathering	Valid	Moderate	Direct	Stringing activities and vegetation clearance between potential transmission towers; and nearby ancillary activities at Becketts Road	Complete	Complete loss of value	This site is wholly within the construction impact area, in areas associated with spanning activities and vegetation clearance activities between towers. The values of this site relate to specific tree species (as a resource used by Aboriginal people), due to vegetation clearance activities, this site is expected to be impacted by the project.
HTP-C-AR02	37-6-4485	Aboriginal resource and gathering	Valid	Moderate	Direct	Stringing activities and vegetation clearance between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities and vegetation clearance activities between towers. The values of this site relate to specific shrub species (as a resource used by Aboriginal people), due to ground disturbance activities associated with vegetation clearance activities, this site may be wholly impacted by the project.
HTP-C-CMT05	37-6-4483	Culturally modified tree	Valid	Moderate	Direct	Stringing activities and vegetation clearance between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities and vegetation clearance activities between towers. Due to ground disturbance activities associated with vegetation clearance, this site is likely to be wholly impacted by the project.

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HTP-C-CP01 (Flat Rock lookout)	45-3-5003	Cultural place	Valid	High	None	EnergyCo has committed to avoiding direct impacts on this site of high significance	NA	No loss of value	This site and surrounding environment (≥55 m) are committed for avoidance by the project. This is incorporated into mitigation measures in *section 13.4.*
HTP-C-CVM08	45-3-5010	[redacted]	Valid	High	None	EnergyCo has committed to avoiding direct impacts on this site of high significance	NA	No loss of value	This site and surrounding environment (≥55 m) are committed for avoidance by the project. This is incorporated into mitigation measures in *section 13.4.*
HTP-C-GG03	37-6-4484	Grinding groove	Valid	High	None	EnergyCo has committed to avoiding direct impacts on this site of high significance	NA	No loss of value	This site and surrounding environment (≥55 m) are committed for avoidance by the project. This is incorporated into mitigation measures in *section 13.4.*
HTP-C-GG05	45-3-5006	Grinding groove	Valid	High	None	EnergyCo has committed to avoiding direct impacts on this site of high significance	NA	No loss of value	This site and surrounding environment (≥55 m) are committed for avoidance by the project. This is incorporated into mitigation measures in *section 13.4.*
HTP-C-RS02	37-6-4492	Rockshelter (no cultural markers)	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities between towers which are anticipated to require minimal ground disturbance (e.g. potential vegetation clearing). Therefore, it is anticipated that this site would be minimally affected by the project.

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HTP-C-FA01 (CSS-10)	37-6-4490	Subsurface cultural deposit	Valid	Moderate	Direct	Within construction support site	Complete	Complete loss of value	Due to the potential ground disturbance activities associated with construction support sites within the construction impact area, this site is expected to be wholly impacted by the project.
HTP-C-FA02 (CSS-72, CSS-58 & CSS-56)	37-6-4489	Subsurface cultural deposit	Valid	Moderate	Direct	Within construction support site	Complete	Complete loss of value	Due to the potential ground disturbance activities associated with construction support sites within the construction impact area, this site is expected to be wholly impacted by the project.
HTP-C-FA03 (CSS-96)	37-6-4491	Subsurface cultural deposit	Valid	Moderate	Direct	Within construction support site	Complete	Complete loss of value	Due to the potential ground disturbance activities associated with construction support sites within the construction impact area, this site is expected to be wholly impacted by the project.
HTP-C-BS1	See Note 3	Background scatter	Valid	Low	Direct	Entire construction impact area	Partial	No loss of value	This site represents part of a broader scatter of cultural materials extending across the region, and a loss of a portion of the cultural deposit is considered to have limited impact to its value.
HTP South									
Watagan Creek ACD	45-3-4623	Cultural place	Valid	Moderate	Indirect	Stringing activities between potential transmission towers	Partial	No loss of value	This site reflects past visitation and resources associated with Watagan Creek, and which would remain unchanged by the project.

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HTP-S-CS01 (Wishing well)	45-3-5009	Cultural place	Valid	Moderate	Direct	Ancillary activities – access road upgrades [redacted]	Complete	Complete loss of value	Due to the potential ground disturbance activities associated with access road upgrades, this site is expected to be wholly impacted by the project.
HTP-S-GG01	45-3-5005	Grinding groove	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities between towers which are anticipated to require minimal ground disturbance (e.g. potential vegetation clearing). Therefore, it is anticipated that this site, while wholly within the construction impact area, would be minimally affected by the project.
HTP-S-RS16	45-3-5007	Rockshelter	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities between towers which are anticipated to require minimal ground disturbance. Therefore, it is anticipated that this site, while wholly within the construction impact area, would be minimally affected by the project.

Site	AHIMS #	Site type	Status	Significance	Type of harm	Location and/or activity causing harm	Degree of harm	Consequence of harm	Notes
HTP-S-RS19	45-3-5008	Rockshelter	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities between towers which are anticipated to require minimal ground disturbance. Therefore, it is anticipated that this site, while wholly within the construction impact area, would be minimally affected by the project.
HTP-S-RS20	45-3-5004	Rockshelter	Valid	Moderate	Direct	Stringing activities between potential transmission towers	Complete	Complete loss of value	This site is wholly within the construction impact area, in an area associated with spanning activities between towers which are anticipated to require minimal ground disturbance. Therefore, it is anticipated that this site, while wholly within the construction impact area, would be minimally affected by the project.
HTP-S-BS1	See Note 3	Background scatter	Valid	Low	Direct	Entire construction impact area	Partial	No loss of value	This site represents part of a broader scatter of cultural materials extending across the region, and a loss of a portion of the cultural deposit is considered to have limited impact to its value.

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 New South Wales

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 Aboriginal cultural heritage assessment (ACHA)

3. The background artefact scatter incorporates some 191 discrete site recordings of isolated Aboriginal objects and/or low-density artefact scatters of ≤20 per square metre. These sites are outlined in Table 10.1

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13 Management strategy and recommendations

13.1 Summary of this chapter

This chapter discusses the management strategy and recommendations relating to Aboriginal cultural heritage for the Hunter Transmission Project (HTP, the project):

- This Aboriginal cultural heritage assessment (ACHA) concludes that 32 Aboriginal sites/places are within the construction impact area. These include 10 moderate and high-density stone artefact scatters, 3 subsurface cultural deposits, 5 rockshelters, 3 grinding groove sites, a culturally modified tree, a stone arrangement, a portion of the broader artefact scatter (presented as 3 discrete site listings), and 6 cultural places (primarily in the form of resource and gathering places). Some 88 hectares of the Warkworth sand system is also within the construction impact area and may be adversely impacted, as well as ~2351 hectares of low-density background scatter found intermittently and disparately across the construction impact area. Of these 32 sites, 5 highly significant sites with this assemblage are committed for avoidance, while a further 12 are within project elements where impacts are expected to be minor. Additional sites are only partially within the construction impact area or are not considered to result in impacts to their significance even where adversely affected. The project impact area also bisects a significant cultural and ceremonial landscape and has the potential to indirectly affect important view-lines and view-scapes.

- A series of investigative actions are proposed to validate the predicted Warkworth sand system and other cultural deposits that cannot be robustly identified without further archaeological research unachievable during the ACHA process. This has been discussed with Heritage NSW and is proposed primarily to occur during the submissions phase and prior to project approval. General discussion on the methods and approaches to some of the mitigation measures is also summarised and presented further *in Appendix H (Post-approval requirements – guiding principles)*.

- Recommendations are proposed for inclusion in the project approval to guide post-approval requirements for Aboriginal heritage. These include the development of an Aboriginal cultural heritage management plan (ACHMP) to provide a framework for implementation of the proposed project, development of a cultural values impact strategy in discussion with Elders and knowledge-holders to offset adverse impacts to cultural places and values, and the development of an Interpretation Strategy and Plan to provide acknowledgement and other visual/educational opportunities for the Aboriginal and broader local community.

13.2 Summary of findings and potential impacts

The assessment outlined in the preceding sections, including Aboriginal consultation with the Wonnarua, Awabakal and Darkinjung traditional owners, included cultural mapping, field survey and test excavations. Each of these activities identified various areas and locales of archaeological and/or cultural value.

A substantive program of ongoing and iterative project refinement was undertaken during the ACHA process, and a large number of significant sites and places were avoided through this process (see *section 12.2*). Ultimately, on ratifying this data, 32 discrete Aboriginal sites and/or objects were identified within the construction impact area, along with a low density of background stone artefacts (<20 per square metre) likely to be intermittently and disparately present. Some 88 hectares of Warkworth sand system, a geological unit in which significant cultural material can occur, is also potentially present within the construction impact area. The project was also found to be in a rich cultural and ceremonial landscape, and several view-lines and view-scapes and localised areas of value were also highlighted and would potentially be affected by the project, including the Flat Rock Lookout, Trig Road, Dora Creek and Dora Pinnacles locales.

Of these identified sites, several of the highly significant sites and their environs are committed for avoidance by the project. The project also has the potential to impact around 88 hectares of the Warkworth sand system. The proposed impacts to several of the sites within HTP Central and the Warkworth sand system are considered to result in regional impact. It is also highlighted that several hundred sites and places, some of high significance, are within 200 metres of the construction impact area. Recommendations to make sure the project does not directly or indirectly affect these cultural materials are included in *section 13.4*.

In relation to the identified cultural landscapes and intangible values, a range of views were articulated during consultation activities on their meanings, importance and values, and whether the project would result in impact to them. Significant attempt has also been undertaken to reduce impacts to view-lines and view-scapes, through refinement of the project off ridgelines and hilltops onto upper and mid-slopes through the State forests. However, it has ultimately been concluded that the local Aboriginal community considers the project would result in impacts to these values through obstruction and/or interruption of connections between key Dreaming places and/or stories and adversely affect their ability to undertake contemporary practises and education. This is most noticeable in the vicinity of Flat Rock Lookout within Corrabare State Forest.

Of those sites that would be adversely affected, a large portion reflect archaeological sites that can be recovered and/or suitably mitigated prior to development activities, such as artefact scatters and culturally modified trees. In so doing, these would provide further information on the past use of the region, which has been a focus of consultation with the Aboriginal traditional owners. Given these findings and the potential impacts – both project-specific and cumulative – additional Aboriginal heritage requirements and mitigation activities are proposed for subsequent stages of the project. In the case of impacts to cultural places, non-archaeological mitigation measures have been discussed with Elders and knowledge-holders to offset the perceived impacts, and these are similarly included in subsequent sections.

13.3 Post-approval requirements

For the purposes of this project, recommendations include the development of an ACHMP to provide the post-approval management framework for all future Aboriginal heritage requirements. 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 *Appendix H (Post-approval requirements – guiding principles)*. These include measures to avoid Aboriginal objects and sites outside and within the construction impact area, investigation and salvage (conservation *ex situ*) of areas of moderate and high significance (including artefact scatters, stone arrangements, and culturally modified trees), archival recording of all identified sites subject to impact, any other recovery and/or collection procedures, completing any post-excavation analyses and reporting, and lodging the various documentation with appropriate public repositories. Notably, the ACHMP should include provisions for Aboriginal participants to recover and relocate key plant species within HTP-C-AR01 and HTP-C-AR02 given their cultural value to the local community.

In the case of the broader background artefact scatter (HTP-N-BS1, HTP-C-BS1, HTP-S-BS1), no further mitigation measures are recommended. It has been demonstrated that <20 artefacts per square metre would be expected intermittently and disparately across the construction disturbance area, which reflects the ephemeral use of the region by Aboriginal people for several millennia. Recovery of such cultural material would have limited scientific value.

In the case of impacts to places of cultural value, discussions with Elders and knowledge-holders sought a range of mitigation measures to offset the perceived harm (see *Chapter 7 (Cultural values mapping)*; *Appendix D (Supplementary cultural values information)*). To date, these are primarily focussed on Aboriginal-led cultural inductions for the project, ongoing cultural monitoring of activities in areas of high cultural value (notably Trig Road and Flat Rock cultural landscapes), and support for future Aboriginal-led research of these places and sites. Other opportunities may include access to Country and/or support for ranger programs. While in some instances the proposed actions can be included in the ACHMP, it is more suitable to manage them independently, since they are likely to require exploration of financial, contractual, community-benefit sharing and traditional ecological knowledge activities that may sit outside the project impact area and/or project timing. As such, it is recommended that a cultural values mitigation strategy is developed to expand on the initial discussions undertaken to date, to develop the details of the mitigation recommendations proposed by the Aboriginal participants and ensure their implementation should the project be approved.

Given the Forestry Corporation of NSW is a key landowner and stakeholder for substantive parts of the project impact area, and which include numerous cultural sites and places proposed for management, they should be consulted during the development of the ACHMP and the cultural values strategy.

In addition to the proposed management of cultural values, several Aboriginal participants noted the general absence or acknowledgement of Aboriginal history regionally. To address and further explore these values and as further offset of proposed harm to the cultural assemblage, it is recommended that an interpretation strategy and interpretation plan be developed and implemented to explore, develop and present Aboriginal heritage values of the project impact area. As with the ACHMP, guiding principles to be integrated into these documents are presented in *Appendix H (Post-approval requirements – guiding principles)*.

13.4 Mitigation measures

Table 13.1 provides a series of recommendations to be implemented for the project. These should be read in conjunction with the updated guiding principles in *Appendix H (Post-approval requirements – guiding principles)*.

Table 13.1 Management and mitigation measures for Aboriginal cultural heritage

Reference	Impact	Mitigation measure	Timing	Applicable location
AH01	Cultural heritage management	An ACHMP will be developed by a heritage specialist in consultation with the registered Aboriginal parties (RAPs) to provide the post-approval framework for managing archaeological mitigation and Aboriginal heritage within the project impact area. The ACHMP will include the following issues and consider guiding principles presented in *Appendix H (Post-approval requirements – guiding principles)*: • 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 will include a grievance mechanism that is readily available and designed for use by the local Aboriginal community • descriptions and methods to avoid any inadvertent impacts to identified Aboriginal objects and sites and areas of archaeological sensitivity outside of the construction impact area. A suitable regime of monitoring these activities will also be outlined, including locations, methods, personnel and timing • descriptions and methods of any additional investigative actions that may be required prior to construction works commencing or during the project for sites that are to be adversely impacted. Activities should include suitable archival recording and cultural material recovery (e.g. relocation of key components, surface collection and/or archaeological excavations). These should include opportunity for Aboriginal participants to recover and relocate culturally important flora species at HTP-C-AR01 and HTP-C-AR02. For these activities, details of locations, methods, personnel, and timing will be included • description and methods for undertaking further Aboriginal cultural heritage assessment, investigation and mitigation of any areas of the project that have changed following completion of the ACHA or during the final design and construction 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 will include suitable collection and processing of stone artefacts, and chronological, soil, and environmental samples • reinforcement of how the cultural landscape is to be considered throughout the project's construction and detail the rehabilitation of the construction impact area. Assessment of rehabilitation of areas where infrastructure is not remaining after construction of the project will be undertaken to determine suitable ecological communities and other factors in returning the cultural landscape as close to its current state as feasible	Detailed design Construction	• Project impact area, and all identified Aboriginal objects, sites and deposits identified in *section 10.2.4* that will be adversely impacted by the project.

Reference	Impact	Mitigation measure	Timing	Applicable location
		• procedures for managing the unexpected discovery of Aboriginal objects, sites and/or human ancestral 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 • procedures for the long-term management of cultural materials that remain within the operational impact area following construction activities • suitable knowledge transfer procedures for personnel changes between project planning and delivery to minimise loss or mistranslation of the intent of the information, findings and future steps for heritage management.		
AH02	Aboriginal objects outside the project impact area	Additional assessment will occur in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (2010a) for areas where ground disturbing activities are required in locations outside of the previously assessed area. Where required, additional heritage surveys will be carried out with the RAPs prior to ground disturbing activities occurring in any such areas (including areas where only visual inspection has been undertaken). If no Aboriginal objects are found or if Aboriginal objects are found and they would not be impacted, then a letter report will be prepared by a heritage specialist that documents the findings and gives clearance to proceed.	Construction Operation	• Activities outside of the project impact area
AH03	Aboriginal objects of high significance	Direct and indirect impacts to all highly significant identified Aboriginal objects and sites and their immediate environment (at least 55 m) within and in the vicinity of the project impact area will be avoided. Some guiding principles for consideration of avoidance are presented in *Appendix H (Post-approval requirements – guiding principles)*. Any site-specific avoidance measures developed to address this commitment would be integrated into AH01.	Detailed design Construction Operation	• DEEP CK MOTHER SWA (rock shelter) • Flat Rock lookout HTP-C-CP01 (cultural place) • HTP-C-CVM08 (cultural place) • HTP-C-GG03 (grinding groove) • HTP-C-GG05 (grinding groove) • Identified significant sites outside the impact area referenced in Table G.2

Reference	Impact	Mitigation measure	Timing	Applicable location
AH04	Impact avoidance and minimisation	The project will investigate the micro-siting of project infrastructure and construction activities in consultation with an Aboriginal heritage specialist to avoid or minimise impacts to all identified Aboriginal objects and sites within the project impact area. Some guiding principles for consideration of avoidance of Aboriginal sites and objects during construction of the project include (but are not limited to): • incorporation of the sites, cultural deposits, curtilages, and obligations for their protection into cultural inductions for the construction workforce • establishment of fencing and/or signage during works in and around identified sites and cultural deposits, which would be implemented in consultation with an Aboriginal heritage specialist and/or RAPs • where necessary, establishment of surface protection such as heavy-duty ground protection mats, or equivalent, which would be implemented in consultation with an Aboriginal heritage specialist and/or RAPs. Further guiding principles for consideration of avoidance are presented in Appendix H (Post-approval requirements – guiding principles). Any site-specific avoidance measures developed to address this commitment will be integrated into AH01.	Detailed design Construction	• All identified Aboriginal sites and objects presented in Table 10.1
AH05	Cultural heritage management	Prior to construction impact, archaeological test excavations will be carried out in areas where ground disturbance to areas of high cultural significance would occur during construction on the remaining sites and places outlined in *section 9.3.1i*. Test excavations will adopt approaches and methods outlined in *section 9.3* and/or the Archaeological Research Design developed for the project.	Detailed design	• Areas of high cultural significance, including areas predicted to contain Warkworth sand system deposits

Reference	Impact	Mitigation measure	Timing	Applicable location
AH06	Cultural heritage management	A cultural values mitigation strategy will be developed in consultation with the Awabakal Elders and key knowledge-holders who participated in the cultural values mapping study for the project. This will be undertaken to explore mitigations for the perceived social and cultural impacts to important view-lines and view-scapes between major promontories in HTP Central, and localised cultural landscapes at Trig Road, Flat Rock, Dora Creek and the Dora pinnacles. The strategy will include, but not be limited to: • implementation of Aboriginal-led cultural inductions throughout the project impact area • support for cultural monitoring of development activities through the Trig Road cultural landscape, Flat Rock cultural landscape, and within 200 m of the Dora pinnacles and Dora Creek. This will include approaches and methods for cultural monitors to be able to relay concerns to the project for consideration and subsequent management • support for an Aboriginal-led research program to investigate cultural areas of interest and associated Aboriginal sites and places at Trig Road cultural landscape and Flat Rock cultural landscape. This will include but not be limited to: HTP-C-RS14 (#45-3-5-5013), Corrabare State Forest Road 2 (#45-3-3582), Corrabare State Forest Western Side of Langans Rd SWA (#45-3-3583), and Corrabare (#45-3-2140).	Construction	• Flat Rock cultural landscape, Trig Road cultural landscape, Dora Creek, Dora pinnacles
AH07	Cultural heritage management	Where possible, the clearing of vegetation between significant cultural viewing locations and the project impact area will be minimised in discussion with Awabakal traditional owners. Where practicable, any intervening vegetation will be protected to reduce the potential for views of the project from Flat Rock lookout, including the view from the top of the rock as well as the setting and access track.	Detailed design Construction	• Flat Rock Lookout (HTP-C-CP01 [#45-3-5504]) • Other important cultural view-lines and view-scapes, including but not limited to SL5 and SL8
AH08	Cultural heritage management	Where practicable, project elements will be positioned to maximise the distance from and/or minimise their visibility within culturally important view-lines, notably SL5, in consultation with the Awabakal traditional owners.	Detailed design Construction	• Important cultural view-lines and view-scapes, including but not limited to SL5

Reference	Impact	Mitigation measure	Timing	Applicable location
AH09	Heritage interpretation	A heritage interpretation strategy will be developed by a heritage specialist to identify the Aboriginal heritage values throughout the project impact area, and to provide direction for potential interpretive opportunities for the project or off-site (e.g. at Broke, Cessnock or Martinsville). This strategy will be made available for consultation and feedback with the Wonnarua, Awabakal and Darkinjung traditional owners. Following consultation and feedback on the strategy, a heritage interpretation plan will refine the strategy with content (visual and textual) and design details in order to allow the implementation of the plan. The interpretation strategy and interpretation plan will be guided by the following principles: • the interpretation strategy and interpretation plan will be co-designed and closely developed with local Wonnarua, Awabakal and Darkinjung traditional owners. This includes identification of initial aims and ideas, content and structure • Content should include, but not be limited to: – the ethnographic and historical record, which includes post-contact and contemporary associations with the site and immediate environs – consultation and input from the Wonnarua, Awabakal and Darkinjung traditional owners – information obtained from the archaeological excavations and findings undertaken for the project. Further guiding principles for consideration of avoidance are presented in *Appendix H (Post-approval requirements – guiding principles)*.	Construction Operation	• All locations
AH10	Consultation	The Aboriginal community consultation process for this project will continue throughout detailed design and construction.	Detailed design Construction	N/A
AH11	Consultation	A copy of the ACHA and all relevant AHIMS site recording forms and information for the project will be lodged with Heritage NSW and provided to each of the RAPs, as relevant.	Detailed design	N/A
AH12	Operation	Following construction of the project, all Aboriginal sites and objects unharmed and/or partially impacted would be subject to a site condition assessment (including mapping and recording in GIS systems) by a heritage specialist in consultation with the RAPs. The site condition assessment will identify management requirements for the future conservation and protection of all documented cultural materials in the context of future operation and maintenance of the operation impact area. This will include consideration of increased access to Aboriginal sites and places as a result of the establishment and maintenance of the transmission easement.	Construction Operation	• Project impact area

References

AMBS. 2002. Archaeological Assessment of Aboriginal Heritage: Lemington to Warkworth Heavy Equipment Access Track. Unpublished report for Coal & Allied Operations Pty Ltd.

Archives Authority of NSW. 1998. A Guide to the New South Wales State Archives Relating to Aboriginal People. Sydney: The Authority.

Arrow Heritage Solutions. 2019. Mitchell Pit Aboriginal Cultural Heritage Site Salvage and Excavation Program–AHIP C0002193. Unpublished report prepared for HVO Pty Ltd.

Attenbrow, Val. 2004. What's Changing: Population Size or Land Use Patterns? The Archaeology of Upper Mangrove Creek, Sydney Basin. Terra Australis 21. Canberra, ACT: The Australian National University Press.

Australian Cultural Heritage Management. 2016. United Wambo Open Cut Coal Project: Aboriginal Cultural Values Assessment Report. Unpublished report prepared for Glencore/Peabody Energy.

Australian Museum Business Services. 2000. Archaeological Site Assessment: Howick Coal Mine, Hunter Valley, NSW. Unpublished report for Coal and Allied.

Australian Museum Business Services. 2001. Howick Coal Mine Archaeological Salvage Excavations, Hunter Valley, NSW Main Report (Volume 1 of a 2 Volume Report). Vol. 1. Unpublished report for Coal and Allied.

Australian Museum Business Services. 2005. Aboriginal Heritage Study: Newcastle Local Government Area.

Awabakal Language Program. n.d. "Awabakal Stories." Awabakal Language Program Online. Retrieved March 7, 2024 (https://awabakallanguage.org.au/awabakal-language/awabakal-stories).

Baker, N. 1992. New South Wales Parks and Wildlife Service Hunter Valley Aboriginal Sites Project: Stone Artefact Assessment and Analysis Recording Techniques and Methodology.

Bickford A, Brayshaw H and Proudfoot H (1998) 'Thematic Forest History And Heritage Assessment (Non-Indigenous) UNE/LNE CRA Regions', *NSW CRA/RFA Steering Committee*.

Biosis Pty Ltd. 2011. Proposed Mitchell Line Feeder Duplication: Aboriginal Cultural Heritage Archaeological Report.

Bowdler, Sandra. 1970. "Bass Point: The Excavation of a South East Australian Shell Midden Showing Cultural and Economic Change." Sydney University.

Bowler, James M., Harvey Johnston, Jon M. Olley, John R. Prescott, Richard G. Roberts, Wilfred Shawcross, and Nigel A. Spooner. 2003. "New Ages for Human Occupation and Climatic Change at Lake Mungo, Australia." Nature 421(6925):837–40. doi: 10.1038/nature01383.

Bradshaw, Corey J. A., Sean Ulm, Alan N. Williams, Michael I. Bird, Richard G. Roberts, Zenobia Jacobs, Fiona Laviano, Laura S. Weyrich, Tobias Friedrich, Kasih Norman, and Frédérik Saltré. 2019. "Minimum Founding Populations for the First Peopling of Sahul." Nature Ecology & Evolution 3(7):1057–63. doi: 10.1038/s41559-019-0902-6.

Brayshaw, Helen. 1981. "Archaeological Survey of Proposed Extensions to Howick-Liddell Open Cut Coal Mine."

Brayshaw, Helen. 1983. "Archaeological Survey of Proposed Mining Extension at Buchanan Borehole Collieries Mine at Lemington near Warkworth in the Hunter Valley."

Brayshaw, Helen. 1986. "Archaeological Survey at the CSR Lemington Mine Hunter Valley, NSW."

Brayshaw, Helen. 1987. Aborigines of the Hunter Valley: A Study of Colonial Records. Scone, NSW: Bicentennial Publication No 4, Scone and Upper Hunter Historical Society.

Brayshaw, Helen. 1989. Archaeological Survey of Proposed Southern Extension [A72] Howick Mine Near Liddell, NSW. Unpublished report for BP Coal Australia.

Brayshaw, Helen, and Laila Haglund. 1981. Archaeological Survey of the Site for the Proposed Hunter Valley No. 2 Opencut Coal Mine, Warkworth, N.S.W. Unpublished report to Coal & Allied Operations Pty Ltd.

Brenton, William Henry. 1835. Excursions in New South Wales, Western Australia, and Van Dieman's Land, during the Years 1830, 1831, 1832, and 1833. 2nd Editio. London: Richard Bentley, New Burlington Street.

Butlin, N. G. 1983. Our Original Aggression: Aboriginal Populations of Southeastern Australia, 1788-1850. Sydney; Boston: Allen & Unwin.

Callen, T. 1994. Bar Safe: History of Newcastle Harbour and Its Entrance. Newcastle, NSW: Newcastle Region Maritime Museum.

Central Queensland Cultural Heritage Management Pty Ltd. 2014. Warkworth Continuation 2014 Proposal Aboriginal Cultural Heritage Assessment. Vol. 2. Unpublished report prepared for Warkworth Mining Limited.

Central Queensland Cultural Heritage Management Pty Ltd. 2016. Aboriginal Cultural Heritage Assessment Report for the Hunter Valley Operations: Mitchell Pit Development Aboriginal Heritage Impact Permit (AHIP) Application. Unpublished report prepared for HVO Pty Ltd.

Clarke, Philip. 2021. Hunter Valley Operations: Aboriginal Cultural Values Mapping Report. Unpublished confidential report prepared for EMM Consulting.

Clive Lucas, Stapleton and Partners Pty Ltd. 2013. Hunter Estates: A Comparative Heritage Study of Pre 1850s Homestead Complexes in the Hunter Region. Volume I: Historical Context and Survey of Sites.

Clouten, K. 1967. Reid's Mistake: The Story of Lake Macquarie from Its Discovery until 1890. Lake Macquarie Shire Council.

Colonial Secretary. 1883. "Copies of Minutes and Memorandums Received."

Cooksey. 1926. "Aboriginal Flakes and Tools of Newcastle (N.S.W.) and District." Virtual Sourcebook for Aboriginal Studies in the Hunter Region.

Darkinjung Aboriginal Land Counci. 2020. "Culture & Heritage." Retrieved March 7, 2024 (https://www.darkinjung.com.au/culture-and-heritage/).

DCCEEW (Department of Climate Change, Energy, the Environment and Water (2020) Interim Biographic Regionalisation for Austrtalia v. 7, DCCEEW, Australian Government.

Dean-Jones P, Peter B and Mitchell B (1993) 'Hunter Valley Aboriginal Sites Assessment Project: Environmental Modelling for Archaeological Site Potential in the Central Lowlands of the Hunter Valley'.

DECCW (Department of Environment, Climate Change and Water) (2010a) Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW, DECCW, Australian Government.

DECCW (Department of Environment, Climate Change and Water) (2010b) Aboriginal Cultural Heritage Consultation Requirements for Proponents, DECCW, Australian Government.

Department of Climate Change Energy the Environment and Water. 2020. Interim Biogeographic Regionalisation for Australia v. 7 (IBRA).

Dortch, C. E. 1979. "New Perceptions of the Chronology and Development of Aboriginal Fishing in South-Western Australia." World Archaeology 29(1):15–35.

Dunn, M. 2015. "A Valley in a Valley: Colonial Struggles over Land and Resources in the Hunter Valley, NSW 1820-1850." UNSW.

Dunn, M. 2020. The Convict Valley - the Bloody Struggle on Australia's Early Frontier. Allen & Unwin Pty Ltd.

Dyall, L. K. 1972. "Aboriginal Occupation in the Dudley-Jewells Swamp Area." Hunter Natural History 4(3):168–77.

EMM (EMM Consulting Pty Ltd) (2022) Aboriginal Cultural Heritage Assessment: HVO Continuation Project, prepared for HV Operations Pty Ltd, EMM.

EMM (EMM Consulting Pty Ltd) (2023) HVO Continuation Project Aboriginal Cultural Heritage Assessment Addendum. Report prepared for HV Operations Pty Ltd.

Environmental Resources Management Australia Pty Ltd. 2004. Substation Access Road: Statement of Enviromental Effects. Unpublished report for Coal and Allied Operations Pty Ltd.

Environmental Resources Management Australia Pty Ltd. 2005. Carrington Extension, Hunter Valley Operations: Cultural Heritage Assessment. Unpublished report for Coal and Allied Pty Ltd.

ERM Mitchell McCotter Pty Ltd. 1995. "Archaeology and Anthropology: Authorisation 72 Howick Coal Mine."

ERM Mitchell McCotter Pty Ltd. 1997. Extension of Mining Operations at Ravensworth Mine EIS (Volume 2). Unpublished report prepared for Peabody.

ERM Mitchell McCotter Pty Ltd. 1999a. Carrington Mine Environmental Impact Statement. Unpublished report prepared for Coal & Aliied Operations Pty Ltd.

ERM Mitchell McCotter Pty Ltd. 1999b. Carrington Mine Environmental Impact Statement Supplementary Archaeological Information. Unpublished report for Coal & Allied Operations Pty Ltd.

Fawcett, J. W. 1898. "Customs of the Wonnah-Ruah Tribe, and Their Dialect or Vocabulary Continued." Science, 180–81.

Find and Connect. 2023. "Aborigines Protection Board (1883 - 1940)." Retrieved March 7, 2024 (https://www.findandconnect.gov.au/guide/nsw/NE00034).

Fitzsimmons, K. E., C. Spry, and N. Stern. 2019. "Holocene and Recent Aeolian Reactivation of the Willandra Lakes Lunettes, Semi-Arid Southeastern Australia." Holocene 29:606–21.

Fluvial Systems (Fluvial Systems Pty Ltd) (2023) *HVO Continuation Project: Geomorphological Assessment of Potential Extent of Late-Pleistocene Deposits Across the Project Area*, Fluvial Systems Pty Ltd, accessed XXX.

Ford, Geoffrey Eric. 2010. "Darkiñung Recognition An Analysis of the Historiography for the Aborigines from the Hawkesbury-Hunter Ranges to the Northwest of Sydney." University of Sydney.

FCNSW (Forestry Corporation of NSW) (2024) 'Over a Centenary of Forestry in NSW', accessed 7 March 2024 (https://www.forestrycorporation.com.au/about/history).

Fullagar, R., Stephenson, B. Hayes, E. 2017. "Grinding Grounds: Function and Distribution of Grinding Stones from an Open Site in the Pilbara, Western Australia." Quaternary International 427:175–83.

Fuller, R. .. 2020. "The Astronomy and Songline Connections of the Saltwater Aboriginal Peoples of the New South Wales Coast." University of New South Wales.

Galloway RW (1963) 'Geomorphology of the Hunter Valley' pp. 90–102 in No.8 General Report on the Lands of the Hunter Valley, CSIRO Land Research Surveys 2010(1) 1-156, edited by Story R, Galloway RW, van de Graaff RHM and Tweedie AD. Melbourne, Victoria, Victoria: CSIRO.

Gould, R. 1977. "Puntutjarpa Rockshelter and the Australian Desert Culture." Anthropological Papers of the American Museum of Natural History.

Gourlay RC and Tunstall BR (1995) Environmental Impact Assessment of the Singleton Training Area, report to the Department of Defence.

Government Gazette of the State of New South Wales. 1914a. "Proclamation." Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), May 27, 3080.

Government Gazette of the State of New South Wales. 1914b. "Proclamation." Government Gazette of the State of New South Wales, July 15, 4065.

Government Gazette of the State of New South Wales. 1919a. “Proclamation—‘Forestry Act, 1916.’” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), August 8, 4416.

Government Gazette of the State of New South Wales. 1919b. “Proclamation—‘Forestry Act, 1916.’” Government Gazette of the State of New South Wales, August 29, 4744.

Government Gazette of the State of New South Wales. 1920a. “Proclamation—‘Forestry Act, 1916.’” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), March 12, 1556.

Government Gazette of the State of New South Wales. 1920b. “Proclamation—Forestry Act, 1916.” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), June 25, 3589.

Government Gazette of the State of New South Wales. 1920c. “Proclamation—‘Forestry Act, 1916.’” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), February 6, 869–70.

Government Gazette of the State of New South Wales. 1921. “Proclamation—Forestry Act, 1916.” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), October 7, 5767.

Government Gazette of the State of New South Wales. 1929. “Crown Lands Not Available For Settlement Until Further Notification.” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), May 10, 2028.

Government Gazette of the State of New South Wales. 1942. “Forestry Act, 1916-1935.” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), October 2, 2719.

Government Gazette of the State of New South Wales. 1966. “Forestry Act, 1916-1964.—Proclamation.” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), November 11, 4669.

Government Gazette of the State of New South Wales. 1984. “Setting Apart Of Part Of A State Forest As A Flora Reserve.” Government Gazette of the State of New South Wales (Sydney, NSW : 1901 - 2001), June 29, 3439.

Grant, J. 1803. The Narrative of a Voyage of Discovery in the Years 1800, 1801, and 1802, to New South Wales. London.

Gray, Nancy. n.d. “Dangar, Henry (1796–1861).” Australian Dictionary of Biography. Retrieved January 26, 2022 (https://adb.anu.edu.au/biography/dangar-henry-1954/text2349).

Greenwood P (2013) 'Land of the Wiradjuri: Traditional Wiradjuri Culture, Wagga Wagga, NSW', *Riverina Environmental Education Centre*

Gunson, Niel. 1966. “Biraban (?–C. 1842).” Australian Dictionary of Biography Online. Retrieved March 13, 2024 (https://adb.anu.edu.au/biography/biraban-1781).

Gunson, Niel. 1967. “Lancelot Edward Threlkeld (1788–1859).” Australian Dictionary of Biography Online. Retrieved March 13, 2024 (https://adb.anu.edu.au/biography/threlkeld-lancelot-edward-2734).

Haglund, L. 1993. Archaeological Investigation of Site 37-5-63, Hunter Valley No 1 Mine: October 1993 Test Excavations for Coal and Allied Pty Ltd. Unpublished report to E.Rich on behalf of Coal & Allied Pty Ltd.

Haglund, Laila. 1982. Archaeological Survey of Proposed Routes for Conveyor Belt and Haul Road Linking Hunter Valley No. 2 Mine Authorisation Area with Hunter Valley No. 1 Mine. Unpublished report to Croft & Associates Pty Ltd.

Hamm, G., P. Mitchell, G. J. Arnold, L.J. Prideaux, D. Questiaux, N. A. Spooner, V. A. Levchenko, Foley E.C., T. H. Worthy, B. Stephenson, V. Coulthard, C. Coulthard, S. Wilton, and D. Johnston. 2016. “Cultural Innovation and Megafauna Interaction in the Early Settlement of Arid Australia.” Nature 539.

Harris, J. 1801. “Surgeon Harris to Governor King 25 June, 1801.” 416–18.

Hawley, S. P., R. A. Glen, and C. J. Baker. 1995. “Newcastle Coalfield Regional Geology 1:100 000.”

Heritage Now Pty Ltd. 2023. “Corrabare North Cultural Survey Report.”

Hiscock, Peter, P. Hughes, W. Shawcross, and R. Paton. 2000. Report of a Salvage Excavation at Site 37-5-63 Hunter Valley, New South Wales. Unpublished report to ERM Mitchell McCotter Pty Ltd.

HLA Envirosciences Pty Ltd. 2006. Aboriginal Heritage Assessment: Area 2, Area 4, Railway Easement, LCHPP, and Archerfield, Hunter Valley Operations South, NSW. Unpublished report prepared for Rio Tinto Coal Australia Pty Ltd.

Hughes PJ (unpublished) 'An Overview of the Archaeology of the Hunter Valley, Its Environmental Setting and the Impact of Development: NSW National Parks and Wildlife Service Hunter Valley Region Archaeology Project Stage 1', NSW National Parks and Wildlife Service.

Hughes PJJ, Spooner N and Questiaux D (2014) 'The Central Lowlands of the Hunter Valley, NSW: Why so Few Early Sites Have Been Found in This Archaeologically-Rich Landscape', *Australian Archaeology* 79:34–44, doi:10.1080/03122417.2014.11682017.

Huonbrook Environment & Heritage Pty Ltd. 1999. A Geomorphological Assessment of the Proposed Carrington Mine Site, Hunter Valley, NSW. Unpublished report to ERM Mithcell McCotter Pty Ltd.

Huonbrook Environment & Heritage Pty Ltd. 2000. Archaelogical and Geomorphological Excavations at the Proposed Carrington Mine Site, Hunter Valley, NSW. Unpublished report for Environmental Resources Management Australia.

HV Operations Pty Ltd. 2017. Aboriginal Cultural Heritage Assessment Report for the Hunter Valley Operations North (DA 450-10-2003), West Pit Dam 17 – Aboriginal Heritage Permit Application. Unpublished report prepared for Rio Tinto Coal Australia Pty Ltd.

Jacobs Group (Australia) Pty Limited. 2019a. Bayswater Water and Other Associated Operational Works Project: ACHA. Unpublished report prepared for AGL Macquarie.

Jacobs Group (Australia) Pty Limited. 2019b. Testers Hollow Cultural Values Assessment. Unpublished report prepared for Roads and Maritime.

Jacobs Group (Australia) Pty Limited. 2021. Eraring Battery Energy Storage System: Aboriginal Cultural Heritage Assessment Report. Unpublished report prepared for Origin Energy Eraring Pty Limited.

JACTO Australia Pty Ltd. 2008. Hunter Valley Operations Mitchell Pit Stage 1 – Indigenous Archaeology Assessment. Unpublished report prepared for Rio Tinto Coal Australia Pty Ltd.

Jones, Gerry. 2009. Yengo Country: A Source of Cultural & Spiritual Awakening.

Kayandel Archaeological Services. 2018. Stage 2 PACHCI Aboriginal Archaeological Survey Report. Unpublished report prepared for Roads and Maritime on behalf of Jacobs.

Keary, Anne. 2009. “Christianity, Colonialism, and Cross-Cultural Translation: Lancelot Threlkeld, Biraban, and the Awabakal.” Aboriginal History 33:117–55.

Kinhill Engineers Pty Ltd. 1995. Morisset Forestry District EIS: An Assessment of Aboriginal Archaeological Sites. Unpublished report prepared for State Forests NSW.

Koettig M 1986. Assessment of Archaeological Sites along the Proposed Singleton to Glennies Creek Water Pipeline Route and the Reservoir Site at Apex Lookout, Hunter Valley, NSW, *Public Works Department*.

Koettig, Margrit. 1991. Survey and Test Excavation: Authorisation 219. Unpublished report for Saxonvale Coal Pty Ltd.

Kovac M and Lawrie J (1991) Soil Landscapes of the Singleton 1:250,000 Sheet Map and Report, Soil Conservation Service of New South Wales.

Kuskie, P. 1997. An Aboriginal Archaeological Assessment of a Newcastle City Council Property at the Corner of Lenaghans Drive and John Renschaw Drive, Beresfield, Lower Hunter Valley, NSW.

Kuskie, P. 1999. An Aboriginal Archaeological Assessment of a Proposed Extension to the South Lemington Coal Mine Lease. Unpublished report prepared for Lemington Coal.

Lake Mac Familiy Life. 2019. “Lake Macquarie, from the Watagans State Forest Viewpoint.” Retrieved March 13, 2024 (https://lakemacfamilylife.com.au/watagans-state-forest-viewpoint/).

Lampert, R. 1971. Burrill Lake and Currarong: Coastal Sites in Southern New South Wales, Terra Australia I. Canberra, ACT: Department of Prehistory, Research School of Pacific Studies, ANU.

Lang, John Dunmore. 1834. An Historical and Statistical Account of New South Wales: Both as a Penal Settlement and as a British Colony. London: Cochrane and M’Crone.

Langley, M., Chris Clarkson, and Sean Ulm. 2011. “From Small Holes to Grand Narratives: The Impact of Taphonomy and Sample Size on the Modernity Debate in Australia and New Guinea.” Journal of Human Evolution2 61(2).

Mathews, Robert Hamilton. 1897. “The Burbung of the Darkinung Tribes.” Proceedings of the Royal Society of Victoria 10:1–12.

Maynard, J. 1999. “Fred Maynard and the Australian Aboriginal Progressive Association.” Journal of Aboriginal History 21:1–13.

Maynard, John. 2013. “Awabakal Voices: The Life and Work of Percy Haslam.” Aboriginal History Journal 37(2013):77–92. doi: 10.22459/ah.37.2013.04.

McCardle Cultural Heritage Pty Ltd. 2009a. Carrington West Extension Study Area–Indigenous Archaeology Assessment. Unpublished report prepared for Rio Tinto Coal Australia Pty Ltd.

McCardle Cultural Heritage Pty Ltd. 2009b. Hunter Valley Operations: South Riverview – AHIP S90 #1102084 Indigenous Archaeological Results. Unpublished report prepared for Rio Tinto Coal Australia Pty Ltd.

McCardle Cultural Heritage Pty Ltd. 2009c. Mitchell Pit Stage 1 – Indigenous Archaeology Assessment. Unpublished report prepared for Rio Tinto Coal Australia Pty Ltd.

McCardle Cultural Heritage Pty Ltd. 2010. HVO CHPP Energy Australia Substation Relocation–Indigenous Archaeology Assessment. Unpublished report prepared for Rio Tinto Coal Australia Pty Ltd.

McDonald, Jo. 1994. The Results of an Excavation Programme near Mount Yengo in the Hunter Range, NSW. Department of Prehistory and Anthropology Faculties, ANU, Canberra.

McDonald, Josephine. 2008. Dreamtime Superhighway : An Analysis of Sydney Basin Rock Art and Prehistoric Information Exchange. ANU E Press.

McNiven, I., Dunn, J.E., Crouch, J., Gunditj Mirring Traditional Owners Aboriginal Corporation. 2017. “Kurtonitj Stone House: Excavation of a Mid-Nineteenth Century Aboriginal Frontier Site from Gunditjmara Country, South-West Victoria.” Archaeology in Oceania 52(3):171–97.

Newcastle Morning Herald and Miners’ Advocate (1 June 1946) 'Hitch-hike back to camp'.Newcastle Morning Herald and Miners’ Advocate, accessed XX.

Newcastle Morning Herald and Miners’ Advocate (1947). “Forests Go Down Into Mines.” Newcastle Morning Herald and Miners’ Advocate (NSW : 1876 - 1954), October 4, 5.

Miller, J. 1985. “About the Wonnarua.” Retrieved March 11, 2022 (https://wonnarua.org.au/wp-content/uploads/2021/06/about-the-wonnarua-2.pdf).

Miller, R. 1887. “The Hunter River: The Wonnarua Tribe and Language.” Pp. 352–55 in The Australian race: its origins, languages, customs, place of landing in Australia, and the routes by which it spread itself over that continent. Vol. 3. Melbourne, Victoria: Government Printer.

Milliss, R. 1992. Waterloo Creek. Sydney: University of New South Wales Press.

Miromaa Aboriginal Language and Technology Centre. 2020. Awabakal Dictionary: Community Edition. Hamilton, NSW: Miromaa Aboriginal Language & Technology Centre.

Moore, D. .. 1981. “Results of an Archaeological Survey of the Hunter River Valley, New South Wales, Australia. Part II. Problems of the Lower Hunter and Contacts with the Hawkesbury Valley.” Records of the Australian Museum 33(9):388–442.

Moore, D. R. 1970. “Results of an Archaeological Survey of the Hunter River Valley, New South Wales, Australia. Part I. The Bondaian Industry of the Upper Hunter and Goulbourn River Valleys.” Records of the Australian Museum 28(2):25–64.

Nolan, Rosa. 2012. “‘We Want to Do What They Did’: History at St Clair.” University of Sydney.

NSW National Parks and Wildlife Service. 2010. Watagans National Park and Jilliby State Conservation Area: Plan of Management.

NSW National Parks and Wildlife Service. 2023. Corrabare Flora Reserves (Corrabare North No. 203 And Corrabare South No. 204) Site Specific Working Plan.

OEH (Office of Environment and Heritage) (2011) Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW, OEH, New South Wales Government.

O’Connell, James F., Jim Allen, Martin A. J. Williams, Alan N. Williams, Chris S. M. Turney, Nigel A. Spooner, Johan Kamminga, Graham Brown, and Alan Cooper. 2018. “When Did Homo Sapiens First Reach Southeast Asia and Sahul?” Proceedings of the National Academy of Sciences 115(34):8482–90. doi: 10.1073/pnas.1808385115.

O’Neill, C, and C Danis (2013) The Geology of NSW, report to the New South Wales Chief Scientist’s Office.

Office of Environment and Heritage NSW Government. 2014. Soil and Land Resources of the Merriwa Plateau. NSW Office of Environment and Heritage, Sydney.

OzArk Environmental & Heritage Pty Ltd. 2013. Aboriginal Archaeological Values Assessment Bulga Optimisation Project. Vol. 7.

OzArk Environmental & Heritage Pty Ltd. 2015. “Archaeological Due Diligence Assessment Proposed Erosion Control Works Hillcrest Offset Area, Upper Hunter Valley NSW Muswellbrook Local Government Area.”

OzArk Environmental & Heritage Pty Ltd. 2016. Aboriginal Archaeological Values Assessment: United Wambo Project. Unpublished report prepared for Glencore/Peabody Energy.

OzArk Environmental & Heritage Pty Ltd. 2019. Glendell Continued Operations Project. Vol. 27.

Pardoe, Colin. 1995. “Riverine, Biological and Cultural Evolution in Southeastern Australia.” Antiquity 69(265):696–713. doi: 10.1017/S0003598X00082284.

Parish of Pokolbin. 2024. “History: About the Parish of Pokolbin.” Retrieved March 13, 2024 (https://www.parishofpokolbin.com.au/history/).

Pate, D. F. 1998. “Stable Carbon and Nitrogen Isotope Evidence for Prehistoric Hunter-Gatherer Diet in the Lower Murray River Basin, South Australia.” Archaeology in Oceania 33(2):92–99.

Paterson, William. 1801a. “Lieut. Colonel Paterson’s Journal and Discoveries at Hunter River, 1801.” 447–48.

Paterson, William. 1801b. “Paterson to King, 25 June 1801.” 414–16.

Paul Budde History, Philosophy, Culture. n.d. “The Darkinjung.” Retrieved March 7, 2024 (https://paulbuddehistory.com/bucketty/the-darkinjung/).

Rich, Elizabeth. 1990. Proposed New Road: Bulahdelah to Coolongolook - Archaeological Survey for Aboriginal Sites. Unpublished report for Roads and Traffic Authority.

Rich, Elizabeth. 1993. Archaeological Investigations of Sites 37-5-63 and 37-5-126 Hunter Valley No.1 Mine. Unpublished report for Coal and Allied Operations Pty Ltd.

Ryan, Lyndall, Jennifer Debenham, Bill Pascoe, Robyn Smith, Chris Owen, Jonathan Richards, Stephanie Gilbert, Robert. J. Anders, Kaine Usher, Daniel Price, Jack Newley, Mark Brown, Le. Hoang. Le, and Hedy Fairbairn. 2022. "Colonial Frontier Massacres in Australia 1788-1930." Retrieved March 16, 2022 (https://c21ch.newcastle.edu.au/colonialmassacres/detail.php?r=566).

Scarp Archaeology. 2009. Warkworth Sands Archaeological Project.

Scarp Archaeology. 2011. Cultural Heritage Investigations: Hunter Valley Operations Over Land Conveyor Firebreak, Hunter Valley. Unpublished report for Rio Tinto Coal Australia.

Singleton Argus. 1888. "A 'Grand' Corroboree." Singleton Argus (NSW : 1880 - 1954), February 29, 2.

Smith, M.A., Hayes, E., Stephenson, B. 2015. "Mapping a Millstone: The Dynamics of Use-Wear and Resides on a Central Australian Seed-Grinding Implement." Australian Archaeology 80:70–79.

State Library of NSW. 2021. "Australian Agricultural Company." State Library of NSW. Retrieved February 19, 2021 (https://www.sl.nsw.gov.au/stories/australian-agricultural-and-rural-life/australian-agricultural-company).

Stewart J and Adler J (1995). "New South Wales Petroleum Potential – Sydney Basin."

Stockton, E. 1973. "Shaw's Creek Rockshelter Human Displacement of Artefacts and Its Significance." Mankind 9:112–17.

Stockton, E., and W. Holland. 1974. "Cultural Sites and Their Environment in the Blue Mountains." Archaeology and Physical Anthropology in Oceania 9(1):36–65.

Suters Architects. 2007. Newcastle City Wide Heritage Study: Thematic History. Unpublished report for Newcastle City Council.

The Cessnock Eagle and South Maitland Recorder. 1919. "Forestry Reserve." The Cessnock Eagle and South Maitland Recorder (NSW : 1913 – 1954), July 25, 3.

The Cessnock Eagle and South Maitland Recorder. 1925. "The Timber Industry." The Cessnock Eagle and South Maitland Recorder (NSW : 1913 – 1954), February 24, 7.

The Council of the City of Maitland. 1983. A New History of Maitland. Maitland, NSW: The Council of the City of Maitland.

The Gosford Times and Wyong District Advocate. 1920. "Supplies for the Public." The Gosford Times and Wyong District Advocate (NSW : 1906 - 1954), July 29, 5.

The Maitland Daily Mercury. 1921. "Olney State Forest." The Maitland Daily Mercury (NSW : 1894 - 1939), January 11, 4.

The Sydney Morning Herald. 2004. "Pokolbin." The Sydney Morning Herald Online, February 8.

Threlkeld, Lancelot Edward. 1974. Australian Reminiscences & Papers of L.E. Threlkeld, Missionary to the Aborigines, 1824-1859. edited by W. N. Gunson. Canberra, ACT: Australian Institute of Aboriginal Studies.

Tindale, Norman B. 1974. Aboriginal Tribes of Australia: Their Terrain, Environmental Controls, Distribution, Limits and Proper Names. Canberra, A.C.T.: Australian National University Press.

Tobler, R., A. Rohrlach, J. Soubrier, P. Bover, B. Llamas, J. Tuke, N. Bean, A. Abdullah-Highford, S. Agius, A. O'Donoghue, I. O'Loughlin, P. Sutton, F. Zilio, K. Walshe, Alan N. Williams, C. Turney, SM. Richards, R. Mitchell, E. Kowal, J. Stephen, L. Williams, W. Haak, and A. Cooper. 2017. "Aboriginal Mitogenomes Reveal 50,000 Years of Regionalism in Australia." Nature 544(7469):180–84.

Tocomwall Pty Ltd. 2015. Glencore United Collieries Aboriginal Cultural Heritage Assessment. Unpublished report prepared for Glencore Coal Assets Australia.

Tuck, D. 2003. An Introduction to the Aboriginal History of Newcastle & of the Lower Hunter NSW.

Turner, J. 1997. A Pictorial History of Newcastle. Crows Nest, NSW: Kingsclear Books.

Turner JW (1985) 'Historical Themes of the Shire of Muswellbrook'.

Turner, J. W. 1996. Muswellbrook Shire Wide Heritage Study: Volume Three : Historical Themes of the Shire of Muswellbrook.

Turney, Chris S. M., Michael I. Bird, L. Keith Fifield, Richard G. Roberts, M. Smith, C. Dortch, R. Grun, E. Lawson, L. Ayliffe, G. Miller, J. Dortch, and R. Cresswell. 2001. "Early Human Occupation at Devil's Lair, Southwestern Australia 50,000 Years Ago." Quarternary Research 55(1).

Umwelt (Australia) Pty Limited. 1998. Environment Impact Statement: Newstan Colliery Life Extension Project. Unpublished report prepared for Powercoal.

Umwelt (Australia) Pty Limited. 2003. "Minmi Corridors Assessment - Maintaining and Enhancing Natural and Cultural Heritage Values."

Umwelt (Umwelt Australia Pty Limited) (2023a) Appendix F - Historic Heritage Assessment, [unpublished report] prepared for the Department of Defence, Umwelt.

Umwelt (Umwelt Australia Pty Limited) (2023b) Hunter Trasmission Project Heritage Risk Assessment, [unpublished report] prepared for EnergyCo, Umwelt.

Umwelt (Umwelt Australia Pty Limited) (2023c) Singleton Military Area Heritage Management Plan: Appendix D - Indigenous Heritage Assessment [unpublished report] prepared for the Department of Defence.

Umwelt (Australia) Pty Ltd. 2004. Response to Department of Environment and Conservation Request for Further Information in Relation to the Aboriginal Archaeological Assessment - Glendell Open Cut Mine. Unpublished to Glendell Joint Venture.

Umwelt (Australia) Pty Ltd. 2010. Ravensworth Operation Project Environmental Assessment Volume 5 Appendix 11A Aboriginal Archaeological Assessment.

Veritas Archaeology & History Service. 2017. Report Covering Cultural Collection, Salvage and Sub-Surface Investigations at HVO West Pit Dam 17 Area. Unpublished report prepared for HVO Pty Ltd.

Veth, P. 1993. Islands in the Interior: The Dynamics of Prehistoric Adaptations within the Arid Zone of Australia. Michigan: Ann Arbor.

Wafer, Jim. 2014. "Placenames as a Guide to Language Distribution in the Upper Hunter, and the Landnám Problem in Australian Toponomastics." Pp. 57–82 in Indigenous and Minority Placenames: Australian and International Perspectives, edited by I. D. Clark, L. Hercus, and L. Kostanski. Canberra, ACT: ANU Press.

Wafer, Jim, and Tracey Howie. 2023. "A Southeastern Dog Country." in Australian National Placenames Survey.

Waters M (2000) 'Alluvial Stratigraphy and Geoarchaeology in the American Southwest'. *Geoarchaeology* 15(6):537–57.

Wiessner, P. 1990. "Is There a Unity to Style?" Pp. 105–12 in New Directions in Archaeology, edited by M. Conkey and C. Hastorf. Cambridge: Cambridge University Press.

Williams, Alan N. 2013. "A New Population Curve for Prehistoric Australia." Proceedings of the Royal Society B: Biological Sciences 280(1761):20130486. doi: 10.1098/rspb.2013.0486.

Williams, Alan N., Fenella Atkinson, Michelle Lau, and Phillip S. Toms. 2014. "A Glacial Cryptic Refuge in South-East Australia : Human Occupation and Mobility from 36 000 Years Ago in The." Journal of Quaternary Science 29(8):735–48. doi: 10.1002/jqs.2742.

Williams, Alan N., Adrian Burrow, Phil S. Toms, Oliver Brown, Michelle Richards, and Tessa Bryant. 2017. "The Cranebrook Terrace Revisited: Recent Excavations of an Early Holocene Alluvial Deposit on the Banks of the

Nepean River, NSW, and Their Implications for Future Work in the Region." Australian Archaeology 83(3):100–109. doi: 10.1080/03122417.2017.1392834.

Williams, Alan N., Peter Mitchell, Richard. S. Wright, and Phillip. S. Toms. 2012. "A Terminal Pleistocene Open Site On The Hawkesbury River, Pitt Town, New South Wales." Australian Archaeology 74(1):85–97. doi: 10.1080/03122417.2012.11681937.

Williams, Alan N., Sean Ulm, Andrew R. Cook, Michelle C. Langley, and Mark Collard. 2013. "Human Refugia in Australia during the Last Glacial Maximum and Terminal Pleistocene: A Geospatial Analysis of the 25-12ka Australian Archaeological Record." Journal of Archaeological Science 40(12):4612–25. doi: 10.1016/j.jas.2013.06.015.

Williams, Alan N., Sean Ulm, Ian Goodwin, and Mike Smith. 2010. "Hunter-Gatherer Response to Late Holocene Climatic Variability in Northern and Central Australia." Journal of Quaternary Science 25(6):831–38.

Williams, Alan N., Sean Ulm, Tom Sapienza, Stephen Lewis, and Chris S. M. Turney. 2018. "Sea-Level Change and Demography during the Last Glacial Termination and Early Holocene across the Australian Continent." Quaternary Science Reviews 182:144–54. doi: 10.1016/j.quascirev.2017.11.030.

Williams, Alan N., Sean Ulm, Chris S. M. Turney, D. Rohde, and G. White. 2015. "Holocene Demographic Changes and the Emergence of Complex Societies in Prehistoric Australia." PLoS ONE 10(6):e0128661.

Williams, Alan N., Peter Veth, W. Steffen, Sean Ulm, Chris S. M. Turney, J. M. Reeves, S. J. Phipps, and M. Smith. 2015. "A Continental Narrative: Human Settlement Patterns and Australian Climate Change over the Last 35,000 Years." Quaternary Science Reviews 123(2015):91–112. doi: 10.1016/j.quascirev.2015.06.018.

Wollombi Valley Progress Association. 1981. Wollombi Valley: Description and History. Wollombi Valley Progress Association.

Wonnarua Nation Aboriginal Corporation. 2014. "Our History." Retrieved March 11, 2022 (https://wonnarua.org.au/about-us-page-2/).

Yorston RM, Gaffney VL and Reynolds PJ (1990) 'Simulation of Artefact Movement Due to Cultivation', *Journal of Archaeological Science*, Volume 17, Issue 1, pp67–83.

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