

Environmental Impact Statement

20 Apr 2026
Rothbury Battery Energy Storage System

Environmental Impact Statement

Client: Ausgrid

ABN: 78 508 211 731

Prepared by

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Declaration

Project details	
Project name:	Rothbury Battery Energy Storage System
Application number:	SSD-85939708
Address of the land in respect of which the development is made:	1309 Wine Country Drive, Rothbury, NSW 2320
Applicant details	
Applicant name:	Ausgrid
Applicant address:	24-28 Campbell Street, Sydney, NSW, 2000
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Declaration	The undersigned declares that this EIS: • Has been prepared in accordance with the Environmental Planning and Assessment Regulation 2021 • Contained all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates • Does not contain information that is false or misleading • Addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project • Identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments • Has been prepared having regard to Department's State Significant Development Guidelines – Preparing an Environmental Impact Statement • Contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the Project and the principals of ecologically sustainable development • Contains a consolidated description of the Project in a single chapter of the EIS • Contains an accurate summary of the findings of any community engagement • Contains an accurate summary of the detailed technical assessment of the impacts of the Project as a whole.
Signature:	
Date:	20 April 2026

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Glossary and terms

Term/Acronym	Definition
°C	Celsius
µg/m ³	Micrograms per cubic metre
ABS	Australian Bureau of Statistics
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHCR	<i>Aboriginal Cultural Heritage Consultation Requirements for Proponents (Consultation Requirements)</i> (NSW DECCW, 2010a)
ACHMP	Aboriginal Cultural Heritage Management Plan
ADD	Archaeological Due Diligence
AEGL	Acute exposure guideline level
AEMO	Australian Energy Market Operator
AEP	Annual Exceedance Probability
AFAC	Australian and New Zealand National Council for Fire and Emergency Services
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information System
AHIP	Aboriginal Heritage Impact Permit
Airports Act	<i>Airports Act 1996</i> (Australian Government, 1996)
Airports Regulation	<i>Airports (Protection of Airspace) Regulation 1996</i> (Australian Government, 1999a)
ALR Act	<i>Aboriginal Land Rights Act 1983</i>
Amber	Amber Organisation Pty Ltd
ANO	Authorised Network Operator
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ARR 2019	<i>Australian Rainfall and Runoff version 4.2</i> (Babister et al., 2019, updated 2024)
ASS	Acid Sulfate Soils
ATSIHP	<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>
BAL	Bushfire Attack Level
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
BDAR	Biodiversity Development Assessment Report
BEMOP	Bushfire Emergency Management & Operations Plan
BERP	Bushfire Emergency Response Plan
BESS	Battery Energy Storage System
Biodiversity and Conservation SEPP	<i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i>
BMP	Biodiversity Management Plan

Term/Acronym	Definition
BoM	Bureau of Meteorology
BRA	Bushfire Risk Assessment
BTEXN	Benzene, toluene, ethylbenzene, xylene, naphthalene
CASA	Civil Aviation Safety Authority
CBD	Central Business District
CCEP	Construction phase Communications and Engagement Plan
CCSP	<i>Cessnock Community Strategic Plan 2036</i>
CCTV	Closed-Circuit Television
CEMP	Construction Environmental Management Plan
Cessnock LEP	<i>Cessnock City Council Local Environment Plan 2011</i>
CIA	Cumulative Impact Assessment
CLM Act	<i>Contaminated Land Management Act 1997</i>
CNVMP	Construction Noise and Vibration Management Plan
Construction Footprint	The area occupied by the Project during construction
COPC	Contaminant of Potential Concern
CPESC	Certified Practitioner of Erosion and Sediment Control
CRSCCS	Centre for Road Safety Crash and Casualty Statistics
Cth	Commonwealth
CTMP	Construction Traffic Management Plan
DA	Development Application
dB(A)	A-weighted decibel. This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e., 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCP	Development Control Plan
DEC	NSW Department of Environment and Conservation
DECC	NSW Department of Environment and Climate Change
DECCW	NSW Department of Environment, Climate Change and Water
DISER	Australian Government Department of Industry Science and Resources
DNSP	Distribution Network Service Provider
DoP	NSW Department of Planning
DOS	Degree of Saturation
DG	Dangerous goods
DP	Deposited Plan
DPE	NSW Department of Planning and Environment
DPHI	NSW Department of Planning, Housing and Infrastructure
DPIE	NSW Department of Planning, Industry and Environment

Term/Acronym	Definition
EDC	Estimated Development Cost
EIS	Environmental Impact Statement
ELF	Extremely Low Frequency
EMF	Electric and magnetic field
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2021 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
EPI	Environmental Planning Instrument
EPL	Environmental Protection Licence
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development
EST	Energy Security Target
FFDI	Forest Fire Danger Index
FIRA	Flood impact and risk assessment
FSS	Fire Safety Study
FTE	Full-Time Equivalent
GDE	Groundwater dependent ecosystem
GHD	GHD Pty Ltd
GWh	Gigawatt hours
ha	Hectare
HAZID	Hazard Identification
HF	Hydrogen fluoride
HIPAP	Hazardous Industry Planning Advisory Paper
HV	High voltage
IBRA	Interim Biogeographic Regionalisation for Australia
ICNG	<i>Interim Construction Noise Guideline</i> (NSW Department of Environment and Climate Change, 2009)
ICNIRP	International Commission of Non-Ionising Radiation Protection
IEMA	Institute of Environment Management and Assessment
IPA	Inner Protection Area
IPC	Independent Planning Commission
ISP	<i>2024 Integrated System Plan</i> (AEMO, 2024)
km	Kilometre
km ²	Square kilometres
km/h	Kilometres per hour
km/year	Square kilometre per year
kV	Kilovolt

Term/Acronym	Definition
kW/m ²	Kilowatts per square metre
L _{A1} , L _{A10} , L _{A90}	Noise level exceeded for n% of the measurement period with A-weighted, calculated by statistical analysis - where n is between 0.01% and 99.99%. For example, L _{A10} is the noise level just exceeded for 10% of the measurement period, calculated by statistical analysis and used to determine traffic noise and L _{A90} is the noise level exceeded for 90% of the measurement period, A-weighted and calculated by statistical analysis and used to determine background noise levels.
L _{Aeq}	This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period. Noise levels often fluctuate over a wide range with time. Therefore, when a noise varies over time, the L _{Aeq} is the equivalent continuous sound which would contain the same sound energy as the time varying sound. Many studies show that human reaction to level-varying sounds tends to relate closer to the L _{Aeq} noise level than any other descriptor
LALC	Local Aboriginal Land Council
LCVIA	Landscape and Visual Impact Assessment
LETS	Low Emissions Technology Statements
LFP	Lithium iron phosphate
LGA	Local Government Area
LiFePO ₄	Lithium Iron Phosphate chemistry
LOS	Level of Service
LSC	Land and Soil Capability
LUCRA	Land Use Conflict Risk Assessment
m	Metre
m/s	Metres per second
mbgs	Metres below ground surface
ML	Megalitres
MLRA	Multi-level Risk Assessment
mm	Millimetre
mm/s	Millimetres per second
MNES	Matter of National Environmental Significance
MP	Member of Parliament
MV	Medium voltage
MW	Megawatts
MWh	Megawatt hours
NBN	National Broadband Network
NEM	National Electricity Market
NHVR	National Heavy Vehicle Regulator
NML	Noise management level
NO ₂	Nitrogen dioxide

Term/Acronym	Definition
NPfl	<i>Noise Policy for Industry (NSW EPA, 2017)</i>
NPI	National Pollutant Inventory
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NPWS	NSW National Parks and Wildlife Service
NSW	New South Wales
NSW EPA	NSW Environment Protection Authority
NSW RFS	NSW Rural Fire Service
NSWALC	New South Wales Aboriginal Land Council
NT Act	<i>Native Title Act 1993</i>
NVIA	Noise and Vibration Impact Assessment
NZP	<i>Net Zero Plan (DCCEEW, 2023)</i>
O ₃	Ozone
OCP	Organochlorine pesticides
OEH	NSW Office of Environment and Heritage
OEM	Original Equipment Manufacturer
OEMP	Operation Environmental Management Plan
ONMP	Operational Noise Management Plan
Operational Footprint	The area occupied by the Project's permanent operational infrastructure
OSOM	Oversize and/or overmass
PAD	Potential archaeological deposits
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyls
PCT	Plant Community Type
PFAS	Polyfluoroalkyl substances
PHA	Preliminary Hazard Analysis
PID	Photoionisation detector
Planning Systems SEPP	<i>State Environmental Planning Policy (Planning Systems) 2021</i>
PM _{2.5}	Fine particles less than 2.5 micrometres in diameter
PM ₁₀	Fine particles less than 10 micrometres in diameter
PMF	Probable maximum flooding
PMST	Protected Matters Search Tool
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
POEO Waste Regulation	<i>Protection of the Environment Operations (Waste) Regulation 2014</i>
pphm	Parts per hundred million
Project	Construct, operate and maintain the Rothbury BESS
Project Area	The development footprint i.e. the area that will be physically disturbed for construction and operation of the Project

Term/Acronym	Definition
RAAF	Royal Australian Air Force
RAPs	Registered Aboriginal Parties
Rating background level (RBL)	The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period
Resilience and Hazards SEPP	<i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>
RET	Renewable Energy Target
REZ	Renewable Energy Zone
RMU	Ring main units
RNP	<i>NSW Road Noise Policy</i> (NSW DECCW, 2011)
SA2	Statistical Area 2
SAII	Significant and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SEIA	Social and Economic Impact Assessment
SEPP	State Environmental Planning Policy
SHI	NSW State Heritage Inventory (NSW DPE, 2025)
SHR	NSW State Heritage Register (Heritage NSW, 2025)
SIA	Social impact assessment
SIA Supplement	<i>Technical Supplement: Social Impact Assessment Guideline for State Significant Projects</i>
Signalised and Unsignalised Intersection Design and Research Aid (SIDRA)	A software package used for the analysis of intersection and network capacity, level of service, and performance, as well as for signalised intersection and network timing calculations
SIS	<i>NSW State Infrastructure Strategy 2022-2042</i> (Infrastructure NSW, 2022)
SISD	Safe Intersection Sight Distance
site	An area of land owned by Ausgrid within Lots 1 and 2 of DP 1318566 at 1309 Wine Country Drive, Rothbury, NSW 2320.
SL	Social Locality
SPV	Special Purpose Vehicle
SSA	Secondary Study Area
SSD	State Significant Development
SSI	State Significant Infrastructure
SVTM	NSW State Vegetation Type Map
SWMP	Soil and Water Management Plan
T	Tonne
TEC	Threatened Ecological Community
TfNSW	Transport for New South Wales
The Blue Book	<i>Managing Urban Stormwater: Soils and Construction (4th ed.)</i>

Term/Acronym	Definition
The SIA Guideline	<i>Social Impact Assessment Guideline</i> (DPE, 2023)
TIA	Traffic Impact Assessment
TIR	<i>Technology Investment Roadmap</i> (DISER, 2020)
TNSP	Transmission Network Service Provider
TOBAN	Total Fire Ban
TPZ	Tree Protection Zone
Transport and Infrastructure SEPP	<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i>
TRH	Total Recoverable Hydrocarbons
UNFCCC	United Nations Framework Convention on Climate Change
v/m	Volts per metre
vpd	Vehicles per day
vph	Vehicles per hour
WIA	Water Impact Assessment
WM Act	<i>Water Management Act 2000</i>
WSP	Water sharing plan
WWTW	Waste Water Treatment Works

Summary

Overview

Over the past two decades the contribution of renewable energy to the national electricity market (NEM) has increased from a very small proportion to 51 percent (%) in Q4 2025. As this contribution continues to grow, the need for short term energy storage becomes increasingly important to even out the intermittency of renewable energy matching daily demand cycles. Ausgrid aims to address this need through the development of battery energy storage systems (BESS) on available land within their existing property portfolio across New South Wales (NSW).

Ausgrid is the largest distributor of electricity in eastern Australia, providing power to 1.8 million customers and powering around 60% of NSW's Gross Domestic Product. Ausgrid's network is made up of substations, transmission lines, underground cables and power poles spanning 22,275 square kilometres (km²) throughout Sydney, the Central Coast and Hunter Region.

Ausgrid is seeking development consent to construct, operate and maintain a BESS adjacent to the existing Ausgrid 132 kilovolt (kV)/11 kV Rothbury Zone Station located in Rothbury, NSW (the Project). The Project would involve the installation of the BESS and its connection, via a 33 kV underground cable, to the existing Rothbury Zone Substation. The Project would be located in Lots 1 and 2 of Deposited Plan (DP) 1318566 at 1309 Wine Country Drive, Rothbury, NSW 2320.

The Project is considered State Significant Development (SSD) under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). As such, this environmental impact statement (EIS) has been prepared in accordance with the relevant provisions of the EP&A Act. This EIS addresses:

- The relevant provisions of the EP&A Act
- The requirements of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation)
- The NSW Government *State significant development guidelines – Appendix B – preparing an environmental impact statement* (NSW Department of Planning, Industry and Environment (DPIE), 2022)
- The Secretary's Environmental Assessment Requirements (SEARs) issued on 3 July 2025.

The Project

Key features and components of the Project would include:

- Construction, operation and maintenance of a BESS with a capacity of up to 135 Megawatts (MW) and storage of up to 540 Megawatt hours (MWh)
- Containerised battery units and associated infrastructure, including inverters and medium voltage (MV) transformers
- Ring main units (RMU)
- One auxiliary transformer
- A 33 kV underground cable connection to the existing Rothbury Zone Substation
- A combined switch and control room building
- An operation and maintenance (O&M) building
- A warehouse to store equipment and other materials or plant related to maintaining the BESS
- A backup diesel generator
- Onsite car parking spaces
- Other ancillary infrastructure including fire suppression, stormwater management, boundary security fencing, noise barriers, lighting and closed-circuit television (CCTV).

A detailed description of the Project is provided in **Chapter 3.0**.

Strategic context

The key strategic driver for the Project is to support the transition of the NEM away from fossil fuels and towards primarily renewable energy. This is driven by the planned decommissioning of the NEM's coal-fired power plants in the coming years and the need to deliver on the Australian Government's commitments under the United Nation's Paris Agreement and the Net Zero Plan, with a view to achieving net zero emissions by 2050.

The Project also aligns with other key government strategies, including Australia's *Long-Term Emissions Reduction Plan*, *NSW Electricity Infrastructure Roadmap 2020*, *Hunter Regional Plan* and the *2024 Integrated System Plan*.

The Project is expected to provide the following benefits to the State and local community:

- Providing additional energy storage capacity to support the increase in renewable energy generation across the electricity grid, addressing projected shortfalls due to the closure of coal-fired generators
- Improving network stability and resilience through the delivery of essential system support services
- Job creation and investment for the Hunter Region and NSW more broadly.

The site for the Project was chosen based on the following characteristics:

- Proximity to the existing electricity transmission network
- Proximity to the growing electricity demand centres, such as Cessnock and Maitland
- The environmental and social context of the site, resulting in low environmental and social impacts
- Availability of suitable land within Ausgrid's existing landholdings
- The availability of skilled construction and operational workforce in the region.

Statutory context

The Project is classified as SSD (SSD-85939708) as per Schedule 1 of *State Environmental Planning Policy (Planning Systems) 2021* (DPIE, 2021). As such, development consent is required for the Project under Part 4 of the EP&A Act. This EIS complies with the objectives of the EP&A Act and has been prepared to support the Project's SSD application.

Consultation

Ausgrid has undertaken consultation with a variety of key stakeholders throughout the development of the Project, including:

- Government agencies
- Landowners
- The local community
- Aboriginal stakeholders.

A detailed account of the consultation undertaken to date is provided in **Chapter 5.0** and the Community and Stakeholder Outcomes Report in **Appendix C**.

Consultation with the community and key stakeholders will continue throughout the subsequent stages of the Project via the Project website, newsletters and community meetings.

This EIS will be placed on public exhibition in accordance with the requirements of the EP&A Act. During the exhibition period, community members and stakeholders have the opportunity to provide feedback directly to the NSW Department of Planning, Housing and Infrastructure (DPHI). This feedback will be considered and responded to within the submissions report, which Ausgrid will prepare for the Project.

Environmental assessment

This EIS has assessed the potential environmental, social and economic impacts associated with the construction and operation of the Project. A summary of these impacts, organised according to the chapters of this EIS, is provided as follows.

Aspect	Summary
Biodiversity	A Biodiversity Development Assessment Report (BDAR) was prepared for the Project (Appendix E), supported by field surveys and an assessment of impacts under the <i>Biodiversity Conservation Act 2016</i> (NSW) (BC Act) and the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth) (EPBC Act). The Project has the potential to generate direct, indirect and prescribed impacts on biodiversity values, with most direct impacts occurring during construction due to vegetation clearing. The Project would involve the removal of: • 0.48 ha of native vegetation (Plant Community Type (PCT) 3315 – Central Hunter Ironbark Spotted Gum Forest • 4.07 ha of non-native vegetation. One species (Swift Parrot) was identified as having an assumed presence within the Subject land. The Project would also remove 0.71 ha of Swift Parrot Important Habitat Mapping (including 0.42 ha of native vegetation) but would not result in the loss of any hollow-bearing trees. Construction and operation would also lead to potential indirect impacts on biodiversity values, such as sedimentation and erosion, spread of weeds and pathogens, noise and vibration, light spill, and increased human activity and disturbance. Overall, the Project will have a minor impact on native vegetation and biodiversity values within the Project Area. Mitigation measures will be implemented to minimise these impacts. After avoiding and minimising impacts in accordance with the mitigation hierarchy, the Project requires nine ecosystem credits and 13 species credits to offset its residual biodiversity impacts.
Aboriginal heritage	An Aboriginal Cultural Heritage Assessment Report (ACHAR) was prepared for the Project (Appendix F) to identify Aboriginal cultural heritage values through consultation with Aboriginal stakeholders, desktop research, and field investigations. The ACHAR found that while the Project Area forms part of a broader Aboriginal cultural landscape, no registered Aboriginal sites are recorded within the Project Area. Field investigations identified areas of archaeological potential, including the presence of Aboriginal cultural material in a limited portion of the site, while much of the site is disturbed and of lower sensitivity. As a result, some potential for impacts to Aboriginal cultural heritage cannot be excluded. An Aboriginal Cultural Heritage Management Plan (ACHMP) will be prepared in consultation with Registered Aboriginal Parties to guide impact avoidance, management measures, and procedures for unexpected finds.

Aspect	Summary
Soils and contamination	Construction of the Project would involve vegetation clearance and ground disturbance, with potential risk to soils given site conditions of low inherent stability and poor drainage. No ASS are expected within the Project Area. Soil erosion and sedimentation risks during construction will be managed through a SWMP, including an ESCP. With these measures in place, residual soil impacts are expected to be low, and no soil disturbance or erosion impacts are anticipated during operation. A Detailed Site (Contamination) Assessment (Appendix G) confirmed the site is not contaminated and is not listed on any NSW EPA contaminated land registers. While there is potential for accidental spills during construction and operation, the predominance of hardstand areas and standard spill prevention and response measures mean residual risks to soil, surface water and groundwater are expected to be low.
Land use	The Project is located on land zoned as 'RU2 Rural Landscape' adjacent to the existing Rothbury Zone Substation and is situated within a substantially modified infrastructure setting that is not in active agricultural use. While surrounding land uses include agriculture, viticulture and rural residential development, the Project is appropriately sited and compatible with the existing land use context. A LUCRA was prepared for the Project (Appendix H) which found land use conflicts to be low risk with the implementation of mitigation measures, with no ongoing constraints on surrounding rural or agricultural activities. Overall, residual land use impacts are expected to be minor and localised.
Landscape character and visual amenity	A Landscape Character and Visual Impact Assessment (LCVIA) was prepared for the Project. The LCVIA identified that the Project would be constructed within a rural landscape already influenced by existing infrastructure, including the adjacent Rothbury Zone Substation. The Project would result in a localised, moderate adverse impact on landscape character within the Rural/Residential/Tourism Landscape Character Zone, while effects on adjacent zones would be negligible. Visual impacts would be most noticeable during construction, resulting in temporary high adverse effects for nearby sensitive receptors. During operation, low to moderate adverse impacts would occur at a limited number of nearby private viewpoints, with low to negligible impacts for most public viewpoints. With the implementation of landscaping, design and lighting mitigation measures, residual landscape character and visual amenity impacts would be localised and acceptable.
Noise and vibration	A Noise and Vibration Impact Assessment (NVIA) was prepared for the Project (Appendix J) to assess potential noise and vibration impacts during construction and operation of the Project. The NVIA identified that construction noise is predicted to exceed noise management levels at nearby residential receivers during standard working hours; however, impacts would be temporary and no receivers would be highly noise affected. Construction traffic noise is expected to be negligible. Mitigation measures will be implemented to manage construction noise, although limited exceedances may occur during certain construction activities.

Aspect	Summary
	Operational noise modelling indicated potential exceedances at sensitive receivers, which will be addressed through the installation of permanent noise barriers. With mitigation in place, residual impacts are predicted to be minor and barely perceptible at three receivers. Construction vibration would remain within acceptable criteria, and no operational vibration impacts are anticipated. Therefore, no vibration impacts are anticipated for the Project.
Traffic and transport	A Traffic Impact Assessment (TIA) was prepared for the Project (Appendix K) to assess the potential construction and operational traffic and transport impacts. The main construction access route to the site would be via Wine Country Drive and an existing access point off Old North Road. Larger plant required for the Project is expected to be delivered from Port Botany or the Port of Newcastle. During the peak construction period (a 6-month duration), the Project is expected to generate up to 190 vehicle trips per day. The assessment concluded that the road network can accommodate the level of construction traffic generated by the Project, however minor intersection upgrades and localised widening on Old North Road would be required to accommodate heavy vehicles. Construction traffic impacts would be managed through a Construction Traffic Management Plan (CTMP). Operation of the Project would generate up to four vehicle movements per week, resulting in a negligible change to existing traffic conditions and no discernible effects on road capacity, intersection performance or road safety.
Surface water, groundwater and flooding	A Water Impact Assessment (WIA) was prepared for the Project (Appendix L) to assess potential impacts to surface water, groundwater and flooding. The Project is located within the Black Creek catchment, approximately 205 m east of Black Creek. No impacts to waterfront land are expected. Surface water quality impacts may occur during construction as a result of soil disturbance or accidental spills. Impact would be managed through the implementation of standard mitigation measures. During operation, stormwater would be managed through permanent drainage and treatment infrastructure, resulting in low residual surface water impacts. Shallow groundwater flows toward Black Creek. Excavation during construction may temporarily intercept shallow groundwater, potentially resulting in short-term localised changes to groundwater levels, turbidity, or flow paths. Appropriate mitigation measures are proposed to manage potential groundwater impacts during construction. No impacts to groundwater are anticipated during operation. The site is subject to flooding from overland flow drainage within the local catchment, as well as regional (riverine) flooding from Black Creek. Flood modelling indicates that operational flood behaviour would remain broadly consistent with existing conditions, with no significant increase in flood hazard or downstream flood risk. Overall, with the implementation of proposed mitigation measures, the Project is expected to result in low residual risks to surface water, groundwater, and flood behaviour.

Aspect	Summary
Hazards and risk	A preliminary risk screening concluded the Project is not a potentially hazardous industry; however, a Preliminary Hazard Analysis (PHA) was undertaken to assess potential operational risks. The PHA prepared for the Project (Appendix M) identified battery unit and transformer fires as hazard events with potential offsite effects. Consequence modelling confirmed that heat radiation and toxic exposure distances for these events would be contained within the site, with only minor irritation-level effects extending marginally beyond the boundary in areas without sensitive land uses. All risks were assessed as Low or Very Low and consistent with land-use safety planning criteria. Electric and magnetic fields (EMF) emissions during operation of the Project are expected to be low and within applicable guideline limits. Given setback distances to sensitive receivers and the implementation of standard design and operational controls, EMF impacts are expected to be negligible.
Bushfire	A Bushfire Risk Assessment (BRA) was prepared for the Project (Appendix N). The assessment concluded that while the site is classified as bushfire-prone land, the surrounding landscape presents a low bushfire risk due to grassland vegetation, gentle topography and limited bushfire history. The BRA identified a requirement for a minimum 10 m Asset Protection Zone around the Project, in accordance with relevant bushfire planning guidance. The proposed APZ, together with vegetation management and non-combustible Project infrastructure, would limit radiant heat and ember attack risk, and a battery unit fire is unlikely to ignite surrounding vegetation. Bushfire risks during construction, operation and decommissioning will be managed through design measures, firefighting access and water supply, vegetation management and bushfire emergency response procedures developed in consultation with NSW fire authorities.
Social and economic	A Social and Economic Impact Assessment (SEIA) was prepared for the Project (Appendix O). The assessment concluded that construction would result in minor, temporary social impacts associated with short-term changes in noise, traffic and visual amenity, which would be managed through standard mitigation and communication measures. Construction would also deliver positive economic impacts through local employment, contractor use and increased regional expenditure. During operation, social impacts are expected to be minimal due to the small workforce and limited operational footprint. The Project would deliver ongoing economic and broader social benefits by supporting grid reliability, energy security and regional economic activity. With mitigation in place, residual social impacts are considered low and acceptable, and overall economic outcomes are expected to be positive at local, regional and state levels.
Non-Aboriginal heritage	Non-Aboriginal heritage (historic heritage) impacts were considered through a desktop assessment. The assessment did not identify any non-Aboriginal heritage items listed on Commonwealth, State or local heritage registers within the Project Area. One locally listed heritage item located approximately 30 m to the south-east of the Project Area, would not be directly affected by construction or operation.

Aspect	Summary
	The Project is located within the eastern extent of the Pokolbin Valley Landscape Conservation Area, which is a non-statutory listing and does not impose heritage protection requirements. Given the disturbed nature of the site and the absence of statutory heritage items, impacts on non-Aboriginal heritage are expected to be negligible. An unexpected finds procedure will be implemented during construction to manage any unforeseen archaeological material.
Waste	The Project would generate typical construction, operational and decommissioning waste, including spoil, green waste (vegetation), construction materials, packaging, general waste and small quantities of hazardous waste. Construction would represent the peak waste-generating phase, with waste volumes expected to be manageable and largely reusable or recyclable in accordance with the waste hierarchy. Operational waste generation would be minimal due to the unmanned nature of the facility, while decommissioning waste would be managed through reuse, recycling and disposal at appropriately licensed facilities. A WMP implemented through the Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) will ensure compliance with NSW regulatory requirements. With these measures in place, waste impacts are expected to be low and manageable.
Air quality	A desktop qualitative assessment was conducted to identify air quality impacts associated with the Project. The assessment found that existing regional air quality is generally good. Construction may result in short-term, localised dust and vehicle emissions, which would be temporary and managed through standard mitigation measures in the CEMP. During operation, air quality impacts would be negligible due to the limited workforce and infrequent vehicle movements. With mitigation in place, the Project is not expected to result in significant adverse air quality impacts.

Cumulative impacts

Cumulative impacts occur when the residual impacts of projects overlap to create more significant impacts.

Major projects in the vicinity of the Project were identified and screened based on their scale, status, data confidence, spatial proximity, overlapping receptors and potential overlap in construction timeframes. Five nearby projects were identified as having the potential for cumulative impacts with the Project.

Potential cumulative impacts associated with the Project relate primarily to construction-phase biodiversity impacts, visual amenity, construction noise and traffic on the surrounding road network and surface water quality

Assessment of the Project's residual impacts in combination with impacts identified for other major projects in the vicinity of the Project concluded that, with the implementation of standard and Project-specific mitigation measures, no significant cumulative impacts are expected during construction or operation.

Justification of the Project

The NEM is transitioning away from fossil fuel-based generation toward a renewable-dominated electricity system, driven by the planned closure of coal-fired power stations and the need to decarbonise the economy. Maintaining a reliable, affordable and resilient electricity network during this transition is a key national and state priority.

The NEM is in the process of transitioning from fossil fuel-based electricity baseload to a grid based primarily on renewable energy. This is motivated by the planned decommissioning of coal-fired power plants in coming years, as well as by the need to decarbonise our economy more generally. The Project directly responds to this need by providing dispatchable energy storage capacity that supports renewable energy integration, enhances network resilience and contributes to a lower-emissions electricity system.

Potential impacts associated with the Project have been assessed and it has been determined that any residual and/or cumulative impacts would result in a low to negligible effect on environmental, social and/or economic factors. Appropriate measures have been proposed to mitigate or manage potential adverse impacts during construction, operation and decommissioning.

The Project would provide environmental, social and economic benefits to the Hunter region and NSW, including:

- Alignment with Commonwealth, state and local planning and energy policies, strategies and statutory requirements
- Additional energy storage capacity to support the broader increase in renewable energy generation across the electricity grid, addressing projected shortfalls due to the closure of coal-fired generators
- Improved network stability and resilience through the delivery of essential system support services
- Employment opportunities and investment, including construction jobs and ongoing operational roles, contributing to the Hunter region economy and NSW more broadly.

The environmental, social and economic benefits of the Project are deemed to outweigh any temporary impacts that would result from the Project's construction and operation. It is therefore recommended that the Project be granted development consent.

1.0 Introduction

1.1 Overview

Over the past two decades the contribution of renewable energy to the national electricity market (NEM) has increased from a very small proportion to 51 percent (%) in Q4 2025 (AEMO, 2026). As this contribution continues to grow, the need for short term storage becomes increasingly important to even out the intermittency of renewable energy matching daily demand cycles. Ausgrid aims to address this need through the development of battery energy storage systems (BESS) using available land within their existing property portfolio across New South Wales (NSW).

Ausgrid is seeking development consent to construct, operate and maintain a BESS adjacent to the existing Ausgrid 132 kilovolt (kV)/11 kV Rothbury Zone Substation located in Rothbury, NSW (the Project). The regional setting of the Project is shown in **Figure 1-1**.

The Project would be located in Lots 1 and 2 of Deposited Plan (DP) 1318566 at 1309 Wine Country Drive, Rothbury, NSW 2320 (the site). The lot boundaries are shown in **Figure 1-2** and the boundary of the site is shown in **Figure 1-3**.

The Project would have a capacity to provide up to 135 megawatts (MW) over a four-hour duration (i.e. up to 540 megawatt hours (MWh) energy capacity).

BESS projects are defined as 'electricity generating works' under *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP). Under section 2.36 of this policy, electricity generating works may be carried out by any person with consent on any land in a prescribed non-residential zone. The Project is located in land zoned as 'RU2 Rural Landscape' under the *Cessnock City Council Local Environment Plan 2011* (Cessnock LEP), which is one of the prescribed non-residential zones defined in section 2.35 of the Transport and Infrastructure SEPP. On this basis, the Project would be permissible with development consent.

The Project is also considered State Significant Development (SSD) in line with Part 2.2 of *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) on the basis that it has an estimated development cost (EDC) of more than \$30 million.

As required by the EP&A Act, this environmental impact statement (EIS) has been prepared to support the SSD application. This EIS has been prepared in accordance with the form and content prescribed by the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation), as well as the NSW Government *State significant development guidelines – Appendix B – preparing an environmental impact statement* (DPE, 2022). The structure of the EIS is further detailed in **Section 1.6**.

This EIS addresses the Secretary's Environmental Assessment Requirements (SEARs) issued for the Project (SSD-85939708) on 3 July 2025, which are included in **Appendix A**.

1.2 The Applicant

The applicant is Ausgrid, the largest distributor of electricity in eastern Australia, providing power to 1.8 million customers and powering 60% of NSW's Gross Domestic Product. Ausgrid's network is made up of substations, transmission lines, underground cables and power poles, spanning 22,275 square kilometres (km²) throughout Sydney, the Central Coast and the Hunter Region.

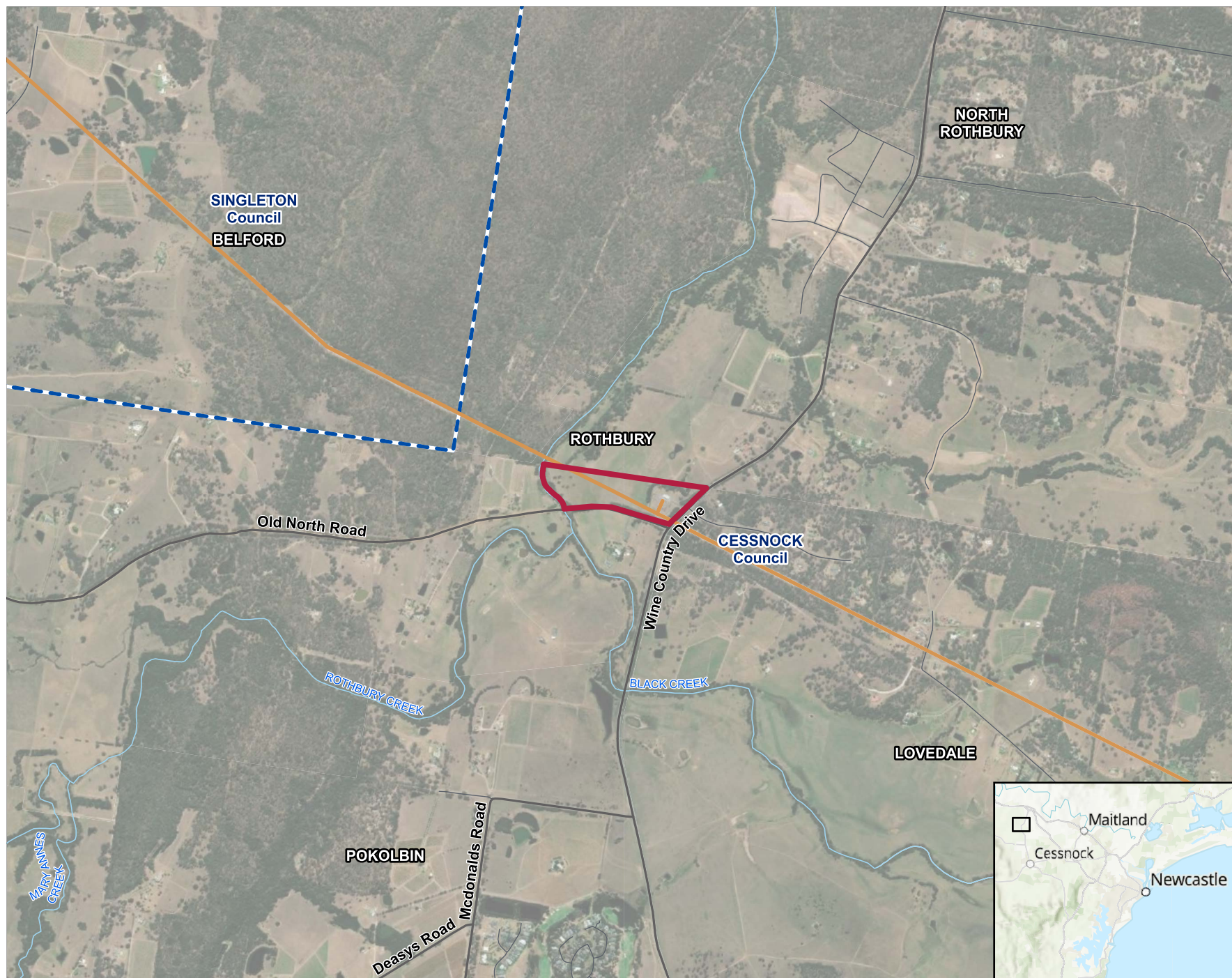
The NSW Treasury holds the largest stake in the Ausgrid business (49%), with the remainder made up of institutional investors.

Ausgrid operates in the NEM as both a Distribution Network Service Provider (DNSP) and a Transmission Network Service Provider (TNSP). Ausgrid actively operates, maintains, repairs and builds its electricity network with a focus on safety and reliability. **Table 1-1** provides further information on Ausgrid.

Table 1-1: Applicant details

Item	Details
Applicant	Ausgrid
Address	24-28 Campbell Street, Sydney, NSW, 2000
ABN	78 508 211 731

**FIGURE 1-1:
REGIONAL SETTING**



Legend

- The site
- LGA Boundary
- Main Road
- Watercourse

Transmission Lines

- 132kV

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FIGURE 1-2:
LOT SUBDIVISION



Legend

-  The site
-  Project Area

Lot Subdivision DP1318566

-  Lot 1
-  Lot 2

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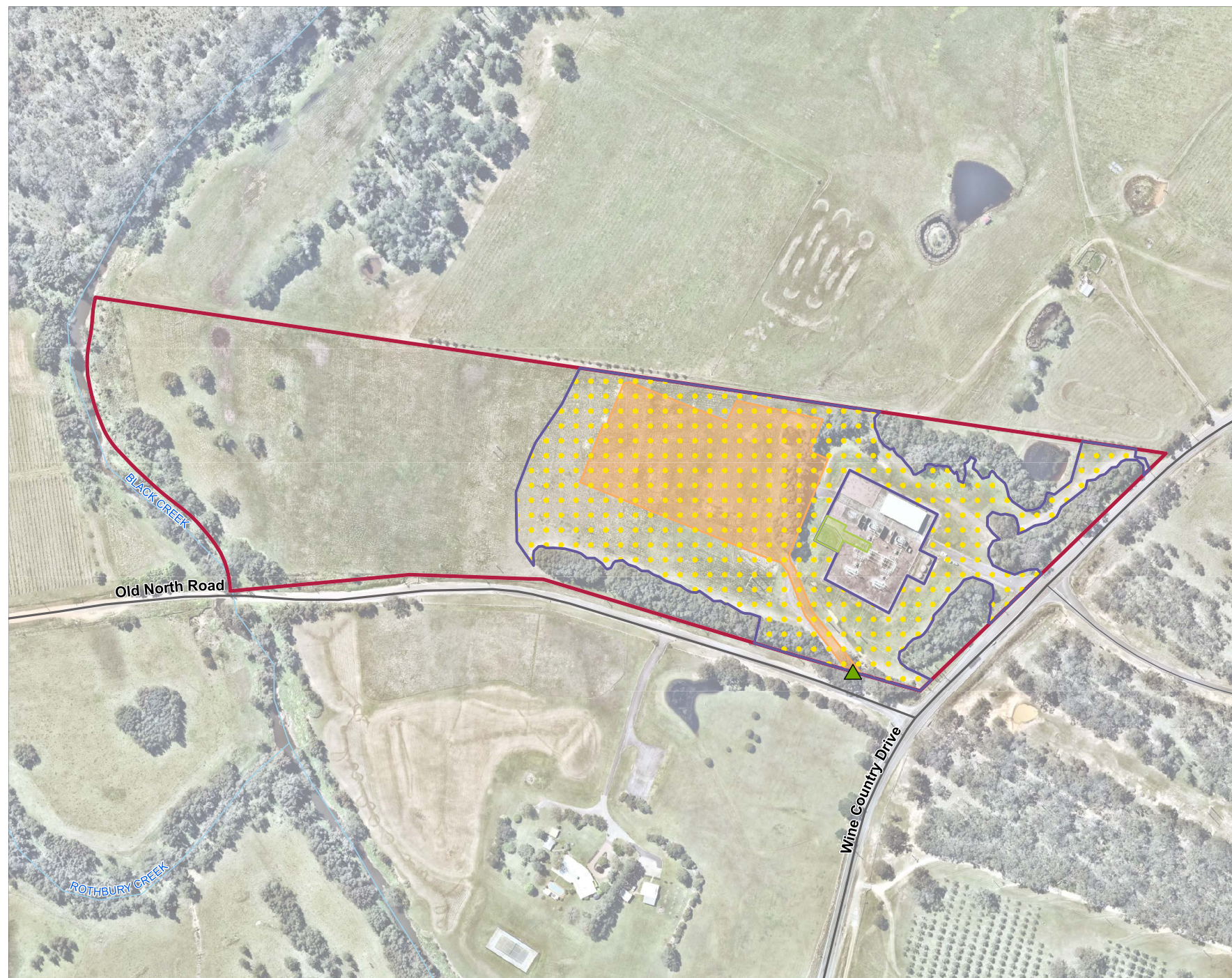
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**FIGURE 1-3:
PROJECT LOCATION**



Legend

-  The site
-  Project Area
-  Construction Footprint
-  Operational Footprint
-  Project entry/exit
-  HV connection infrastructure (subject to separate approvals process)
-  Main road
-  Local road
-  Watercourse

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1.3 The Project

1.3.1 Background

The increasing contribution of renewable energy to the NEM brings challenges in relation to aligning energy generation and demand. Specifically, the peak of renewable energy generation usually occurs in the middle of the day, though consumer demand usually peaks in the afternoon and evening, at a time when generation from some renewable sources (such as solar) has ceased or significantly subsided.

Ausgrid has identified the opportunity to leverage their existing property portfolio to provide a solution to this mismatch in supply and demand through the construction and operation of BESSs in strategic locations across NSW. The ability of a BESS to store and release energy at different times addresses the generation and demand issue directly, supporting the progression of the NEM beyond the impending planned closure of the majority of existing fossil fuel-powered electricity generation assets.

The design of the Project has aimed to avoid, minimise and offset the potential impacts its construction and operation may have on the surrounding physical, biological and social environments. This has been based on a robust site selection process, including siting the Project immediately adjacent to an existing substation to avoid the need for additional transmission infrastructure and minimising amenity impacts to surrounding receivers.

1.3.2 Project purpose and objectives

The purpose of the Project is to store excess electrical energy at periods of higher generation and lower consumer demand and release this energy during periods of lower generation and higher consumer demand.

The objectives of the Project are:

- To provide short term storage capacity to the NEM to increase the stability of the electricity network
- To support the transition from fossil fuel electricity to renewable electricity generation by providing firming capability
- Where applicable, provide system services to help correct and/or stabilise the wider transmission network, e.g. frequency stabilisation.

1.3.3 Key features of the Project

The key features of the Project would include:

- Construction, operation and maintenance of a BESS located adjacent to the existing Rothbury Zone Substation. The BESS would be comprised of containerised Lithium Iron Phosphate (LiFePO₄) battery units and associated infrastructure, including inverters and medium voltage (MV) transformers. The Project would have a maximum power output capacity of up to 135 MW over a four-hour duration (i.e. up to 540 MWh energy capacity)
- Connection of the BESS via a 33 kV underground cable to the existing Rothbury Zone Substation
- Ancillary infrastructure, including:
 - Ring main units (RMU)
 - One auxiliary transformer
 - A combined switch and control room building
 - An operation and maintenance (O&M) building
 - A warehouse to store equipment and other materials or plant related to maintaining the BESS
 - A backup diesel generator
 - Onsite car parking spaces
 - Other ancillary infrastructure, including fire suppression, stormwater management infrastructure, boundary security fencing, noise barriers, lighting and closed-circuit television (CCTV).

1.4 Project location and description

1.4.1 Regional context

The Project is located within the Cessnock City Council Local Government Area (LGA), approximately 190 kilometres (km) north of Sydney's Central Business District (CBD). **Figure 1-1** shows the location of the Project within its broader regional context.

The Cessnock City Council LGA has an area of approximately 1,950 km² and is bordered by Maitland City Council LGA to the north, Newcastle City Council LGA and Lake Macquarie City Council LGA to the east, Central Coast Council LGA and Hawkesbury City Council LGA to the south, and Singleton Council LGA to the west. The Cessnock City Council LGA has an estimated population of 58,025 (ABS 2021).

Major transport routes within the local area include Wine Country Drive (B82), which borders the site to the east, and the Hunter Expressway (M15), which passes approximately 6 km to the north of the site at its nearest point. Public transport nearby the site includes Branxton Railway Station, approximately 6 km to the north. There are no bus services in the local area, with the nearest buses servicing the township of Branxton.

1.4.2 Project location

For the purpose of this EIS, the definitions used to describe the physical boundaries of the Project are as follows:

- The **site** comprising land owned by Ausgrid situated within Lots 1 and 2 of Deposited Plan (DP) 1318566, with a total area of 11.8 hectares (ha). The address of the site is 1309 Wine Country Drive, Rothbury, NSW 2320. The main existing feature of the site is the Rothbury Zone Substation. The Project would be located in the central portion of the site, to the west of the existing substation
- The **Project Area** is located within the site and constitutes the development footprint of the Project, being the area that will be physically disturbed during construction and operation. The Project Area is 4.56 ha
- The **Construction Footprint** represents the area occupied by the Project during construction. This is a larger area than will be required for operation. The Construction Footprint is 4.56 ha
- The **Operational Footprint** represents the area occupied by the Project's permanent operational infrastructure. This is a smaller area than the Construction Footprint. The Operational Footprint is 1.47 ha.

The extent of the site, the Project Area, the Construction Footprint and the Operational Footprint is shown on **Figure 1-3**.

The site is bordered by Wine Country Drive to the east and Old North Road to the south. Black Creek is located to the west of the site and agricultural land and bushland is present immediately to the north.

1.4.3 Related development

The Project is located adjacent to the existing Rothbury Zone Substation and would connect to this infrastructure via a 33 kV underground cable.

To support new and changing customer connections associated with the renewable energy transition, Ausgrid is undertaking separate high voltage (HV) connection works at the Rothbury Zone Substation. These works include the installation of new HV infrastructure, similar to the augmentation approach being applied across Ausgrid's grid-scale BESS program. The works are being assessed and determined by Ausgrid under Part 5 of the EP&A Act, consistent with its role as an Authorised Network Operator (ANO) and prescribed public authority for development associated with the electricity transmission and distribution network.

These works are separate to the SSD assessment for this Project but are required to enable future customer connections, including the Project.

The area subject to the HV connection infrastructure works is shown in **Figure 1-3**.

Existing overhead electricity cables that cross the Project Area and connect to the Rothbury Zone Substation will also be modified by Ausgrid to establish a new easement. These works will be subject to a separate approval process.

1.5 Site constraints

The existing Rothbury Zone Substation and associated infrastructure are located within the site. In addition, an existing 132 kV overhead transmission line connecting to the Rothbury Zone Substation crosses the Project Area.

The western portion of the site, outside the Project Area, includes an area of potential archaeological deposits (PAD). Potential impacts on Aboriginal heritage are assessed in **Section 6.3**.

Vegetation present within the Project Area comprises areas of planted native screening vegetation and introduced perennial grasses. These will require removal to accommodate the Project. Potential impacts on biodiversity values are discussed in **Section 6.2**.

The above site constraints are shown in **Figure 1-4**.

FIGURE 1-4:
SITE CONSTRAINTS

Legend

-  The site
-  Project Area
-  Existing Rothbury Zone Substation and associated infrastructure
-  Potential Archaeological Deposit (PAD) Area
-  HV connection infrastructure (subject to separate approvals process)
-  132kV transmission line
-  Main Road
-  Watercourse
- Vegetation:**
-  Aquatic dams
-  Introduced perennial grasses
-  PCT 4023 coastal valley swamp oak riparian forest
-  Planted native screen

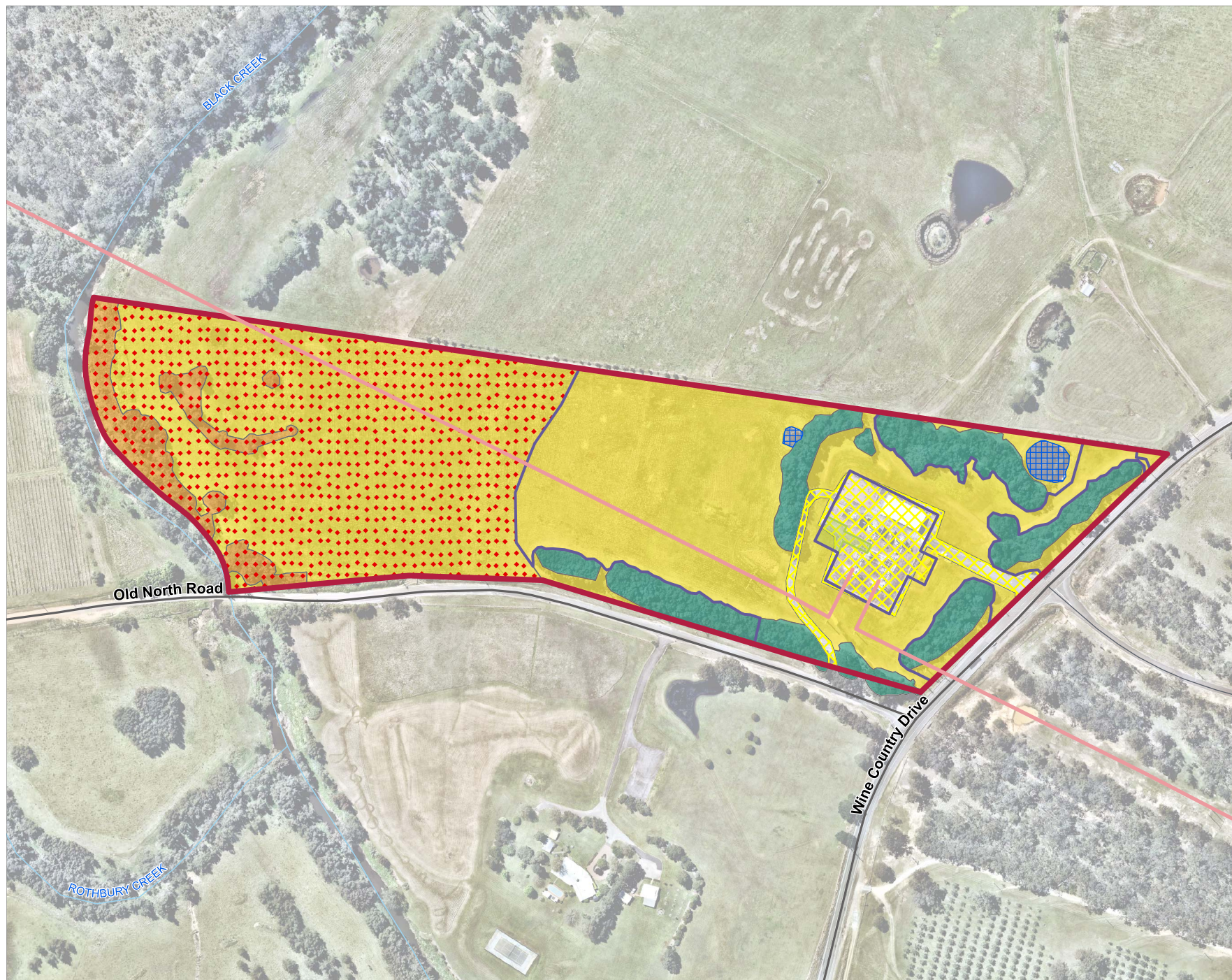
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1.6 Purpose and structure of this EIS

The purpose of this EIS is to provide a detailed description of the Project, the existing environment and the potential direct, indirect and cumulative impacts arising from its construction and operation. The EIS also identifies measures and strategies to be implemented to avoid, minimise, mitigate, offset and/or monitor potential impacts. The structure of this EIS is outlined in **Table 1-2**.

This EIS has been prepared to address the SEARs issued by the NSW Planning Secretary on 3 July 2025. These requirements, including how they have been addressed within this EIS, are outlined in **Appendix A**.

Table 1-2: Structure and content of the EIS

Chapter	Description
Summary	Concise description of the proposed works, environmental assessments, and findings of the EIS.
Chapter 1.0: Introduction	Provides a brief description of the Project and relevant background information.
Chapter 2.0: Strategic context	Provides the strategic context and explains the need for the Project.
Chapter 3.0: Project description	Provides a summary of the Project, including the key components of the Project, design requirements and alignments.
Chapter 4.0: Statutory context	Outlines the statutory requirements and approvals required to support the Project.
Chapter 5.0: Community and stakeholder engagement	Outlines the consultation activities undertaken to date, key issues raised and how these have been addressed.
Chapter 6.0: Assessment of environmental impacts	Provides the results of the environmental assessments and outlines appropriate mitigation measures.
Chapter 7.0: Justification and conclusion	Provides a conclusion to the EIS, including justification for the Project and whether the Project achieves the objectives.
Chapter 8.0: References	Summarises the supporting material that was referenced in preparing this EIS.

The EIS is supported by several appendices, as listed in **Table 1-3**.

Table 1-3: EIS appendices

Appendix	Description	Author
A	SEARs compliance table	AECOM
B	Statutory compliance table	AECOM
C	Community and Stakeholder Outcomes Report	Ausgrid
D	Proposed mitigation and management measures	AECOM
E	Biodiversity Development Assessment Report	Niche Environment and Heritage
F	Aboriginal Cultural Heritage Assessment Report	Apex Archaeology
G	Detailed Site (Contamination) Assessment	RCA Australia
H	Land Use Conflict Risk Assessment	AECOM
I	Landscape Character and Visual Impact Assessment	AECOM
J	Noise and Vibration Impact Assessment	AECOM

Appendix	Description	Author
K	Traffic Impact Assessment	Amber Traffic
L	Water Impact Assessment	GHD
M	Preliminary Hazard Analysis	Sherpa Consulting
N	Bushfire Risk Assessment	Blackash Bushfire Consulting
O	Social and Economic Impact Assessment	AECOM
P	Estimated Development Cost Report	Investstructure

2.0 Strategic context

2.1 Project benefits

The Project is expected to create benefits at community level, State level and across the wider NEM, which extends across the eastern and southern parts of Australia. These benefits include:

- Supporting the renewable energy transition
- Improving grid stability for NSW
- Job creation and investment.

2.1.1 Supporting the renewable energy transition

Presently, a significant portion of the NEM's electricity is generated from fossil fuel sources. In 2024, fossil fuel generation provided around 64% of total electricity generation, made up of coal (46%), gas (17%) and oil (2%) (Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2025).

The NSW and Australian Governments have introduced legislation and policies intended to guide the energy sector towards increasing the proportion of electricity generated from renewable sources. In September 2025, the Australian Government announced a new national climate target for 2035, aiming for a 62–70% reduction in greenhouse gas emissions from 2005 levels (Australian Government, 2025). This target reflects Australia's commitment to the Paris Agreement (refer to **Section 2.4.1**) and supports the broader goal of achieving net zero emissions by 2050. It provides a clear signal for investment in clean energy technologies and reinforces the importance of transitioning to a low-emissions economy through practical, cost-effective measures.

Since 2012, ten large coal-fired power stations have closed, with the most recent being AGL's Liddell Power Station which closed in April 2023. Closures have been announced for all but one of the NEM's remaining coal-fired fleet, with approximately half of these expected to close by 2035 and the rest by 2051 (AEMO, 2024). However, AEMO's *2024 Integrated System Plan* (AEMO, 2024) (further described in **Section 2.4.11**) forecasts that the remaining coal fleet will close two to three times faster than those announcements (AEMO, 2024). The closure of these generators will require a substantial increase in the introduction of new renewable energy generation into the NEM to make up projected shortfalls.

In light of the withdrawal of coal-fired generation, BESSs are becoming an integral part of the NEM. They play an increasingly important role in providing short-term storage capacity to support intermittent renewable generation and improving the strength and reliability of the network.

In relation to the Project, the operation of a BESS would provide additional energy storage capacity to support the broader increase in renewable energy generation across the NEM, directly addressing projected shortfalls. In doing so, the Project contributes to a more stable and resilient electricity grid by reducing the risk of blackouts and minimising power outages and disruptions. This enhanced reliability is particularly important for essential services, households and businesses that depend on an uninterrupted power supply. Additionally, by helping to stabilise energy price volatility during peak demand periods, the BESS enables more predictable energy costs. This benefits consumers by reducing exposure to price spikes and improving cost certainty for businesses, particularly those with energy-intensive operations.

Furthermore, BESS infrastructure can help defer costly network upgrades, ultimately reducing long-term costs for consumers and supporting a more equitable energy transition.

2.1.2 Improving grid stability for NSW

The energy landscape in the grid is evolving, with fundamental changes required to avoid potential projected future supply shortfalls.

Energy Security Target Monitor Reports provide an independent assessment of whether NSW has sufficient firm electricity capacity (generation, storage, firming and transmission) to meet the Energy Security Target (EST). The most recent EST Monitor Report, published by NSW DCCEEW in December 2025, shows an improved energy security outlook compared to previous years driven by the commissioning of new generation and storage projects. While coal-fired power stations continue to play

a critical role in ensuring energy reliability and security, they are nearing the end of their operational lives. This is reflected in the EST breaches forecast for 2027–28, 2033–34 and 2034–35, coinciding with the closures of Eraring, Bayswater and Vales Point coal-fired power stations. The report also shows that new energy infrastructure being delivered through the NSW Electricity Infrastructure Roadmap is adequate to resolve these forecast breaches, as long as it is delivered on time.

Energy storage technologies such as BESSs play a crucial role by providing firming capacity, facilitating increased penetration of renewable energy and enhancing grid stability. By storing excess energy generated during periods of lower demand and higher renewable output, BESSs can release energy during higher demand times or when renewable sources are less productive, such as during heatwaves or storms. This capability helps to balance supply and demand, reducing the risk of power outages and maintaining a consistent electricity supply.

Additionally, in the event of certain natural disasters or other emergencies, BESSs can provide critical backup power to essential services and infrastructure by providing rapid response to grid disturbances, as well as absorbing or dispatching power as needed to stabilise voltage and frequency. This flexibility is essential for ensuring that the grid remains resilient and reliable.

2.1.3 Job creation and investment

The construction of the Project would bring investment in the local and regional economy, as well as flow-on benefits for local businesses and the community of the Hunter region.

The EDC for the Project is \$231 million (**Appendix P**). Major components of this total include the purchase of the battery units and associated components, as well as civil, electrical and cable construction activities.

The Project would also deliver direct economic benefit to the local area and the broader region through job creation. During the peak construction phase, up to 100 full-time equivalent (FTE) roles would be created. These jobs would also provide a secondary boost to the local economy by increasing the demand for services needed by construction workers.

Once operational, the Project would provide up to five part-time roles, equating to up to two FTE positions, which would provide a direct ongoing economic benefit to the local economy.

2.2 Project alternatives

Ausgrid has considered a range of options to meet the Project's objectives. As part of the consideration of the constraints and opportunities present within the site, the following alternatives were considered:

- The 'do nothing approach'
- Site location alternatives
- Alternative configurations
- Alternative BESS technology.

2.2.1 The 'do nothing' approach

The 'do nothing' option would involve not constructing or operating the Project. While this would avoid the potential environmental impacts associated with construction and operation of the Project and retain the site in its current state, it would also result in the Project's objectives being unmet.

However, the 'do nothing' option would fail to provide short-term energy storage capacity to the NEM, limiting the ability to improve network stability, leaving the system more exposed to volatility during peak demand or periods of low renewable output. It would also fail to deliver the firming capability required to support the transition from fossil-fuel to renewable electricity generation, which is essential to maintaining reliability as thermal generators close. In addition, doing nothing would prevent the Project from delivering system services that support the wider transmission network, reducing the resilience and security of the grid.

This option would therefore neglect the opportunity to enhance grid reliability and add substantial storage capacity to the distribution network, both of which are necessary to enable continued growth of renewable energy within the NEM. It would also fail to support the broader transformation of the energy

grid needed to meet Australia's net zero commitments and impede progress on electrification and decarbonisation of the economy. Further, the 'do nothing' approach would not provide grid-scale storage on an accelerated, lower-cost and lower-impact basis, as the Project achieves by using a site containing existing electrical infrastructure rather than developing a new greenfield location.

As such, the 'do nothing' option is not considered feasible, as it would result in all key Project objectives remaining unmet.

2.2.2 Location alternatives

In selecting a location for the BESS, Ausgrid undertook a detailed site selection process, including rating potential alternative locations based on key selection criteria, including environmental, social and technical parameters.

A criterion was the location of the BESS in relation to the distribution network. By locating grid-scale storage on the distribution network close to customers, Ausgrid is able to deliver network resilience during extreme weather and network events and potentially help to defer network investment over time. Additionally, constructing the Project in proximity to an existing Ausgrid substation has the benefit of containing the impacts of the Project to an existing operating industrial location.

Environmental and amenity factors were also considered for each location, noting the sensitivities in proximity to each location.

Alternative locations were discounted based on:

- Environmental and community amenity impacts, and/or
- The potential increased costs associated with acquiring property, and/or
- The increased extent of connection infrastructure between the BESS and the substation.

A critical factor in this assessment was the location of the BESS relative to the distribution network, with proximity to an existing Ausgrid substation offering significant advantages. This co-location allows for efficient grid connection with minimal additional infrastructure thereby supporting cost-effective delivery. This approach also consolidates development within Ausgrid's existing landholdings, reducing disturbance to surrounding land uses.

2.2.3 Alternative configurations

The selected Project Area has undergone refinements to further enhance its suitability. This includes adjustments to avoid existing biodiversity values near Black Creek and screen planting around the perimeter of the site (refer to **Section 6.2**). In addition, an area containing subsurface archaeological deposits within the western portion of the site has been avoided (refer to **Section 6.3**).

The location of the Project Area has also been influenced by flood impacts, through siting of infrastructure outside mapped flood prone areas and the incorporation of new stormwater management infrastructure into the Project design. Further details are contained in **Section 6.9**.

The Project Area has been designed to accommodate the existing 132 kV transmission line within an existing 45 m wide easement within the site, as shown in **Figure 1-4**.

2.2.4 Alternative technology

A range of energy storage technologies are available, each offering different characteristics and levels of maturity. Alternatives such as hydrogen fuel cells and flow batteries present long-term potential for grid-scale storage; however, these technologies are still emerging, with higher capital costs, lower charge/discharge efficiency and limited existing commercial deployment in Australia.

For this Project, LiFePO₄ batteries were selected, as they represent a proven and commercially mature solution for grid-connected energy storage. LiFePO₄ batteries are composed of abundant, non-toxic materials such as iron and phosphate, and do not contain any cobalt or nickel. This makes them a more environmentally sustainable and ethically sourced option compared to traditional lithium-ion batteries that use cobalt and/or nickel. LiFePO₄ batteries offer thermal stability and a long operational life, both of which are critical for utility-scale installations.

In addition to their safety and sustainability benefits, LiFePO₄ batteries provide high energy density, efficient charge/discharge performance and are relatively lightweight. Their widespread adoption and scalable manufacturing processes contribute to cost-effectiveness and supply chain reliability. These attributes make LiFePO₄ batteries the most suitable option for the Project.

The selection of the Original Equipment Manufacturer (OEM) for the Project will be guided by technical and safety requirements to ensure reliable and compliant operation within the existing network. Evaluation criteria will include technology safety, operational reliability, and infrastructure compatibility to maintain grid stability. Key considerations will include fire protection systems, thermal management, and emergency response protocols, to mitigate risks to surrounding communities and safeguard natural assets.

2.3 Site suitability

The selected site possesses several key attributes that make it an optimal location for the development of a BESS:

- Close proximity to the electricity distribution network and growing demand centres, including Cessnock and Maitland, enabling efficient energy distribution and reduced transmission losses
- Sufficient existing network capacity to accommodate the Project without the need for significant network upgrades
- Adequate land area to accommodate a BESS and associated infrastructure
- Environmental and social conditions that allow potential Project impacts to be avoided, minimised or effectively managed through appropriate mitigation and management measures
- Availability of a skilled regional workforce to support construction, operation and maintenance of the Project.

2.4 Consistency with government plans and policies

The construction and operation of the Project would facilitate Australia's ongoing transition towards renewable energy generation, as described in **Section 2.1**. The Project's objectives would align with those of numerous plans and policies at the international, commonwealth, state, and local levels. A summary of these plans and policies is provided as follows.

2.4.1 United Nations Framework Convention on Climate Change (The Paris Agreement)

The *United Nations Framework Convention on Climate Change* (UNFCCC) Paris Agreement (the Paris Agreement) (United Nations, 2015) is an international agreement for addressing global climate change. The agreement commits the participating parties to greenhouse gas reduction targets in a step-phase approach. Developed countries are charged with establishing a precedence and standard for the rest of the world and are also encouraged to provide financial and other resource assistance to those who require it.

Australia is a signatory to the Paris Agreement, with this being enacted in Australian law through the *Climate Change Act 2022* (Australian Government, 2022b). The *Climate Change Act 2022* legislates the Australian Government's responsibility to reduce greenhouse gas emissions by providing a set of short and long-term targets, using 2005 emissions as a reference point. Key targets include the reduction of emissions by 62-70% below 2005 levels by the year 2035, moving to net-zero emissions nationally by 2050. The plan for reaching these targets is established in *Australia's Long-Term Emissions Reduction Plan* (Australian Government Department of Industry Science and Resources (DISER), 2021), as detailed in **Section 2.4.2**.

To achieve these targets, Australia's renewable energy generation capacity will need to increase substantially. BESS technology is expected to play a crucial role in enhancing the effectiveness and reliability of renewable energy sources by balancing supply and demand within the NEM.

2.4.2 Australia's Long-Term Emissions Reduction Plan

Australia's whole-of-economy Long-Term Emissions Reduction Plan (DISER, 2021) is focused on technology and sets out how Australia will achieve net zero emissions by 2050. One of the key principles of the plan is keeping energy prices down with affordable and reliable power. The plan outlines how the Australian Government will:

- Drive down the cost of low emissions technologies (including battery storage)
- Deploy these technologies at scale
- Help regional industries and communities seize economic opportunities in new and traditional markets
- Work with other countries on the technologies needed to decarbonise the world's economy.

The *Technology Investment Roadmap* (DISER, 2020) (TIR) is the foundation of the *Long-Term Emissions Reduction Plan* and sets a process to develop and deploy low emissions technologies (including battery storage). By prioritising government investment, it aims to make these emerging technologies cost competitive with existing high-emissions technologies. Importantly, the TIR includes a requirement to prepare Low Emissions Technology Statements (LETS) (DISER, 2022), which reviews, refines and evaluates the government's investment in low carbon emission technologies.

The current LETS (2022) includes energy storage as an existing priority technology for government investment. Specifically, the LETS indicates that broad deployment of electrical energy storage will facilitate further integration of solar and wind energy in the NEM. The LETS states that energy storage will provide network security services and a source of reliable, dispatchable electricity.

The Project would help reduce electricity prices during peak demand periods for consumers in the Ausgrid distribution network. As the Project intends to provide a source of reliable, dispatchable electricity, it would be consistent with the principles of the *Long-Term Emissions Reduction Plan*.

2.4.3 Net Zero Plan

The Australian Government established the *Net Zero Plan* (DCCEEW, 2023) (NZP) to guide the transition to the legislated net zero emissions target by 2050. The NZP achieves this by setting out the government's priorities to reduce emissions, particularly by supporting investment in low emissions and renewable activities.

The NZP incorporates six sectoral emissions reduction plans that capture the full breadth of the economy: electricity and energy, transport, industry, agriculture and land, resources, and the built environment. The NZP combines these individual plans to support the Australian Government's aim for a climate resilient nation.

The Project supports the NZP by facilitating an increase in the supply of renewable energy to the NEM, which contributes to the target of achieving net zero emissions by 2050.

2.4.4 2035 Targets Advice

The *2035 Targets Advice* (Climate Change Authority, 2025) is a statutory report published in September 2025 which provided independent expert recommendations for Australia's emissions reduction pathway, advising a 62–70% cut below 2005 levels by 2035. This advice was formally adopted by the Australian Government and announced in the Prime Minister's media release, *Setting Australia's 2035 Climate Change Target* on 18 September 2025.

This target is ambitious yet achievable, supported by existing policies such as the Safeguard Mechanism, clean energy initiatives, and programs promoting zero emission vehicles and the adoption of home batteries. It is backed by scientific advice from the Climate Change Authority and forms part of a practical pathway outlined in the NZP. Achieving this target will support environmental protection, economic resilience and global competitiveness, aligning with Australia's national interests.

The Project will support the target by enabling greater integration of renewable energy, reducing reliance on fossil fuel-based peaking generation, and improving electricity system reliability and flexibility. In doing so, the Project aligns with the emissions reduction pathway outlined in the 2035 Targets Advice and supports the transition to a low-emissions energy system.

2.4.5 NSW Climate Change Policy Framework

The NSW Government has developed the *NSW Climate Change Policy Framework* (NSW Office of Environment and Heritage (OEH), 2016) in response to the Australian Government's commitments under the Paris Agreement. This framework outlines the NSW Government's commitment to achieving net zero emissions across the state by 2050.

The framework responds to our changing climate by making NSW more resilient to the impacts of climate change through the provision of opportunities for the introduction of alternative energy sources to the NEM.

The Project supports the overall goals of the framework as it increases the resilience of the NEM by allowing renewable energy to be stored until demand requires it to be released to consumers. This is also beneficial in the event of certain power outages that may occur during extreme climate-related events, further bolstering the climate resilience of the NEM.

2.4.6 NSW Net Zero Plan Stage 1: 2020-2030

The *NSW Net Zero Plan Stage 1: 2020-2030* (DPIE, 2020e) outlines how NSW aims to achieve net zero emissions by 2050. The priorities of this plan include:

- Drive uptake of proven emissions reduction technologies
- Empower consumers and businesses to make sustainable choices
- Invest in the next wave of emissions reduction innovation
- Ensure the NSW Government leads by example.

Combined with the *NSW Electricity Infrastructure Roadmap* (DPIE, 2020c) (refer to **Section 2.4.9**) the *NSW Net Zero Plan* will help generate 9,000 jobs and up to \$37 billion in private investment.

The Project helps meet the goals in *NSW Net Zero Plan Stage 1: 2020-2030* through the provision of technology that can store and release renewable energy into the NEM, at periods of peak demand. The Project also demonstrates NSW leading by example through the implementation of industry-leading energy efficient technology.

2.4.7 NSW Transmission Infrastructure Strategy 2018

The *NSW Transmission Infrastructure Strategy* (DPE, 2018) aims to address the need for the State to enhance the capacity of the electricity grid by connecting various energy sources. This strategy was developed to address the following five driving principles:

- Lower energy bills for NSW households and businesses
- A technology neutral approach to new energy generation projects
- Private sector-led investment in transmission and generation
- Regional economic growth and increased job opportunities
- Ongoing secure and reliable energy to power the NSW economy.

The *NSW Transmission Infrastructure Strategy* sets out a plan to facilitate private sector investment in priority transmission infrastructure projects that can deliver least-cost energy to customers by 2040 and beyond. The strategy forms part of the NSW Government's broader plan to make energy more affordable, secure investment in new electricity generation and network infrastructure, and ensure new technologies deliver benefits for consumers.

The Project would improve the reliability of electricity supply through periods of high demand, helping to facilitate lower-cost electricity which benefits consumers. The construction and operation of the Project would diversify industry and provide additional job opportunities in the Greater Sydney region. The Project therefore aligns with the principles of the *NSW Transmission Infrastructure Strategy*.

2.4.8 NSW Electricity Strategy 2019

The *NSW Electricity Strategy* (DPIE, 2019b) is the NSW Government's plan for a reliable, and sustainable electricity future that supports a growing economy. This strategy is designed to complement the *NSW Transmission Infrastructure Strategy*, and the work of the NEM's regulatory bodies.

The strategy outlines three approaches for the NSW Government to meet these objectives:

- Support the market to deliver reliable electricity at the lowest price, while protecting the environment
- Set an EST to ensure that the State has sufficient generation capacity and covers electricity supply reliability shortfalls
- Ensure the State has sufficient powers and plans to respond effectively to electricity system emergencies.

The strategy outlines the cheapest and most efficient way to develop a modern and complex energy system to replace coal-fired generators is to build a mix of low-cost renewables, gas-fired generators and other storage options, such as batteries and pumped hydro. The strategy also outlines the projected changing patterns of electricity usage, with more consumers and businesses utilising their own solar generation.

It is noted that the peak supply of solar energy, during the middle of the day, does not align with peak demands, which typically occurs in the late afternoon. The implementation of electricity storage allows this mismatch to be better managed, thereby also helping to manage electricity prices for consumers, whilst contributing to the NSW Government's plan for reliable and sustainable electricity supply into the future.

The Project supports the strategy by providing utility-scale battery storage that improves electricity system reliability, enables greater integration of renewable generation by shifting excess daytime renewable energy generation, such as solar, to peak demand periods, and contributes to a secure, affordable and sustainable electricity supply for NSW.

2.4.9 NSW Electricity Infrastructure Roadmap 2020

The *NSW Electricity Strategy* (DPIE, 2019b) is intended to be implemented through the *NSW Electricity Infrastructure Roadmap* (DPIE, 2020c). The Roadmap envisions a modern electricity system in NSW built on the following five pillars:

1. *"Driving investment in regional NSW: supporting our regions as the State's economic and energy powerhouse."*
2. *Delivering energy storage infrastructure: supporting stable, long-term energy storage in NSW.*
3. *Delivering Renewable Energy Zones: co-ordinating regional transmission and renewable generation in the right places for local communities.*
4. *Keeping the grid secure and reliable: backing the system with gas, batteries or other reliable sources as needed.*
5. *Harnessing opportunities for industry: empowering new and revitalised industries with cheap, reliable and low emissions electricity".*

The Project is in keeping with the vision of the Roadmap in that it:

- Represents a private regional investment, delivers energy storage
- Is appropriately zoned and uses existing transmission infrastructure
- Provides security to the NEM
- Provides cost effective and reliable electricity with negligible additional emissions.

2.4.10 Renewable Energy Target

The *Renewable Energy Target* (RET) is a scheme established by the Australian Government that aims to deliver an extra 33,000-gigawatt hours (GWh) of electricity from renewable sources, every year from 2020 to 2030.

In 2019, the Clean Energy Regulator announced that Australia had met the RET more than a year ahead of schedule. Despite this, the scheme will continue to require high-energy users to meet their obligations under the policy until 2030.

Although the Project would not generate renewable energy, it will facilitate the introduction of a greater amount of renewable energy to the NEM.

2.4.11 2024 Integrated System Plan

The *2024 Integrated System Plan* is a whole-of-system plan that provides a coordinated generation and transmission investment plan to transition the NEM over the next 30 years. AEMO updates the ISP every two years, with the most recent ISP for the NEM being published in June 2024. Under the 'Step Change' scenario, identified in the *2024 Integrated System Plan* as the most likely scenario, the NEM will need to cater for significant investment in generation capacity, storage and transmission augmentation as coal-fired generation withdraws - a process that is occurring two to three times faster than anticipated (refer to **Section 2.1.1**).

The ISP sets out an optimal development path for reliability and affordability, which comprises the following:

- Transition to renewable generation
- Actionable and other network investments
- Storage and gas to firm renewables.

The Project supports the ISP optimal development path by increasing the ability to store energy within the NEM.

2.4.12 State Infrastructure Strategy 2022-2042

The *NSW State Infrastructure Strategy 2022-2042* (Infrastructure NSW, 2022) (SIS) builds on the NSW Government's major long-term infrastructure plans, as initially outlined within *NSW State Infrastructure Strategy 2012* (Infrastructure NSW, 2012). The SIS outlines the government's priorities for the next 20 years, and highlights that ongoing investment is required to keep pace with population growth, ensure competitiveness of NSW industry and meet the government's social and economic goals.

Some of the relevant objectives and strategic directions of the SIS include:

- Embedding energy reliability and resilience
- Achieve an orderly and efficient transition to net zero
- Adopting new technologies to improve infrastructure efficiency
- Boosting economy-wide productivity
- Supporting sustainable growth and development.

The SIS highlights the need for reliable and resilient infrastructure. The Project would address this through the provision of backup power during certain outages and by stabilising the grid.

The Project would support the transition to net zero by enabling the storage and supply of renewable energy into the NEM, reducing reliance on fossil fuels.

The Project would also contribute to the reduction in energy costs and improvement in the economic competitiveness of NSW, which aligns with the strategy's goals.

2.4.13 Hunter Regional Plan 2041

The *Hunter Regional Plan 2041* (DPE, 2022b) (the Regional Plan) is a 20-year land use plan prepared under the EP&A Act. The Regional Plan applies to ten LGAs of the Hunter Region, including Cessnock.

The Regional Plan sets the strategic land use framework for continued economic growth and diversification of the region. The Regional Plan includes four principles:

- Growth – Support a net zero emissions economy and foster employment growth, competitiveness and innovation
- Community – Promote places to be together by weaving nature into our towns and cities which have welcoming and safe streets and public spaces
- Resilience – Reduce risks associated with place-based shocks and stresses to improve the community's ability to withstand, recover from and adapt to changes and become more resilient
- Equity – Ensure communities are safe and healthy with residents having opportunities for economic advancement, housing choices and a secure retirement.

To support the delivery of these principles, the Regional Plan contains nine objectives, which are delivered through several strategies. Of relevance to this Project are the following objectives:

- Objective 1: Diversify the Hunter's mining, energy and industrial capacity
- Objective 7: Reach net zero and increase resilience and sustainable infrastructure.

These objectives, and their relevance to the Project, are described in further detail below.

2.4.13.1 Objective 1: Diversify the Hunter's mining, energy and industrial capacity

The Hunter is an economic powerhouse, driven by the mining, energy and manufacturing sectors. The Hunter-Central Coast is one of five Renewable Energy Zones (REZ) designated in NSW. The Hunter-Central Coast REZ takes advantage of the region's existing transmission infrastructure, transport links, water resources and skilled workforce. This is supported by Strategy 1.2 of the Regional Plan, which states:

- Following completion of the Hunter-Central Coast REZ, local strategic planning should consider:
 - Opportunities to leverage new employment in related manufacturing and energy intensive industries that benefit from proximity to the energy infrastructure within the REZ
 - The proximity of sensitive land uses to ensure sensitive land uses do not encroach on activities within the REZ.

The site has been chosen due to it being strategically located adjacent to an existing substation (Rothbury Zone Substation), which is owned and operated by Ausgrid. The Project would support the increasing energy requirements in the Cessnock area by storing and supplying power to the grid. The proximity of the site to transmission infrastructure aligns the Project with Objective 1 of the Regional Plan.

2.4.13.2 Objective 7: Reach net zero and increase resilience and sustainable infrastructure

The Regional Plan highlights the need for low-carbon energy solutions and resilient infrastructure to support economic and population growth while reducing emissions. Objective 7 aims to facilitate the transition to a net-zero economy by integrating sustainable energy infrastructure, enhancing energy security, and ensuring the region is prepared for climate-related risks.

The Project, being a grid-scale BESS, would support the transition to a net-zero emissions economy. It would provide energy security by storing energy until it is required by consumer demand and by providing grid reliability services. Therefore, the Project is in line with Objective 7 of the Regional Plan.

2.4.14 Greater Newcastle Metropolitan Plan 2036

The *Greater Newcastle Metropolitan Plan 2036* (DPE, 2018a) (GNMP) sets out strategies and actions that will drive sustainable growth across the Greater Newcastle region's five LGAs (including Cessnock). The GNMP also helps to achieve the vision set out in the *Hunter Regional Plan 2041* to be the leading regional economy in Australia with a vibrant new metropolitan city at its heart (refer to **Section 2.4.13**).

One of the outcomes of the GNMP is to: '*Enhance environment, amenity and resilience for quality of life*'. Strategy 15 within that outcome is: '*Plan for a carbon neutral Greater Newcastle by 2050*'.

The Project supports the outcomes and strategies of the GNMP by facilitating renewable energy input by storing it outside of periods of peak production and then supplying electricity back to the grid when consumer demand requires it. This also contributes to the objective of creating a carbon neutral Greater Newcastle by 2050.

2.4.15 Cessnock Local Strategic Planning Statement 2036

The *Cessnock Local Strategic Planning Statement 2036* (Cessnock City Council, 2020) (CLSPS) sets out Cessnock City Council's vision and land use priorities to 2036. The CLSPS is centred on four themes: *Liveable*, *Productive*, *Sustainable* and *Unique*, from which 30 planning priorities are derived.

Under the *Liveable* theme, the Project supports community needs by improving energy reliability and strengthening network resilience, helping ensure essential services remain accessible and able to meet future demand (Priority 5).

The Project strongly aligns with the *Productive* theme by locating modern energy infrastructure alongside the existing Rothbury Zone Substation, avoiding fragmentation of rural land (Priority 8) and leveraging established grid assets to support regional economic growth (Priority 15). Through the adoption of advanced battery storage technology, it also supports Council's commitment to embracing innovation (Priority 16).

The Project advances the *Sustainable* theme by minimising environmental impacts through a design that responds to site characteristics and incorporates mitigation for noise, visual impacts, biodiversity and hazards (Priority 21). It also contributes to broader sustainability objectives by supporting greater integration of renewable energy (Priority 23).

The Project is consistent with the *Unique* theme by retaining and enhancing the rural landscape through careful siting, landscape integration and the application of visual mitigation measures. Although the Project includes an 8 m high noise barrier to meet operational acoustic requirements, its visual presence would be softened through appropriate colour treatments, non-reflective finishes and landscape screening to reduce contrast with the surrounding environment. By co-locating the Project with the existing electrical infrastructure at the adjacent Rothbury Zone Substation, the Project avoids spreading new built form across the wider rural setting and limits its footprint to an area already characterised by utility uses. This approach helps preserve the rural landscape character and protects the scenic qualities of the Vineyards District, consistent with Planning Priorities 22 and 23.

Overall, the Project aligns with the CLSPS by delivering essential, innovative and well-sited energy infrastructure that supports Cessnock's productivity, community needs, environmental values and rural landscape character.

2.4.16 Cessnock Community Strategic Plan 2036

The *Cessnock Community Strategic Plan 2036* (Cessnock City Council, 2020) (CCSP) sets out community's main priorities and aspirations for the future. The Community vision, as stated in the CCSP, is:

'Cessnock is a cohesive and welcoming community living in an attractive and sustainable rural environment. There is a diversity of business and employment opportunities supported by accessible infrastructure and services which effectively meet community needs.'

The Project would help to achieve this vision by providing alternative measures for storing energy. This would assist the community through wholesale electricity price reductions and long-term grid security, which enhances grid stability for future generations. By supporting a more resilient and low-emission energy system, the Project also contributes to broader sustainability goals.

2.5 Key features and surrounds

2.5.1 Surrounding land uses and sensitive receivers

The Project is located in land zoned as 'RU2 Rural Landscape' under the Cessnock LEP.

Lots surrounding the Project Area are generally zoned as 'RU2 Rural Landscape' and 'RU4 Primary Production Small Plots'. These lots contain residential buildings, areas of cultivation (including vineyards) and mixed bushland. Land use zones are shown in **Figure 2-1** and discussed further below.

2.5.1.1 Infrastructure

The Project Area is bordered by Old North Road to the south and Wine Country Drive (B82) to the east, which is zoned as 'SP2 Infrastructure – Classified Road'. Existing electricity infrastructure is present within and surrounding the Project Area, including the existing Rothbury Zone Substation and associated overhead powerlines. Existing utility services include potable water supply, sewer connection, telecommunications and stormwater drainage infrastructure.

2.5.1.2 Primary production small plots

Lot 5 of DP 598847, located on the southern side of Old North Road, is zoned as 'RU4 Primary Production Small Plots'. Quambatook House is situated on this lot, approximately 188 m south of the Project Area. While the property was formerly listed as a guest house/hotel, it is no longer operating in this capacity and is therefore considered to be a residential use.

Lot 1 of DP 848702, located to the west of the Project Area is also zoned as 'RU4 Primary Production Small Plots'. The property accommodates Black Creek Farm, situated approximately 440 m west of the Project Area, and comprises a vineyard, farmhouse, wine cellar and wine tasting room.

2.5.1.3 Residential

The closest residential zoned land (R5 Large Residential Lot) is located around 600 m west of the Project Area. However, residential dwellings are also present on the rural properties adjoining the Project Area, as part of existing farms and tourism facilities.

There are four residential properties within 500 m of the Project Area, with the nearest located at 864 Old North Road (Quambatook House), approximately 188 m to the south. The residential properties are shown on **Figure 6.7-1**.

2.5.1.4 Tourism

The Project is located in the Hunter Valley Wine Region. There are numerous vineyards and wine estates directly off Wine Country Drive or accessed off minor roads which connect to Wine Country Drive. Wine Country Drive is therefore an important route for tourism.

Lots zoned as 'SP3 Tourist' are located approximately 800 m south of the Project Area. These lots contain a golf estate, vineyards, restaurants and commercial accommodation.

2.5.1.5 Recreational and environmental land

One lot zoned as 'C3 Environmental Management' is located approximately 400 m north-west of the Project Area. This lot is largely undeveloped and is comprised mainly of bushland.

The edge of Tiraki Nature Reserve is located approximately 800 m north-west of the Project Area. This land is zoned as 'C1 National Parks and Nature Reserves'. Tiraki Nature Reserve covers an area of 609 ha and contains hiking trails and birdwatching facilities (NSW National Parks and Wildlife Service 2025). Belford National Park is located approximately 6.5 km north-west of the Project Area and Werakata National Park is located approximately 7 km to the south-east. Pokolbin State Forest (No. 716) and Pokolbin Flora Reserve are situated approximately 7 km south-west of the Project Area.

2.5.2 Environmental context

Black Creek is located on the western border of the site and flows north to south. The site lies within the 1 in 100-year flood extent of Black Creek, as identified by Cessnock City Council (2025).

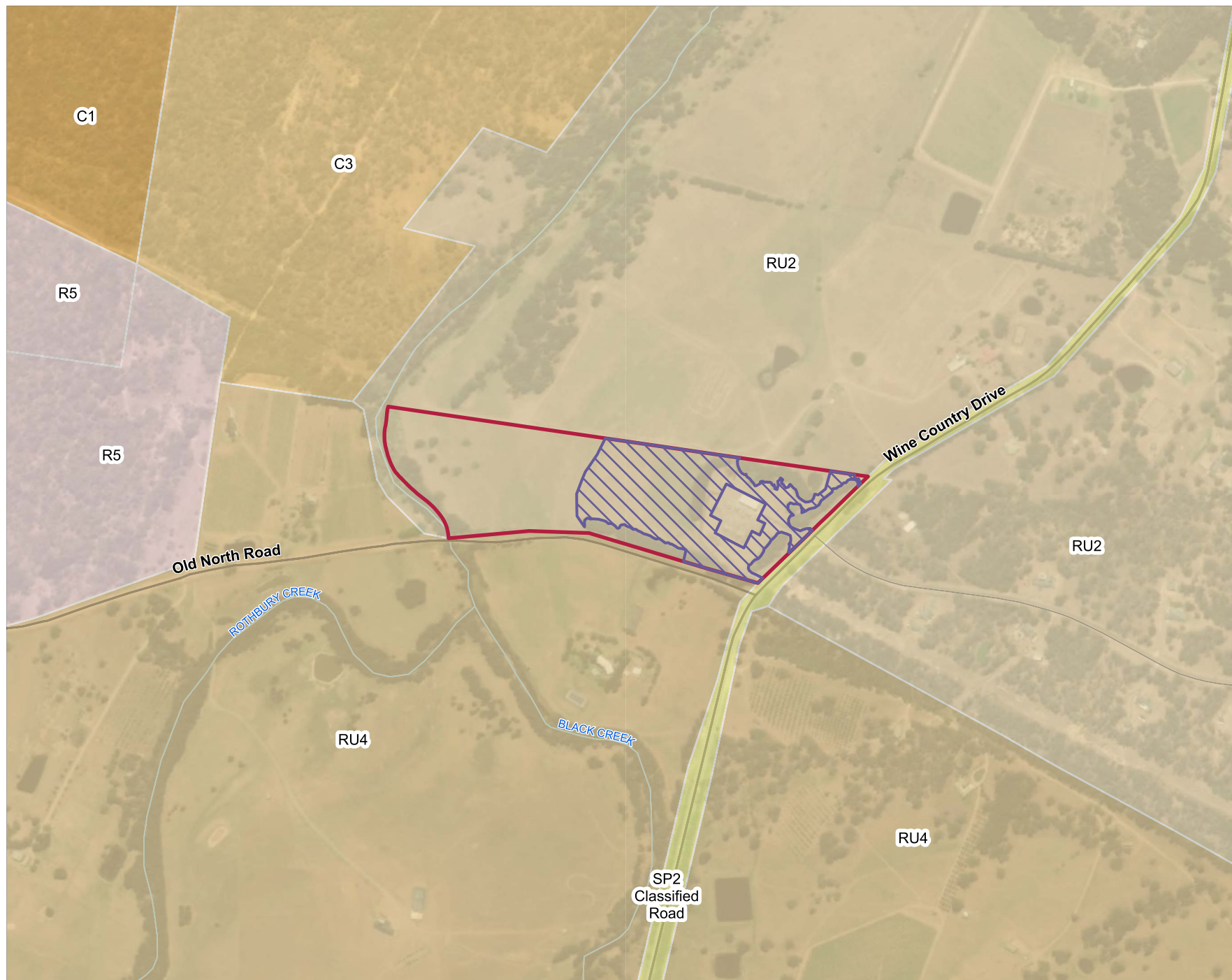
The site and surrounding land are identified as bushfire-prone land and are therefore subject to a potential bushfire risk.

Historically, the site has been disturbed by agricultural use and more recently by the construction and operation of the Rothbury Zone Substation and associated infrastructure. The Project Area is now dominated by introduced perennial grasses, as well as screening vegetation planted around the Rothbury Zone Substation during its construction in 2007.

An area of potential Aboriginal archaeological sensitivity has been identified in the western portion of the site. As such, the archaeological potential of the site is high. The nearest non-Aboriginal heritage item is the Old North Road remnant (LEP #1177), a locally significant feature located approximately 30 m south-east of the site, on the eastern side of Wine Country Drive.

Environmental constraints surrounding the site, including key ecological and heritage features such as watercourses, native vegetation, threatened species records, nature reserves, conservation areas, and known heritage items are shown in **Figure 2-2**.

FIGURE 2-1:
LAND USE ZONING



Legend

- The site
- Project Area
- Main road
- Watercourse

LEP Land Zoning

- C1 - National Parks and Nature Reserves
- C3 - Environmental Management
- R5 - Large Lot Residential
- RU2 - Rural Landscape
- RU4 - Primary Production Small Lots
- SP2 - Infrastructure

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**FIGURE 2-2:
ENVIRONMENTAL CONSTRAINTS**

Legend

- The site
- Project Area
- Main road
- Local road
- Watercourse
- Tiraki Nature Reserve
- Heritage**
 - General heritage item
 - Pokolbin Valley Landscape Conservation Area
 - Potential Archaeological Deposits (PAD)
- Native Vegetation Plant Community Type**
 - 3315 - Central Hunter Ironbark-Spotted Gum Forest
 - 3328 - Lower Hunter Red Gum-Paperbark Riverflat Forest
 - 3431 - Central Hunter Ironbark Grassy Woodland
 - 3442 - Lower Hunter Lowland Ironbark-Paperbark Forest
 - 3443 - Lower Hunter Spotted Gum Scrubby Transition Forest
 - 3446 - Lower North Foothills Ironbark-Box-Gum Grassy Forest
 - 4023 - Coastal Valleys Swamp Oak Riparian Forest
- Bionet threatened species records**
 - Critically Endangered
 - Endangered
 - Vulnerable

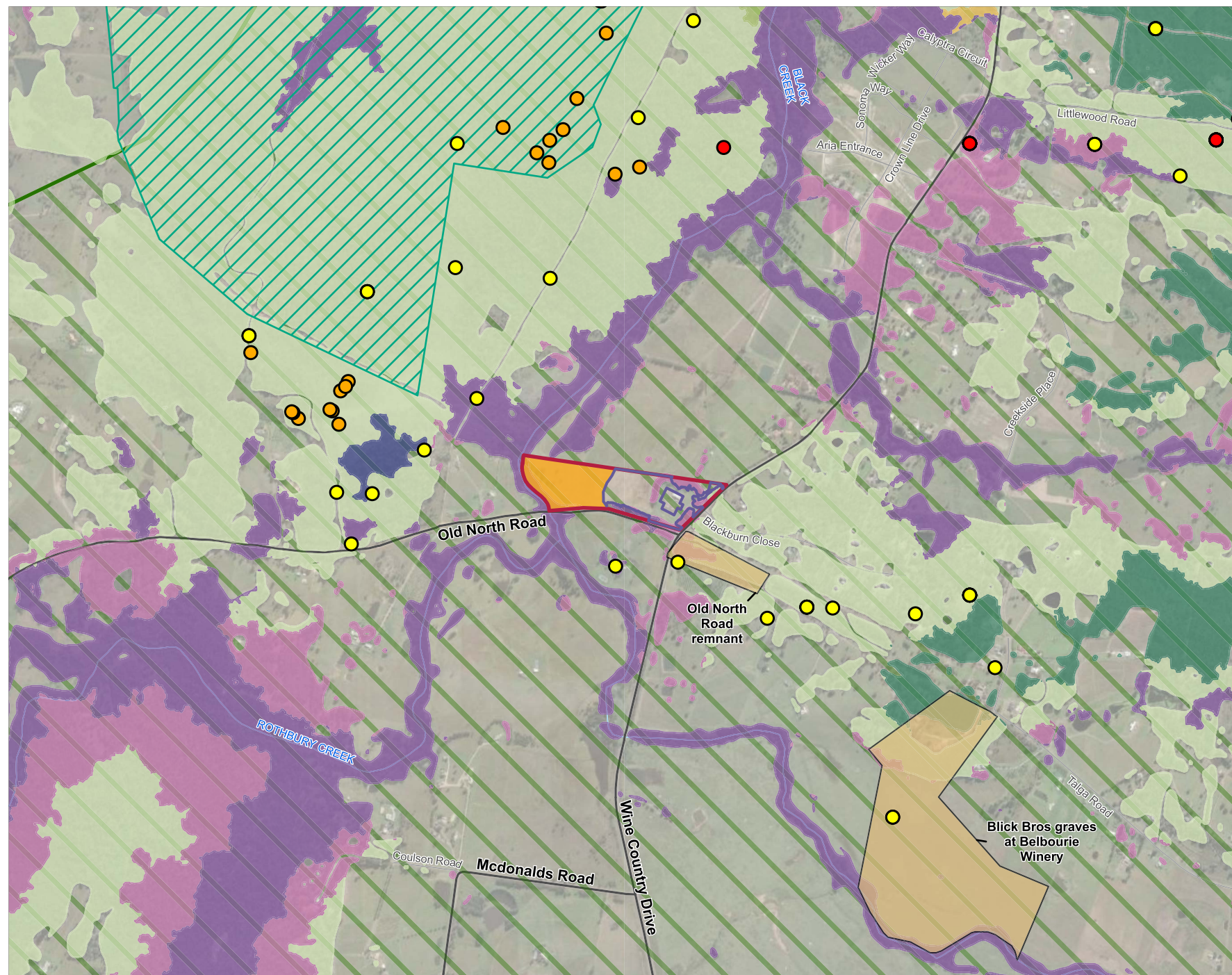
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2.6 Cumulative impacts

The *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPE, 2022a) require consideration of the cumulative impacts of the Project when considered alongside other existing and planned projects.

A search of the NSW Department of Planning, Infrastructure and Housing (DPHI) Major Projects website was undertaken on 7 January 2026 to identify other state significant projects within the vicinity of the Project that may contribute to cumulative impacts. A search was also conducted of the Cessnock City Council Application Tracker for Development Applications (DA) within 1 km of the Project. The five projects identified are outlined in **Table 2-1**.

Table 2-1: Relevant future projects for cumulative impact assessment

Project	Description	Distance to the site
Sunshine Estate BESS (SSD-92914712)	A BESS with a capacity of approximately 120 MW/480 MWh and ancillary infrastructure at Wine Country Drive, Rothbury.	Adjacent to the north
Huntlee New Town – Stage 2 (SSD-707484466)	A Concept Master plan for Stage 2 includes Villages 2, 3 and 4 and a large lot residential area located to the west of the site on Old North Road. Development of 1,750 new lots which would be largely residential lots.	1.1 km west and 3.1 km north
Huntlee New Town – Stage 1 (MP10_0137-Mod-25)	As per Modification 22, the development will consist of: • 2,272 residential land lots • 123 large lots • 12 infrastructure, community and education lots • 84 commercial lots.	4.3 km north
Huntlee Arcare Seniors Housing (SSI-49283708)	Construction of a 1-2 storey residential care facility with a maximum height of 8.12 m (RL 51.64) consisting of 96 beds, café, car parking for 47 vehicles and signage.	5.2 km north
Cedar Mill Hunter Valley (SSD-39121472)	Comprises a wine museum, convention space/areas and associated facilities, accommodation, winery, brewery, distillery, artesian produce outlets restaurants and cafes.	5.9 km south-west

A detailed assessment of potential cumulative impacts has been undertaken in **Section 6.14**.

2.7 Agreements

Construction and operation of the Project will be undertaken on property that is owned by Ausgrid. There are no negotiated agreements with any third-party landowners.

Ausgrid will provide benefit sharing in accordance with the *Benefit Sharing Guideline* (DPHI, 2024) and in consultation with Cessnock City Council. It is anticipated that a voluntary planning agreement would be negotiated with Council. Further details are included in **Chapter 5.0**.

3.0 Project description

3.1 Project overview

Ausgrid proposes to construct, operate and maintain a BESS with a maximum power output capacity of up to 135 MW over a four-hour duration (i.e. up to 540 MWh energy capacity), located adjacent to the existing Rothbury Zone Substation, in Rothbury, NSW. The Project would comprise battery units that would store energy from the grid, releasing it during high demand periods. The Project would also perform other ancillary services for the grid.

Key features of the Project are summarised in **Table 3-1** and shown in **Figure 3-1**.

Table 3-1: Project summary

Feature	Description
The Project	- Construction, operation, and maintenance of a BESS with a maximum power output capacity of up to 135 MW over a four-hour duration (i.e. up to 540 MWh energy capacity) - Containerised battery units and associated infrastructure, including inverters and MV transformers - RMUs - One auxiliary transformer - A 33 kV underground cable connection to the existing Rothbury Zone Substation - A combined switch and control room building - An O&M building - A warehouse to store equipment and other materials or plant related to maintaining the BESS - A backup diesel generator - Onsite car parking spaces - Other ancillary infrastructure including fire suppression, stormwater management infrastructure, boundary security fencing, noise barriers, lighting and CCTV.
The site	The site is located in Lots 1 and 2 of Deposited Plan (DP) 1318566 at 1309 Wine Country Drive, Rothbury, NSW 2320. The Project would be located in the central portion of the site.
Disturbance area	The total area of disturbance within the site (i.e. the Project Area) would be approximately 4.56 ha.
Access	Access to the Project Area is proposed via an existing driveway off Old North Road. Old North Road is a council-managed, single lane, unmarked road with line marking at the intersection of Wine Country Drive.
Noise barrier	An 8 m high noise barrier is proposed to be positioned around the eastern, southern and western perimeter of the battery units.
Grid connection	The Project would be connected to the NEM through the existing Rothbury Zone Substation via a 33 kV underground cable.
Estimated Development Cost	The total EDC for the Project would be \$231 million.
Operational life expectancy	The Project is intended to operate for 50 years, with some component replacements expected during this period. At the end of this period, the battery units would either be replaced or decommissioned. When the Project is decommissioned, the site would be rehabilitated. Any extension to the life of the battery units beyond the proposed 50-year period would be subject to the relevant approval regime at the time.

Feature	Description
Operational workforce	The Project would operate 24 hours a day, seven days a week, primarily as an unmanned facility. The Project would provide up to five part-time roles, equating to up to two FTE positions, during operation. Staff activities onsite would primarily consist of scheduled inspections and maintenance of battery units, along with occasional planned or unplanned maintenance of other equipment.

3.2 Environmental constraints

Latter chapters in this EIS provide further detail on the environmental constraints within the site and surrounds; these constraints have shaped the development and design of the Project. The key environmental constraints are shown in **Figure 2-2**.

The design and development of the Project have been shaped by the required layout and connection of Project equipment, as well as the following environmental considerations:

- Biodiversity values within and around the site
- Retention of existing vegetation that provides visual screening
- Potential areas of Aboriginal archaeological significance
- Results of the preliminary hazard analysis (PHA)
- Bushfire risk
- Potential flooding impacts.

**FIGURE 3-1:
INDICATIVE PROJECT LAYOUT
Legend**

-  The site
-  Project Area
-  Operational Footprint
-  Laydown area
-  Ancillary facilities
-  Fire water tank system
-  Containerised battery units
-  Internal site road
-  Construction car parking
-  Construction site office
-  Asset Protection Zone
-  Proposed landscaping
-  33 kV grid connection
-  Noise barrier
-  Project entry/exit
-  HV connection infrastructure (subject to separate approvals process)
-  Main road
-  Watercourse
-  Existing transmission lines

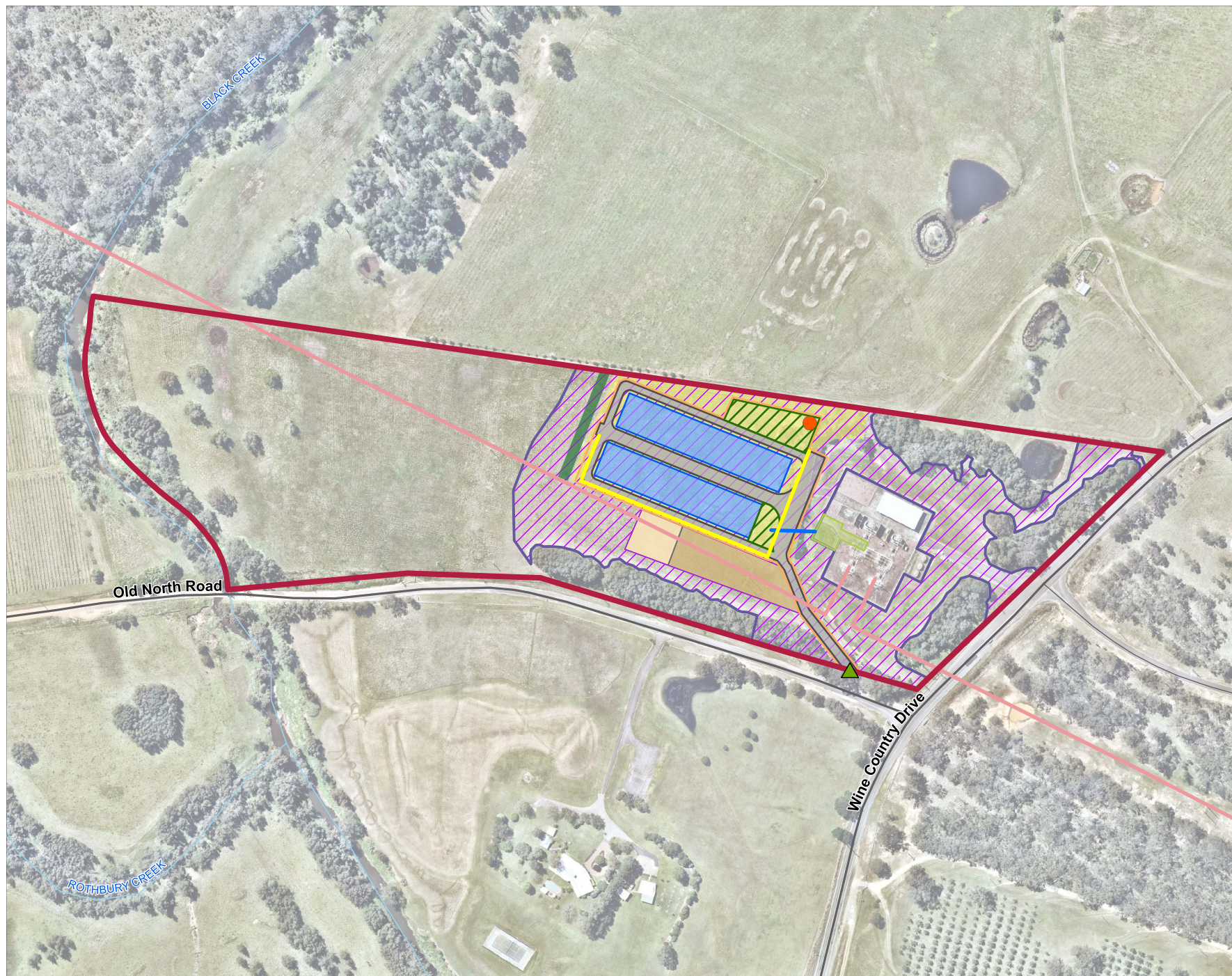
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3.3 Project description

3.3.1 Battery Energy Storage System

The BESS would consist of containerised LiFePO₄ battery units. These units would stand at a height of approximately 2.8 m, with a footprint of 1.7 m by 8.8 m, and would be mounted on a compacted gravel base, screw piles or a concrete slab. A typical battery unit is shown in **Figure 3-2**.

The battery units (containing the battery cells, inverters and cooling systems) would be arranged in rows, as shown in **Figure 3-3**. This would minimise cable run lengths and maintain appropriate separation distances, as per the manufacturer's requirements, to manage fire risks and provide access for maintenance.

The battery units would connect to MV transformers, RMUs and control systems. In addition, they would be connected to a Battery Management System, which would:

- Prevent overcharging, overheating and current surges into and out of the BESS
- Maintain voltage levels and automatically cut-out the BESS in the event of electrical shorts.

A combined switch and control room building (estimated 30 m length x 30 m width x 5 m height), as well as an O&M building and a warehouse would be located within the Project's Operational Footprint. The O&M building and warehouse would be used to store equipment, plant and materials to maintain and repair the Project and its ancillary infrastructure. A typical operations building is shown in **Figure 3-4**.

An indicative Project layout is provided in **Figure 3-1**.



Figure 3-2: A typical single containerised battery unit



Figure 3-3: A typical BESS site



Figure 3-4: A typical operations building

3.3.2 Services and infrastructure

Table 3-2 summarises the existing infrastructure within proximity of the site as well as the augmentation of this infrastructure that would be undertaken as part of the Project. Existing infrastructure is shown in **Figure 1-4**.

Table 3-2: Site infrastructure

Infrastructure	Detail
Stormwater	New stormwater management and drainage infrastructure would be constructed to service the Project, including a drainage channel to collect, convey and safely discharge stormwater runoff generated by the Project. Further details are provided in Section 6.9 .
Potable water	An existing potable water supply to the site connects to the Rothbury Zone Substation. Water supply during construction is expected to be externally sourced and delivered to the site via a water tanker. A new potable water connection for onsite amenity facilities during operation would be installed for the Project. Further details are provided in Appendix L .
Sewer	There is an existing septic system at the Rothbury Zone Substation. A new connection to sewer or the existing septic system would be sought for the Project.
Electricity	Ausgrid would install a new electricity metered connection at the site.
Telecommunications	The Project would utilise the existing Ausgrid fibre from the adjacent Rothbury Zone Substation and a secondary connection via NBN or cellular 4G.
Fire services	Fire water is supplied onsite via an existing fire hydrant supply at the Rothbury Zone Substation. Any additional fire water requirements from the Fire Safety Study (FSS) (to be prepared during detailed design) would be incorporated prior to construction.
Security	The existing Rothbury Zone Substation is fenced and access-controlled with signage around the perimeter. A security fence would be constructed around the perimeter of the Project. This would be augmented with security gates to facilitate authorised access only. CCTV would also be installed.
Access and circulation	Access to the Project Area (as outlined in Table 3-1) would be designed adequately to allow for relevant heavy vehicle swept paths and sight distances. Further details are provided in Section 6.8 . The internal site roads, which would enable vehicular access during operation of the Project, are shown in Figure 3-1 .
Parking and workforce	Section 3.4.3.3 and Section 3.5.3 outline parking and workforce requirements during construction and operation, respectively.

3.3.3 Project sequencing

The Project would move through various phases during construction, as outlined in **Figure 3-5**. These phases are described in more detail in **Sections 3.4.3** and **3.4.4**.

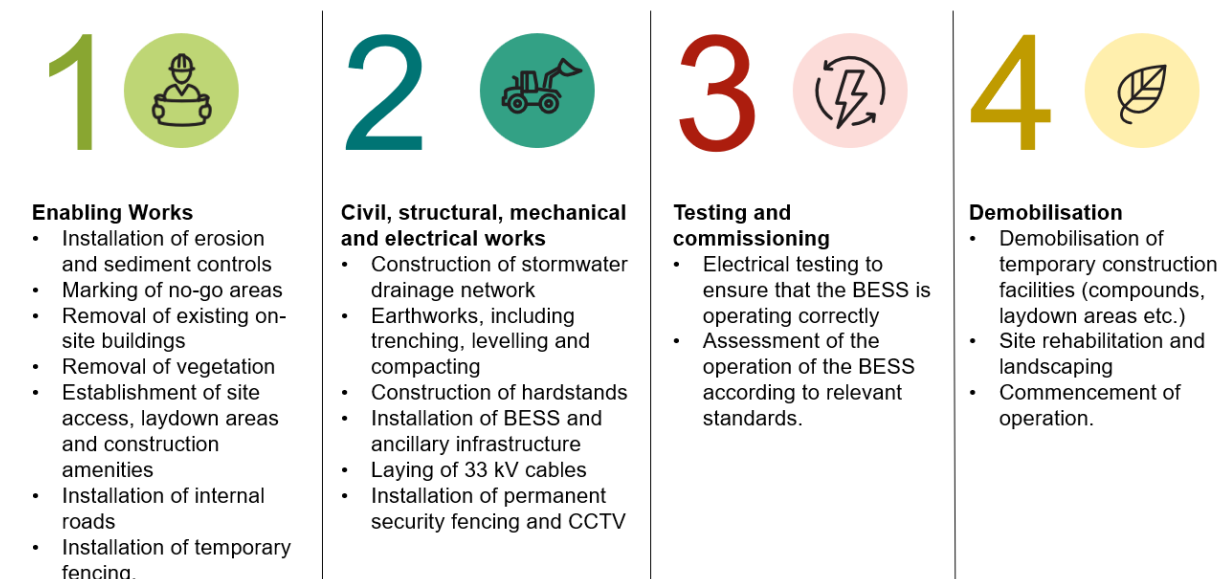


Figure 3-5: Project sequencing

3.4 Project construction

3.4.1 Overview

Table 3-3 provides an overview of the construction works.

Table 3-3: Construction overview

Construction	
Construction activities	Construction would involve: • Enabling works • Civil, structural, mechanical and electrical works • Testing and commissioning • Demobilisation. The works associated with each of these stages are discussed in Section 3.4.3. Construction laydown areas would be provided within the Project's Construction Footprint.
Plant and equipment	The indicative plant and equipment that would be used include: Enabling works: • Front end loaders • Dump trucks • Road trucks • Water trucks • Excavators • Graders • Compactors • Bulldozer • Tub grinder/mulcher • Chainsaws • Light vehicles.

Construction	
	Civil, structural, mechanical and electrical works: • Front end loaders • Road trucks • Graders • Concrete trucks and pumps • Dump trucks • Excavators • Bobcats • Compactors and rollers • Elevated work platforms • Cranes • Concrete saws and grinders • Water trucks • Light vehicles • Backhoe • Generators. Testing and commissioning: • Elevated work platforms • Cranes • Generators • Light vehicles. Demobilisation: • Water trucks • Compactors • Backhoe • Light vehicles.
Construction duration	It is anticipated that construction of the Project would commence in late 2027 and be completed by mid-2029 (approximately 22 months). The peak construction period would have a duration of around 6 months. However, these timeframes are indicative and subject to change pending planning approvals, equipment lead times and availability.
Construction workforce	Up to 100 FTE construction workers (at peak) would be required. These workers would be preferentially sourced locally where appropriate skillsets are available.
Construction hours	Construction would occur during standard working hours as outlined in the <i>Interim Construction Noise Guideline</i> (NSW Department of Environment and Climate Change, 2009) (ICNG), being: • Monday to Friday 7.00 am to 6.00 pm • Saturday 8.00 am to 1.00 pm • No works on Sundays and Public Holidays. Some activities may be required to be completed outside of standard hours. These would be completed in accordance with an Out of Hours Work procedure and may include (but not be limited to): • Electrical commissioning and testing • Emergency situations where work is required to prevent harm to persons or property.
Construction traffic volumes	Up to 120 light vehicles and 70 heavy vehicles would access the site per day during the peak construction period.

3.4.2 Materials, stockpiling and laydown areas

Temporary construction laydown areas would be required within the Project's Construction Footprint. These areas would provide a location to store plant, materials and equipment during construction, and may be covered with temporary roofing to protect stored equipment.

The likely location of the laydown areas, car parking and site office during construction is shown in **Figure 3-1**. As the land is generally flat in these areas, no earthworks would be required to construct the laydown areas. A hardstand layer would be applied that would be removed once construction is complete.

3.4.3 Construction stages

3.4.3.1 Enabling works

Enabling works would be carried out to prepare the site for construction, and would generally include:

- Establishment of Project access, laydown areas and construction compound (including temporary offices, lunchrooms, storage areas and washrooms)
- Installation of erosion and sediment controls and marking out of no-go areas
- Clearing of vegetation
- Installation of temporary fencing and lighting
- Establishment of temporary construction services including diesel generators
- Installation of temporary site drainage and underground services.

3.4.3.2 Civil, structural, mechanical and electrical works

Following the enabling works, the following works would be required:

- Construction of internal site roads, consisting of either compacted gravel or road base
- Earthworks and site levelling to form a suitable pad for the battery units and ancillary infrastructure
- Appropriate foundations for the battery units, MV transformers and RMUs
- Delivery and installation of BESS components
- Internal fit out of the combined switch and control room building
- Construction of the O&M building and warehouse
- Installation of stormwater management and drainage systems
- Installation of noise barriers.

The 33 kV cable from the BESS to the Rothbury Zone Substation would be installed below ground. This would include:

- Excavation of a cable trench
- Laying of cables within trench
- Connecting cables to the substation HV infrastructure
- Backfilling of trench and rehabilitation of the cable easement.

Soils along the route of the trench would be excavated and stockpiled nearby, or within designated stockpile areas for the Project. Excavation would be completed in a progressive manner to minimise the amount of material stockpiled and to reduce the potential for erosion.

3.4.3.3 Construction traffic and parking

Access to the Project is proposed via an existing driveway off Old North Road. This would be used during construction and for ongoing maintenance once the Project is operational.

Up to 70 heavy vehicles per day would require access to the Project during the peak construction period. None of these vehicles would be oversize and/or overmass (OSOM). The vehicles may arrive and leave at any point during the day, but most likely would arrive in the early morning.

Parking would be provided within the site for heavy vehicles. Sufficient parking would be provided onsite for the construction workforce to ensure vehicles do not park on the surrounding road network. While not proposed at this stage, a shuttle bus program, managed by a local bus company, may be considered to transport some of the construction workforce to and from the site for a portion of the construction phase, if necessary. Further details would be included in a Construction Traffic Management Plan (CTMP).

3.4.4 Post construction works

3.4.4.1 Testing and commissioning

Commissioning works would include electrical testing to ensure that the Project is operating correctly and according to relevant standards.

3.4.4.2 Demobilisation

Prior to operation, all temporary construction equipment and facilities would be removed, and all unoccupied disturbed land would be rehabilitated in accordance with the existing nature of the site. **Table 3-3** outlines the equipment required for commissioning and demobilisation.

3.4.5 Construction program

An indicative schedule for construction is provided in **Table 3-4**.

Table 3-4: Indicative construction schedule

Task/stage	Date/duration
Enabling works	Late 2027 – 1 to 3 months
Civil, structural, mechanical and electrical works	Early 2028 – 6 to 12 months
Testing and Commissioning	Mid-2028 – 12 to 18 months
Demobilisation	Mid-2029 – 1 to 3 months

3.5 Operation

3.5.1 Operational activities

During operation, activities would include:

- Operation, maintenance, testing and management of the BESS and its associated infrastructure
- General office activities
- Receipt of goods
- Waste removal
- General site maintenance (e.g. mowing).

3.5.2 Operational plant and equipment

Table 3-5 provides an indicative list of operational plant and equipment.

Table 3-5: Indicative plant and equipment during operation

Equipment to be used during operation	
Light vehicles	Elevated work platforms
Whipper snippers	Tractors
Chainsaws	Generators

3.5.3 Operational workforce and hours

The Project would operate 24 hours a day, seven days a week, primarily as an unmanned facility. The Project would be managed remotely and staffed during planned and unplanned maintenance periods. The Project would provide up to five part-time roles, equating to up to two FTE positions, during operation.

Adequate parking would be provided onsite for the operation of the Project to accommodate the operational staffing requirements.

3.6 Decommissioning

The Project is intended to operate for 50 years, with some component replacements expected during this period. At the end of this period, the battery units would either be replaced or decommissioned. When the Project is decommissioned, the site would be rehabilitated. Any extension to the life of the battery units beyond the proposed 50-year period would be subject to the relevant approval regime at the time.

During decommissioning above-ground components would be removed and recycled where possible, and the land rehabilitated. Prior to any demolition, existing infrastructure, plant and equipment would be assessed and categorised based on whether the materials can be reused, repurposed, or recycled. Materials able to be reused, repurposed, or recycled will be preferentially distributed offsite to other projects, suppliers, or recycling facilities.

At the end of a battery's life, the battery units would be recycled at an approved recycling facility or returned to the manufacturer for refurbishment/remanufacturing (e.g. OEM remanufacturing facilities in Australia). At recycling facilities, batteries are dismantled with materials reclaimed through mechanical, hydrometallurgical and pyrometallurgical processes. Recycled materials can be reintegrated into the battery manufacturing process, reducing reliance on virgin resources. The CSIRO (2023) states that 95% of battery components can be recovered for alternative use. With the growth in battery usage being driven by electrification of our economy, end-of-life battery recycling is becoming increasingly viable (Zhao et al., 2020). This is expected to continue as the remanufacturing capacity, regulations and technology develop over the coming years (Sheth et al., 2023). As such, more advanced battery recycling technology is expected to become available during the operational life of the Project.

3.7 Estimated Development Cost

The total EDC for the Project is \$231 million, as outlined in the Estimated Development Cost Report in **Appendix P**.

4.0 Statutory context

4.1 Introduction

This chapter outlines the relevant statutory requirements for the Project. Specifically, it identifies:

- The relevant planning pathway under which consent is sought
- Relevant state approvals beyond the EP&A Act, including those that are not required for SSD projects (section 4.41 of the Act), and those that cannot be refused and must be substantially consistent with the approved SSD project (section 4.42 of the Act)
- Mandatory matters for consideration, including relevant state and local environmental planning instruments (EPIs)
- Relevant Commonwealth approvals.

A summary of the statutory requirements for the Project is provided in **Table 4-1**, with further detail provided in **Section 4.1.1** to **Section 4.3.4**. A detailed assessment of the statutory requirements is provided in the relevant sections of the environmental impact assessment (**Chapter 6.0**) and a statutory compliance table is provided in **Appendix B**.

Table 4-1: Summary of statutory requirements

Category	Requirement
Power to grant approval	The Project is considered SSD under the EP&A Act as it satisfies the SSD requirements of section 2.6 of the Planning Systems SEPP. Being SSD, the Project would be assessed under Part 4, Division 4.7 of the EP&A Act (refer to Section 4.2.2). Under section 4.5(a) of the EP&A Act, the consent authority for the Project would be the Minister for Planning and Public Spaces or the Independent Planning Commission (IPC). The IPC would be the consent authority in the event that more than 50 public objections to the application are received, or the local council objects, or a reportable political donation has been made by the proponent in the two years prior to application being lodged.
Permissibility	The definition of 'electricity generating works' under Section 2.35 of the Transport and Infrastructure SEPP includes 'electricity storage'. The Project meets this definition and is therefore considered to be 'electricity generating works' for the purpose of this policy. The Project is located on land zoned 'RU2 Rural Landscape' under the Cessnock LEP. 'Electricity generating works' are permissible with consent under the Cessnock LEP within this land use zone. Section 2.36(1) of the Transport and Infrastructure SEPP also provides for 'electricity generating works' to be carried out by any person with consent on land within a prescribed non-residential zone under section 2.35 of the Transport and Infrastructure SEPP. As such, permissibility for the Project is also achieved through the application of section 2.36 of the Transport and Infrastructure SEPP, which prevails to the extent of any inconsistency with the LEP.
Other approvals	There are no other approvals required for the completion of the Project.
Pre-condition to exercising the power to grant consent	Pre-conditions to exercising the power to grant development consent include consideration of matters discussed in further detail in Section 4.1.1 and Table 4-2 .

Category	Requirement
Mandatory matters for consideration	Section 4.15 of the EP&A Act requires the consent authority to consider the following relevant matters: • Relevant EPIs • Relevant development control plans (DCPs) • Any planning agreement that has been or will be entered into the regulations • Likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality • Suitability of the site for the development • Public interest. These and other relevant matters are considered in Section 4.3.

4.1.1 Pre-conditions to grant development consent

Pre-conditions for the consent authority to exercise the power to grant development consent for the Project are provided in **Table 4-2**.

Table 4-2: Pre-conditions to granting development consent

Statutory reference	Pre condition	Relevance	Chapter/Section/Appendix in EIS
<i>State Environmental Planning Policy (Resilience and Hazards) 2021</i> – section 3.7	Section 3.7 of the <i>State Environmental Planning Policy (Resilience and Hazards) 2021</i> (Resilience and Hazards SEPP) requires that relevant circulars and guidelines be considered when determining if a development is potentially hazardous or offensive. If a development is determined to be either, or both, potentially hazardous or offensive, a Preliminary Hazard Analysis (PHA) must be prepared.	The Project has not been assessed as potentially hazardous or potentially offensive development; however, the SEARs require that a PHA be prepared. The PHA concluded that the Project does not pose any potential offsite risk. Mitigation measures to minimise risk are included in Section 6.10 and Appendix D.	Section 6.10 Appendix M Appendix D
<i>State Environmental Planning Policy (Resilience and Hazards) 2021</i> – section 4.6	Section 4.6 of this policy requires that before determining an application for development consent, the consent authority must consider whether the land is contaminated and if so, they must consider a report prepared by the applicant outlining the findings of a preliminary investigation of the land. This report must be prepared in accordance with the contaminated land guidelines.	The Detailed Site (Contamination) Assessment prepared for the Project has not identified any potentially contaminated locations within the Project Area that are above the human health and ecological criteria. It concludes that the site is suitable for the proposed use without the need for further assessment of soil, remediation or long-term management. A soils and contamination assessment has been conducted as part of this EIS.	Section 6.4 Appendix G

Statutory reference	Pre condition	Relevance	Chapter/Section/Appendix in EIS
<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i>	Section 2.119(2) of this policy specifies that the consent authority must not grant consent to development on land that has a frontage to a classified road unless certain conditions are satisfied.	The Project is bordered by Old North Road to the south and Wine Country Drive (B82) to the east. Wine Country Drive is a classified road under the <i>Roads Act 1993</i> . As such, the requirements under clause 2.119 of the Transport and Infrastructure SEPP have been considered. A Traffic Impact Assessment (TIA) prepared for the Project addresses the matters of consideration under this clause.	Section 6.8 Appendix K
Cessnock LEP	The Cessnock LEP sets out the environmental planning provisions applicable to the Cessnock LGA, including land use zoning.	The requirements of the Cessnock LEP have been considered in this EIS.	Section 4.3.3

4.2 Environmental Planning and Assessment Act 1979

4.2.1 Overview

The EP&A Act and EP&A Regulation provide the framework for land use planning and development control in NSW. The EP&A Act and the EP&A Regulation are supported by a number of EPIs, including SEPPs and LEPs.

Part 4 of the EP&A Act establishes a framework for the assessment of development that requires consent. The term 'development' is defined under section 1.5 of the EP&A Act.

4.2.2 Planning approval pathway

The Project meets the definition of 'development' under Section 1.5 of the EP&A Act as it involves the use of land and the erection of a building. BESSs are defined as 'electricity generating works' under the Transport and Infrastructure SEPP, being a building or place used for the purpose of electricity storage.

'Electricity generating works' are permissible with consent under the Cessnock LEP on land zoned 'RU2 Rural Landscape'. Section 2.36(1) of the Transport and Infrastructure SEPP states that development for the purpose of 'electricity generating works' may be carried out by any person with consent on land within a prescribed non-residential zone. The Project is located in a prescribed non-residential zone under section 2.35 of the Transport and Infrastructure SEPP. On this basis, the Project is permissible with development consent.

Section 4.36 of the EP&A Act defines development that is SSD and notes that development can be declared as such by an EPI. Under the Planning Systems SEPP, 'electricity generating works' are deemed to be SSD if they have an EDC of more than \$30 million. The Project will have an EDC in excess of \$30 million and is therefore considered SSD.

Section 4.12(8) of the EP&A Act states that a 'development application for State significant development is to be accompanied by an environmental impact statement (EIS) prepared by or on behalf of the applicant in the form prescribed by the regulations'. Part 8, Division 2 of the EP&A Regulation sets out the requirements of an EIS and requires that the content of an EIS is 'subject to the environmental assessment requirements that relate to the EIS'. Environmental assessment requirements are typically sought through a request for SEARs submitted to the DPHI.

In line with section 4.5 of the EP&A Act, the consent authority for the Project would be the NSW Minister for Planning and Public Spaces or the IPC. The IPC would become the consent authority in the event that more than 50 public objections to the application are received, Cessnock City Council objects, and/or the applicant has made reportable political donations in the two years prior to submitting the application.

As noted in section 4.40 of the EP&A Act, SSD applications are evaluated and determined in line with the requirements of section 4.15 of the EP&A Act. Matters for consideration specified in this section include relevant EPIs, likely impacts to the built and natural environment and social and economic impacts, submissions made on the application, site suitability and the public interest. These matters have been considered and presented in this EIS (refer to **Section 4.3**).

Sections 4.41 and 4.42 of the EP&A Act identify authorisations that are not required for a SSD, and authorisations that cannot be refused, if necessary, for carrying out a SSD, respectively (refer to **Section 4.3.1**).

4.3 Mandatory considerations

Relevant mandatory considerations for the Project are summarised within in **Table 4-3** and described further in **Sections 4.3.1** to **4.3.5**.

Table 4-3: Mandatory considerations

Statutory document	Section reference	Mandatory consideration	Section in EIS
Considerations under the EP&A Act and EP&A Regulation			
<i>Environmental Planning and Assessment Act 1979</i>	Section 1.3	Relevant objects of the Act	Section 7.2
	Section 1.5	The definition of the term 'development'	Section 4.2.1
	Section 4.12	(8) A development application for SSD is to be accompanied by an EIS prepared by or on behalf of the applicant in the form prescribed by the regulations.	This EIS
	Section 4.15	(1) Matters for consideration – general In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:	
		a) The provisions of – i) any relevant environmental planning instruments, and [...] iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), that apply to the land to which the development application relates.	This EIS chapter and the EIS generally
		b) The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.	Chapter 6.0
		c) The suitability of the site for the development.	Section 2.3
		e) The public interest	Chapter 7.0

Statutory document	Section reference	Mandatory consideration	Section in EIS
	Section 4.40	SSD applications are to be evaluated in accordance with section 4.15 requirements	Section 4.2.2
	Section 4.41	Authorisations that are not required for SSD	Table 4-4
	Section 4.42	Authorisations that cannot be refused for SSD and must be applied consistently	Table 4-4
	Section 4.5	Designation of consent authority	Section 4.2.2
<i>Environmental Planning and Assessment Regulation 2021</i>	Section 24	(1) A development application must – a) Be in the approved form, and b) Contain all of the information and documents required by: i) The approved form, and ii) The Act of this Regulation, and c) Be submitted on the NSW planning portal	This EIS will be submitted via the NSW planning portal and has been prepared in the approved form
	Section 190	(1) An EIS must contain the following information -	
		a) The name, address and professional qualifications of the person who prepared the statement,	Certification page
		b) The name and address of the responsible person	Table 1-1
		c) The address of the land – (1) To which the development application relates, or (2) On which the activity or infrastructure to which the statement relates will be carried out,	Table 1-1
		d) A description of the development, activity or infrastructure,	Chapter 3.0
		e) An assessment by the person who prepared the statement of the environmental impact of the development, activity or infrastructure, dealing with the matters referred to in this Division	Table 4-3 Table 4-3
		(2) The person preparing the statement must have regard to -	
		a) For State significant development – the <i>State Significant Development Guidelines</i>	Section 1.1 and the EIS generally
		(3) An environmental impact statement must also contain a declaration by the person who prepared the statement of the following -	
		a) the statement has been prepared in accordance with this Division, and b) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure, and c) the information contained in the statement is not false or misleading.	Certification page

Statutory document	Section reference	Mandatory consideration	Section in EIS
	Section 192	(1) an environmental impact statement must contain the following -	
		a) a summary of the environmental impact statement	Summary
		b) a statement of the objectives of the development, activity or infrastructure,	Section 1.2
		c) an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, considering its objectives, including the consequences of not carrying out the development, activity or infrastructure,	Section 2.2.2
		d) an analysis of the development, activity or infrastructure, including -	
		i) a full description of the development, activity or infrastructure, and	Chapter 3.0
		ii) a general description of the environment likely to be affected by the development, activity or infrastructure and a detailed description of the aspects of the environment that are likely to be significantly affected, and	Section 2.5 Chapter 6.0
		iii) the likely impact on the environment of the development, activity or infrastructure, and	Chapter 6.0 Appendix E to Appendix N
		iv) a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment, and	Chapter 6.0
		v) a list of the approvals that must be obtained under another Act or law before the development, activity or infrastructure may lawfully be carried out,	This chapter (Chapter 4.0) Appendix B
		e) a compilation, in a single section of the EIS, of the measures referred to in paragraph (d)(iv),	Appendix D
		f) the reasons justifying the carrying out of the development, activity or infrastructure, considering biophysical, economic and social factors, including the principles of ecologically sustainable development set out in Section 193.	Chapter 7.0

Statutory document	Section reference	Mandatory consideration	Section in EIS
Mandatory relevant considerations under EPIs			
<i>State Environmental Planning Policy (Planning and Systems) 2021</i>	Section 2.6	(1) Whether the development is SSD.	Section 4.2.2
	Section 2.7	Consideration must be given to whether the Independent Planning Commission is a consent authority of the SSD	Section 4.2.2
	Section 2.10	Applicability of the Development Control Plans	Section 4.3.2
<i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i>	Chapter 3	Identifies areas applicable to Chapter 3 (Koala habitat protection 2020)	Section 4.3.4.2
<i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>	Section 2.10	Consideration on the impacts of the Project on the physical, social and cultural environments.	Chapter 6.0
	Section 2.10	Consideration of whether the Project has proposed reasonable mitigation measures	Chapter 6.0
	Section 3.2	Whether the development is potentially hazardous or offensive	Section 6.10 Appendix M
	Section 3.7	Consideration must be given to current circulars or guidelines published by DPHI relating to hazardous or offensive development	Section 6.10 Appendix M
	Section 4.6	(1) A consent authority must consider whether the land to be developed is contaminated (2) For a change of use on any of the land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned	Section 6.4 Appendix G
<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i>	Section 2.36	Permissibility of Project with consent with consideration to its land use zone	Section 4.2.2 Section 4.3.3
	Section 2.48	The impact on the electricity transmission network	Section 4.3.2.4
	Section 2.119	Consideration to development on land that has a frontage to a classified road.	Section 4.3.2 Section 6.8 Appendix K
<i>Cessnock Local Environmental Plan 2011</i>	Part 2 - Land Use Table	Land use zones and objectives	Section 4.3.3 Section 6.5.3.1
	Clause 4.3	Height of buildings	Section 4.3.2
	Clause 4.4	Floor space ratio	Section 4.3.2
	Clause 5.10	Heritage conservation	Section 4.3.2
	Clause 5.21	Flood planning	Section 4.3.2
	Clause 5.22	Special flood considerations	Section 4.3.2

Statutory document	Section reference	Mandatory consideration	Section in EIS
	Clause 7.1	Acid sulfate soils (ASS)	Section 4.3.2
	Clause 7.2	Earthworks	Section 4.3.2
	Clause 7.14	Essential services	Section 4.3.2
	Clause 7.15	Groundwater vulnerability	Section 4.3.2
Mandatory relevant considerations under other NSW Legislation			
<i>Aboriginal Land Rights Act 1983</i>	Section 166	Consider the presence of claimable Crown Land	Section 4.3.4.1 Appendix F
<i>National Parks and Wildlife Act 1974</i>	Section 90	The requirement of an Aboriginal Heritage Impact Permit (AHIP)	Section 4.3.4.2 Appendix F
<i>Water Management Act 2000</i>	Section 91	The distance of the Project to rivers, lakes and estuaries	Section 4.3.4.3 Section 6.9 Appendix L
<i>Protection of the Environment Operations Act 1997</i>	Chapter 3	Consider the need for an environment protection licence	Section 4.3.4.4
<i>Contaminated Land Management Act 1997</i>	Section 60	Consider the level of contamination of the site	Section 4.3.4.5 Section 6.4 Appendix G
<i>Biodiversity Conservation Act 2016</i>	Section 7.9(2)	Consider the need for a Biodiversity Development Assessment Report (BDAR)	Section 4.3.4.6 Section 6.2 Appendix E
<i>Biosecurity Act 2015</i>	Entirety of the Act	Consider the presence of pests, diseases and weeds within the Project Area	Section 4.3.4.7 Section 6.2 Appendix E
<i>Rural Fires Act 1997</i>	Section 63	Public authorities must take all practicable steps to prevent the occurrence and minimise the spread of bush fires on or from land vested in or under its control or management.	Section 4.3.4.8 Section 6.11 Appendix N
<i>Roads Act 1993</i>	Section 138	Consider whether the Project will impact roadways	Section 4.3.4.9 Section 6.8 Appendix K
<i>Heritage Act 1977</i>	Entirety of the Act	Consider the presence of heritage items	Section 4.3.4.10 Section 6.3 Section 6.13.1 Appendix F
Mandatory considerations under Commonwealth Legislation			
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	Entirety of the Act	Consider whether declarations have been made to protect the site.	Section 4.3.5 Section 6.3 Appendix F

Statutory document	Section reference	Mandatory consideration	Section in EIS
Airports Act 1996 and Airports (Protection of Airspace) Regulations 1996	Airports Act 1996 Part 12	Consider the location of the Project in relation to airports	Section 4.3.5.2
	Airports (Protection of Airspace) Regulations AC 139-07(2)	Consider the height of structures or equipment used in the Project and the distance of those to surrounding airports	Section 4.3.5.2
Environment Protection and Biodiversity Conservation Act 1999	Section 18	Consider the level of impact the Project will have on Matters of Environmental Significance (MNES)	Section 4.3.5.3 Section 6.2
Native Title Act 1993	Entirety of the Act	Consider the presence of possible native title or native title claims that may be affected by the Project	Section 4.3.5.4

4.3.1 Authorisations under sections 4.41 and 4.42 of the EP&A Act

Sections 4.41 and 4.42 of the EP&A Act identify authorisations that are not required for a SSD, and authorisations that cannot be refused, if necessary, for carrying out a SSD, respectively. These authorisations, and their applicability to the Project are outlined in **Table 4-4**.

Table 4-4: Relevant approvals under sections 4.41 and 4.42 of EP&A Act

Approval	Comment
Authorisations that are not required under section 4.41 of the EP&A Act	
A permit under section 201, 205 or 219 of the <i>Fisheries Management Act 1994</i>	A permit under the <i>Fisheries Management Act 1994</i> is not required for this Project.
An approval under Part 4, or an excavation permit under section 139 of the <i>Heritage Act 1977</i>	An approval under the <i>Heritage Act 1977</i> is not required for this Project.
An Aboriginal heritage impact permit under section 90 of the <i>National Parks and Wildlife Act 1974</i>	An Aboriginal heritage impact permit is not required for this Project.
A bush fire safety authority under section 100B of the <i>Rural Fires Act 1997</i>	A bushfire safety authority under the <i>Rural Fires Act 1997</i> is not required for this Project.
A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the <i>Water Management Act 2000</i> .	The Project would not require a water management approval or an activity approval under the <i>Water Management Act 2000</i> .
Authorisations that cannot be refused under section 4.42 of the EP&A Act	
An aquaculture permit under section 144 of the <i>Fisheries Management Act 1994</i>	The Project would not involve aquaculture. Therefore, no aquaculture permit would be required.
An approval under the <i>Coal Mine Subsidence Compensation Act 2017</i> , section 22	The Project is not located within a mine subsidence district. An approval under section 22 of the <i>Coal Mine Subsidence Compensation Act 2017</i> would not be required.
A mining lease under the <i>Mining Act 1992</i>	The Project does not include any mining activities. A mining lease would not be required.
A production lease under the <i>Petroleum (Onshore) Act 1991</i>	The Project would not involve petroleum production.

Approval	Comment
An environment protection licence (EPL) under Chapter 3 of the <i>Protection of the Environment Operations Act 1997</i> (for any of the purposes referred to in Section 43 of that Act)	The Project would not include any scheduled activities under the <i>Protection of the Environment Operations Act 1997</i> (POEO Act) and as such an EPL is not required.
A consent under section 138 of the <i>Roads Act 1993</i>	The Project would require works within road reserve areas and therefore would require approval under the <i>Roads Act 1993</i> .
A licence under the <i>Pipelines Act 1967</i>	No pipelines would be required for the Project and therefore a licence would not be required.

4.3.2 State Environmental Planning Policies

SEPPs relevant to the Project are discussed in detail in the following sections.

4.3.2.1 State Environmental Planning Policy (Planning Systems) 2021

The Planning Systems SEPP applies across NSW. Chapter 2 (State and Regional development) of the Planning Systems SEPP identifies and regulates development that is significant to the State. Part 2.2 of the policy relates to development that is declared SSD. Pursuant to section 2.6(1) of this policy, development is declared to be SSD for the purposes of the EP&A Act if:

- (a) *The development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the [EP&A] Act, and*
- (b) *The development is specified in Schedule 1 or 2 [of the Planning Systems SEPP].*

As discussed in **Section 4.2.2**, the Project is declared as SSD under section 2.6 of the Planning Systems SEPP. Furthermore, section 2.10 of this SEPP states that DCPs do not apply to SSD projects.

4.3.2.2 State Environmental Planning Policy (Biodiversity and Conservation) 2021

The following chapters of *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity and Conservation SEPP) are relevant to the Project:

Chapter 3 Koala habitat protection 2020

The aim of Chapter 3 of the Biodiversity and Conservation SEPP is to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of population decline.

Section 3.3 of the SEPP provides that Chapter 3 applies only to land zoned RU1 Primary Production, 'RU2 Rural Landscape' and 'RU3 Forestry' within LGAs listed in Schedule 2 of Chapter 4 of the Biodiversity and Conservation SEPP.

The Project is located on land zoned 'RU2 Rural Landscape' in the Cessnock City Council LGA, which is defined in Schedule 2. Accordingly, the provisions of Chapter 3 of the Biodiversity and Conservation SEPP are applicable to the Project.

Although mapped Biodiversity Values land occurs within the site, it is not associated with any core koala habitat identified in an adopted koala plan of management under the Biodiversity and Conservation SEPP. Furthermore, the site was assessed and determined not to constitute Potential Koala Habitat. As a result, no further assessment or consideration is required under Chapter 3 of the Biodiversity and Conservation SEPP.

4.3.2.3 State Environmental Planning Policy (Resilience and Hazards) 2021

The objective of the Resilience and Hazards SEPP is to provide a State-wide planning approach to resilience and hazards. The following chapters of this policy are relevant to the Project:

Chapter 3 Hazardous and offensive development

Chapter 3 of the Resilience and Hazards SEPP outlines the approach to planning and assessing the risks and hazards associated with the development of potentially hazardous or offensive industry. The

Resilience and Hazards SEPP outlines matters for consideration for a project which are linked to its safety and pollution control performance. Chapter 3 applies to all projects that fall under the policy's definition of '*potentially hazardous industry*' or '*potentially offensive industry*'.

For projects classified as '*potentially hazardous industry*' the policy establishes a comprehensive test by way of a preliminary screening assessment and PHA to determine the risk to people, property and the environment. This preliminary screening assesses the storage of specific dangerous goods classes that have the potential for significant offsite effects. Specifically, the assessment involves the identification of classes and quantities of all dangerous goods to be used, stored or produced on site, or transport to and from the site.

In response to the SEARs, a PHA has been prepared to assess potential hazards and risks associated with the Project. The PHA is provided in **Appendix M** and summarised in **Section 6.10**.

Chapter 4 Remediation of Land

Chapter 4 of the Resilience and Hazards SEPP provides a State-wide planning approach for the remediation of contaminated land and aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or the environment. Chapter 4 restricts consent authorities from issuing development consent on land that may be contaminated, unless the consent authority is satisfied that the land in question is suitable for the development proposed to be carried out or would be suitable if appropriate remediation is undertaken.

A search of the NSW Environment Protection Authority (NSW EPA) Contaminated Land Register under section 58 of the *Contaminated Land Management Act 1997* (CLM Act) and the list of NSW contaminated sites notified to the EPA under section 60 of the CLM Act was undertaken as part of the Detailed Site (Contamination) Assessment on 8 July 2025. The search did not identify the site as being contaminated or requiring contamination regulation.

Section 6.4 discusses the risk of existing contamination within the Project Area and the potential for the Project to result in new contamination. Further details are contained in the Detailed Site (Contamination) Assessment in **Appendix G**.

4.3.2.4 State Environmental Planning Policy (Transport and Infrastructure) 2021

The objective of Chapter 2 of the Transport and Infrastructure SEPP is to facilitate the effective delivery of infrastructure across the State.

The site is located on land zoned 'RU2 Rural Landscape' under the Cessnock LEP. The Project is characterised as 'electricity generating works', which is permissible with consent in this land use zone. This land use zone is also defined as a 'prescribed non-residential zone' for the purpose of considering the permissibility of 'electricity generating works' in section 2.35 of the Transport and Infrastructure SEPP. Section 2.36 of this policy provides that the Project is permissible with consent on the basis of the site's existing land use zoning.

Section 2.48 of this policy relates to determination of development applications that are likely to affect an electricity transmission or distribution network.

As the Project would potentially trigger one or more of the above thresholds it is expected the consent authority would consult with the relevant electricity supply authority (which is the same as the applicant).

Section 2.119 of the Transport and Infrastructure SEPP relates to development in or adjacent to road corridors and road reservations. This section restricts the consent authority from granting consent to development on land that has a frontage to a classified road, unless certain conditions are met.

As mentioned in **Section 3.1**, the eastern extent of the Project Area borders Wine Country Drive, which is a classified road under the *Roads Act 1993*. As such the requirements of section 2.119 of this policy have been considered in the TIA in (**Appendix K**) and summarised in **Section 6.8**.

4.3.3 Cessnock Local Environmental Plan 2011

The site is located on land that is zoned 'RU2 Rural Landscape' under the Cessnock LEP. As stated in **Section 4.2.2**, the Project is characterised as 'electricity generating works', which is permissible with consent in this land use zone under the Cessnock LEP.

The principal development standards and other local provisions under the LEP have been considered in **Table 4-5**.

Table 4-5: LEP provisions

LEP provision	Objective	Compliance
Clause 4.3 Height of buildings	This clause seeks to ensure that building height is compatible with the desired future character of the area, protects amenity, and maintains appropriate scale relationships with surrounding development.	The site is not subject to a maximum building height under the LEP. As a result, this principal development standard does not apply to the Project.
Clause 4.4 Floor space ratio	This clause seeks to provide sufficient floor space for high-quality development, regulate development density and associated traffic generation, and facilitate development that supports the economic growth of the Cessnock city centre.	The site is not subject to a floor space ratio under the LEP. Accordingly, this principal development standard does not apply to the Project.
Clause 5.10 Heritage conservation	This clause seeks to conserve Cessnock's environmental heritage by protecting the significance of heritage items, conservation areas, archaeological sites, and Aboriginal objects and places.	The site is not mapped under the LEP as containing any historic heritage items or places of significance. A search of the Aboriginal Heritage Information System (AHIMS) database (DCCEEW, 2025) did not identify any previously recorded Aboriginal sites within the site. The Aboriginal Cultural Heritage Assessment Report (ACHAR) (Appendix F), however, identified an area of potential archaeological deposits in the western portion of the site, and the overall archaeological potential of the site is assessed as high. No direct impacts to known heritage items are expected, and management considerations are outlined in the ACHAR and summarised in Section 6.3 .
Clause 5.21 Flood planning	This clause seeks to minimise flood risk to life and property, ensure development is compatible with existing and future flood behaviour, avoid adverse or cumulative flood impacts, and enable the safe occupation and efficient evacuation of people during flood events.	The site is located within the Black Creek floodplain and is subject to periodic inundation. Flood modelling has been undertaken and potential flood-related impacts have been assessed in the Water Impact Assessment (WIA) in Appendix L and summarised in Section 6.9 .

LEP provision	Objective	Compliance
Clause 5.22 Special flood considerations	This clause seeks to enable the safe occupation and evacuation of people during flooding, ensure development is compatible with flood behaviour, avoid adverse or cumulative flood impacts, protect emergency and critical infrastructure, and prevent environmental harm from hazardous development in flood events.	The site is subject to flooding due to overland flow drainage from the local catchment and from regional (riverine) flooding of Black Creek. The existing flood environment at the site is characterised by shallow localised flooding during more frequent events and deep, high-hazard inundation during rare extreme floods, reflecting the site's location within a low-lying area of the Black Creek floodplain. Flooding impacts have been assessed in the WIA in Appendix L and summarised in Section 6.9. Flood modelling concluded that the Project would not adversely alter flood behaviour or create cumulative impacts. Project infrastructure is designed to remain operable and safe during flood events, with finished levels set to avoid immersion and maintain emergency access and egress. The Project does not involve hazardous industry and does not pose flood-related environmental risks. The Project incorporates appropriate mitigation measures and does not hinder safe evacuation or increase risk to life in a flood event.
Clause 7.1 Acid sulfate soils	This clause seeks to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.	The site is not mapped under the LEP to be potentially impacted by acid sulfate soils (ASS). The Detailed Site (Contamination) Assessment in Appendix G , which is summarised in Section 6.4 , confirmed there is no known occurrence of ASS within the Project Area.
Clause 7.2 Earthworks	This clause seeks to ensure that earthworks do not have a detrimental impact on environmental functions and processes, neighbouring land uses, or cultural and heritage items or features of the surrounding land.	Earthworks will generate spoil that will be tested and classified prior to reuse or disposal. Surplus material will be reused at another project, sent to a repurposing facility, or disposed of at landfill where required, as described in Section 6.13. Soil stability considerations are addressed in Section 6.4. The Project's potential effect on the future use of the land is assessed in the Land Use Conflict Risk Assessment (Appendix H) and summarised in Section 6.5. Visual impacts on adjoining properties are assessed in Section 6.6. One statutory heritage item, the Old North Road remnant (LEP #1177), is located approximately 30 m south-east of the Project Area. Direct impacts are unlikely, although earthworks may encounter

LEP provision	Objective	Compliance
		unrecorded archaeological features; this is addressed in Section 6.13 . The Project is not located in a drinking water catchment or environmentally sensitive area. Impacts on waterways and drainage, including Black Creek (approximately 205 m west), are assessed in the WIA in Appendix L and summarised in Section 6.9 .
Clause 7.14 Essential services	This clause seeks to ensure that development occurs only where adequate essential services, such as water, electricity, sewer, stormwater, and access, are available or can be reliably provided.	Existing essential services, such as water supply, electricity connections, sewer connections, stormwater drainage, and suitable vehicular access are already provided within the site, in conjunction with the existing Rothbury Zone Substation. Essential services infrastructure will be augmented to facilitate the Project, where required. Further details on the site infrastructure are provided in Table 3-2 in Chapter 3.0 .
Clause 7.15 Groundwater vulnerability	This clause seeks to maintain the hydrological functions of key groundwater systems and protect vulnerable groundwater resources from depletion and contamination arising from development.	Shallow groundwater is present within the Project Area and generally flows toward Black Creek. No groundwater extraction is proposed during construction or operation. As a result, the Project is expected to have negligible impacts on groundwater levels or flow. Groundwater impacts are assessed in the WIA in Appendix L and summarised in Section 6.9 .

4.3.4 Other relevant NSW legislation

4.3.4.1 *Aboriginal Land Rights Act 1983*

The *Aboriginal Land Rights Act 1983* (ALR Act) was established to return land in NSW to Aboriginal peoples through lodging claims for certain Crown land. The Act, administered by the NSW Department of Aboriginal Affairs is a compensatory regime, which recognises that land is of spiritual, social, cultural and economic importance to Aboriginal people.

The ALR Act establishes the NSW Aboriginal Land Council (NSWALC) and a network of over 120 Local Aboriginal Land Councils (LALCs) and requires these bodies to:

- Take action to protect the culture and heritage of Aboriginal persons in the LALC's area, subject to any other law
- Promote awareness in the community of the culture and heritage of Aboriginal persons in the LALC's area.

LALCs constituted under the ALR Act can make claims in respect of 'claimable Crown land'. The Registrar of the ALR Act must maintain the Register of Aboriginal Land Claims under section 166 of the ALR Act. All land claims that have been made under the ALR Act are recorded in the Register.

No active Aboriginal Land Claims over the Project Area have been identified.

4.3.4.2 *National Parks and Wildlife Act 1974*

The *National Parks and Wildlife Act 1974* (NPW Act), administered by NSW DCCEE, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Chief

Executive responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined as follows:

- *An Aboriginal object is any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of the area that comprises NSW, being habitation before concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains)*
- *An Aboriginal place is a place so declared by the Ministers under section 84 of the NPW Act because in the opinion of the Minister, the place is or was of special significance with respect to Aboriginal culture. It may or may not contain Aboriginal objects.*

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them and includes a 'strict liability offence' for such harm. A 'strict liability offence' does not require someone to know that it is an Aboriginal object or place they are harming to be prosecuted. Defences against the 'strict liability offence' in the NPW Act include the carrying out of certain 'Low Impact Activities', prescribed in clause 58 of the National Parks and Wildlife Amendment Regulation 2019, and the demonstration of due diligence.

An AHIP is required under section 90 of the NPW Act before harming or desecrating an Aboriginal object, otherwise, such action is an offence under the NPW Act. Despite this, under section 4.41 of the EP&A Act, an AHIP is not required for SSD. Instead, potential impacts to Aboriginal heritage are typically managed under an ACHAR, required under relevant conditions of consent.

An ACHAR has been completed for the Project and is provided in is provided in **Appendix F** and summarised in **Section 6.3**.

4.3.4.3 Water Management Act 2000

The *Water Management Act 2000* (WM Act) aims to ensure that water resources are conserved and properly managed for sustainable use benefiting both present and future generations. The Act also provides formal means for both the protection and enhancement of the environmental qualities of waterways, and their in-stream uses, as well as to providing for the protection of catchment conditions.

Freshwater sources in NSW are managed via water sharing plans (WSP) established under the WM Act. Key rules within a WSP specify when licence holders can access water and how water can be traded.

The Project Area is covered by the WSP for the Hunter Unregulated and Alluvial Water Sources 2022, established in accordance with section 50 of the WM Act.

Water supply during construction is expected to be externally sourced and delivered to the site via a water tanker. A new potable water connection for onsite amenity facilities during operation would be installed for the Project and therefore a licence under this Act is not required.

The WM Act specifies certain activities as controlled activities when carried out on waterfront land. This is defined as within 40 m of the banks of a river, lake or estuary (or as prescribed by the regulations). The Project Area is not within 40 m of a river, lake or estuary, and therefore a controlled activity approval is not required under section 91 of the WM Act.

The nearest watercourse to the site is Black Creek, located around 205 m west of the Project Area. The potential for the Project to affect waterways is discussed in **Section 6.9**. The WM Act also provides for the need to obtain an aquifer interference approval under certain circumstances. Section 4.41 of the EP&A Act does not remove the requirement for obtaining an aquifer interference approval; however, the approval is mandatory whenever groundwater extraction exceeds 3 megalitres (ML) per year. The Project would not extract groundwater and therefore an aquifer interference approval would not be required.

4.3.4.4 Protection of the Environment Operations Act 1997

The objectives of the POEO Act include to rationalise, simplify, and strengthen the regulatory framework for environment protection. Chapter 3 and Schedule 1 of the POEO Act outlines the specific circumstances under which an EPL must be obtained for a development.

Clause 17 of Schedule 1 lists general electricity works as a scheduled activity where they exceed the capacity to generate 30 MW. However, the Project would only store electricity rather than generating it, and therefore an EPL is not required for the Project.

4.3.4.5 Contaminated Land Management Act 1997

The general objective of the CLM Act is to establish a process for investigating and (where appropriate) remediating land that the NSW EPA considers to be contaminated enough to require regulation under Division 2 of Part 3 of the Act.

A search of the NSW EPA Contaminated Land Register, undertaken as part of the Detailed Site (Contamination) Assessment on 8 July 2025, confirmed that the Project Area is not listed as a notified contaminated site under the CLM Act.

The Detailed Site (Contamination) Assessment (**Appendix G**) details the risk of existing contamination within the site and potential for the Project to result in contamination impacts to any receiving environments. The results are summarised in **Section 6.4**.

4.3.4.6 Biodiversity Conservation Act 2016

The purpose of the *Biodiversity Conservation Act 2016* (BC Act) is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future.

Section 7.9(2) of the BC Act states that a development application for SSD is to be accompanied by a BDAR (as defined under section 7.1 of the BC Act), unless both the Planning Secretary and the Environment Agency Head determine that the proposed development is not likely to result in a significant impact on biodiversity values.

A BDAR has been prepared for the Project in accordance with the Biodiversity Assessment Method (BAM) 2020. The BDAR is included in **Appendix E** and summarised in **Section 6.2**.

The BDAR outlines the measures that have been incorporated into the Project's design or would be implemented during construction and operation of the Project, to avoid, reduce or offset impacts on biodiversity values. The BDAR includes an outline of the biodiversity credits required to offset the impacts of the Project.

On the basis that the mitigation measures provided in **Section 6.2.5** and **Appendix D** are implemented, the Project is considered consistent with the objectives of the BC Act.

4.3.4.7 Biosecurity Act 2015

The *Biosecurity Act 2015* manages the risk of biosecurity risks across the State in an integrated manner. The Act includes a general biosecurity duty for all individuals who deal with plants known or likely to pose a biosecurity risk. This includes a duty to prevent, eliminate or minimise the risk posed by a prohibited matter (priority weed) as outlined in Schedule 2 of the Act so far as is reasonably practicable.

Section 6.2 considers weeds declared as priority weeds in the Cessnock City Council LGA that occur within and surrounding the site and provide measures to manage this.

4.3.4.8 Rural Fires Act 1997

The Project is located in land identified as bush fire prone land under Section 10.3 of the EP&A Act. As such, the provisions of the *Rural Fires Act 1997* are relevant to the assessment of the Project.

A Bushfire Risk Assessment has been prepared for the Project which is provided in **Appendix N** and summarised in **Section 6.11**. The Project will ensure full compliance with the relevant provisions of the *Rural Fires Act 1997*, and consultation with the NSW Rural Fire Service (RFS) will be undertaken as required.

4.3.4.9 Roads Act 1993

An objective of the *Roads Act 1993* is to confer certain functions (in particular, the function of carrying out road work) on Transport for NSW (TfNSW) and on other roads authorities. Section 7 defines the respective road authorities depending on the classification of the road.

Of relevance to this Project are:

- Wine Country Drive (B82), a classified road and therefore under the management of TfNSW
- Old North Road, a local road and therefore under the management of Cessnock City Council.

Section 138 of the *Roads Act 1993* provides that a person must not erect a structure or carry out works in, on or over a public road without the consent of the appropriate roads authority. The Project would require works within road reserve areas and, accordingly, approval under section 138 would be required. Any necessary section 138 approvals would be obtained from the relevant roads authority prior to the commencement of works.

4.3.4.10 Heritage Act 1977

The *Heritage Act 1977* aims to promote an understanding of heritage, encourage conservation and provide for protection of NSW State heritage. Heritage significance can relate to historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values of a place, building, work, relic, moveable object or precinct.

No items of heritage significance were identified under the NSW State Heritage Register or Cessnock LEP within the site. One local heritage item listed under the Cessnock City Council LEP was identified around 30 m to the south-east of the site, however this is not expected to be affected by the Project and as such the provisions of this Act are not relevant to the Project.

4.3.5 Commonwealth Legislation

4.3.5.1 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act) provides for the preservation and protection of injury and/or desecration of areas and objects in Australia and its waters that are of significance to Aboriginal people, in accordance with Aboriginal tradition.

Under this Act, the responsible Minister has provision to make both temporary and/or long-term declarations, in order to provide protection to areas and objects which are at threat of injury or desecration. In some instances, this Act can override State or Territory provisions or be invoked if State or Territory provisions are not enforced. An Aboriginal or Torres Strait Islander individual or organisation must invoke the Act.

No items within the site are listed or protected under this Act.

4.3.5.2 Airports Act 1996 and Airports (Protection of Airspace) Regulation 1996

The *Airports Act 1996* (Airports Act) and the *Airports (Protection of Airspace) Regulation 1996* (Airports Regulation) apply to development near core regulated airports as defined in section 7 of the Act. The site is located within regional proximity to several aerodromes and airfields, including Cessnock Aerodrome, Luskintyre Airfield, Elderslie Airport, Dochra Military Airstrip and Maitland Airport; however, none meet the definition of a core regulated airport. Accordingly, the Airports Act and Airports Regulation do not apply to the Project.

Notwithstanding this, construction may require the temporary use of cranes. The Civil Aviation Safety Authority (CASA) Advisory Circular AC 139-07(2) *Reporting of Tall Structures* (CASA, 2021) requires notification to the Royal Australian Air Force (RAAF) and Airservices Australia of structures exceeding 30 m within 30 km of an aerodrome. The Project Area is within 30 km of the identified aerodromes and airfields and these requirements apply. Ausgrid will consult with the RAAF and Airservices Australia regarding any potential impacts associated with crane use during construction.

4.3.5.3 Environmental Protection and Biodiversity Conservation Act 1999

Section 18 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires a proponent of a development or activity to obtain approval from the Commonwealth Minister for the Environment and Water when undertaking an activity which is likely to cause a significant impact to a MNES. MNES include threatened species or ecological communities listed under the EPBC Act, among others.

If the Project is likely to result in a significant impact to a MNES, a referral to the Commonwealth Minister for the Environment and Water would be required to determine whether the Project is a controlled action or if it can be undertaken in a particular manner to adequately mitigate potential impacts. If the Project constitutes a controlled action, it will be subject to further assessment before a determination can be made by the Commonwealth Minister for the Environment and Water regarding whether it can be carried out, including under certain conditions.

A search of the EPBC Act Protected Matters Search Tool (PMST) (DCCCEW, 2025) was undertaken on 8 January 2026 for MNES within 5 km of the Project Area. The search identified the matters as outlined in **Table 4-4**. Further details are included in **Appendix E**.

Table 4-6: Results of the EPBC Act PMST

Matter	MNES within 5 km of the site
World heritage properties	None
National heritage places	None
Wetlands of International Importance (listed under the Ramsar Convention)	1
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	None
Listed Threatened Ecological Communities	7
Listed Threatened Species	50
Listed Migratory Species	11

The BDAR (as summarised in **Section 6.2** and provided in **Appendix E**) has identified threatened or migratory biodiversity listed under the EPBC Act that may be potentially affected by the Project. The BDAR outlines that the Project is not expected to significantly impact on any MNES and therefore a referral would not be required.

While the PMST identified the potential presence of threatened species, ecological communities, and a Ramsar wetland within the broader area, the Project Area itself is disturbed, substantially reducing the likelihood of it providing significant habitat value for threatened species or affecting the downstream Ramsar wetland values.

4.3.5.4 Native Title Act 1993

The *Native Title Act 1993* (NT Act) provides for the recognition and protection of native title for Aboriginal peoples and Torres Strait Islanders. The NT Act recognises native title for land over which native title has not been extinguished and where persons are able to establish continuous use, occupation or other classes of behaviour and actions consistent with a traditional cultural possession of those lands. The NT Act also makes provision for Indigenous Land Use Agreements to be formed, as well as a framework for notifying native title stakeholders for certain future acts on land where native title has not been extinguished.

A search of the National Native Title Tribunal Register was undertaken using the National Native Title Tribunal online system as part of the ACHAR (**Appendix F**). The search returned no active or historic claims associated with the site. As all land within the site is either freehold or the subject of a 'previous exclusive possession act', native title rights will not be impacted by the Project.

5.0 Community and stakeholder engagement

5.1 Introduction

This chapter summarises engagement undertaken by Ausgrid throughout the development of the Project and preparation of this EIS, which commenced in March 2025 and will continue as the Project progresses.

Engagement has focused on building constructive relationships with stakeholders and the community through transparent, accountable and meaningful consultation to inform Project design and decision making.

5.2 Engagement objectives and approach

5.2.1 Engagement purpose and objectives

The purpose of engagement undertaken was to inform the community about the Project and its benefits, identify potential social and environmental impacts, and understand community sentiment and concerns.

The engagement objectives for the Project include:

- Building awareness and understanding of the Project and its benefits among key stakeholders
- Informing Project design and mitigation measures by seeking to understand community concerns and priorities
- Supporting early stakeholder involvement in the Project's design and delivery approach.

5.2.2 Engagement principles and approach

The specific approach for this Project was underpinned by Ausgrid's guiding principles for engagement: Community-minded, Inclusive, Helpful, Responsive and Genuine. These principles are set out in the following:

- *Ausgrid's Community Engagement Framework* (Ausgrid, 2025)
- *Ausgrid's Engagement Framework 2024-2029 Regulatory Proposal* (Ausgrid, 2022).

The approach to engagement for this Project was also designed to align with the following:

- Consultation requirements as set out in the Project SEARs
- *Undertaking Engagement - Guidelines for State Significant Projects* (DPHI, 2024)
- *Community Participation Plan* (DPIE, 2019a)
- *IAP2 Public Participation Spectrum* (International Association for Public Participation, 2015)
- Lessons learned from other large electrical infrastructure projects undertaken by Ausgrid.

5.2.3 Community participation objectives

State significant projects, by their nature, are likely to affect a diverse range of stakeholders. To effectively engage, Ausgrid has adhered to DPHI's community participation objectives, as per the *Community Participation Plan* (DPHI, 2025).

The objectives and how the engagement undertaken for this Project addresses them are detailed in **Table 5-1**.

Table 5-1: Community participation objectives

Objectives	Actions	How it is addressed
Open and inclusive	Keep the community informed	Letters were delivered to nearby landowners within 1.5 km of the Project to introduce the Project and offer one-on-one meetings with the Project team. Three community newsletters were distributed to properties within a 2 km radius at key Project milestones. A dedicated Project webpage was established and regularly updated with newsletters, Project information, FAQs, technical summaries and contact details.
	Promote participation	
	Seek community input and accurately capture community views	
		Community members were actively encouraged to participate through invitations included in letters, newsletters, emails and the Project webpage. Engagement opportunities included pop-up information sessions, meetings with near neighbours, site visits, and online surveys promoted at key milestones.
		Community input was collected through pop-up information sessions, meetings, phone calls, emails, online surveys and the Project inbox and 1800 number. Feedback received was logged, analysed and used to inform Project design refinement and mitigation measures, as summarised in the Community and Stakeholder Outcomes Report in Appendix C .
	Build strong partnerships with the community participation	Ausgrid focused engagement on stakeholders most likely to be affected by the Project, particularly near neighbours and local interest groups, while continuing to keep the broader community informed. Ongoing relationships were maintained through regular updates, direct communications and offers of further meetings during EIS preparation.
	Incorporate culturally appropriate practices when engaging Aboriginal and Torres Strait Islander and culturally and linguistically diverse communities	Engagement was undertaken with Mindaribba LALC and Registered Aboriginal Parties, supported by an Aboriginal heritage consultant. Engagement was consistent with best-practice Aboriginal consultation principles and informed the Aboriginal Cultural Heritage Assessment in Appendix F , including avoidance of culturally sensitive areas such as Black Creek.
	Conduct community participation initiatives in a safe environment	Four pop-up information sessions were held in accessible public locations at Cessnock (29 March 2025), Huntlee (5 April 2025 and 18 September 2025) and Rothbury (27 September 2025), providing safe, informal opportunities for discussion with the Project team. Online engagement channels also provided safe and accessible participation options.
Easy access	Outline in advance how and when the community can participate	All communication materials, including letters, newsletters, the Project webpage and emails, clearly outlined how and when the community could participate, provide feedback and remain engaged throughout the planning process.
	Use best practice community participation techniques	The engagement approach was informed by DPHI's <i>Undertaking Engagement Guidelines for State Significant Projects</i> and the IAP2 spectrum, with engagement activities tailored to the Project's scale, location and stakeholder interest levels.
	Make relevant information available in plain English and translate information	Information provided to the community and stakeholders was prepared in plain English and supported by visual material to explain technical information such as the Project layout, potential

Objectives	Actions	How it is addressed
	when engaging linguistically diverse communities or people living with disabilities	impacts and proposed mitigation measures. Information was made available both online and in hard copy, with multiple engagement channels (phone, email and in-person meetings) available to support accessibility and respond to individual information needs.
	Incorporate visual representations to clearly illustrate possible impacts of a proposal	Maps, diagrams and photomontages were used in newsletters, information sessions and technical assessments to help explain the Project location, layout and potential visual impacts.
	Ensure information is accessible for groups who find it difficult to participate in usual community participation activities	Multiple participation methods were available, including phone calls, emails, online surveys, one-on-one meetings, newsletters, and a dedicated Project webpage. Hard copies of newsletters were also made available at Cessnock Library to improve accessibility in the semi-rural area.
	Stage events at convenient times and locations	Pop-up information sessions were held at accessible community locations on weekdays and weekends to accommodate different schedules and maximise opportunities for participation.
Relevant	Establish what things can be discussed	Engagement activities focused on issues relevant to the community, including safety and hazards, visual impact, noise, traffic and transport, flooding, Aboriginal cultural heritage and economic impacts, as summarised in the Community and Stakeholder Outcomes Report in Appendix C .
	Ensure as many community members as possible can participate	A range of engagement activities was provided to cater for different levels of interest and ability to participate, including targeted engagement with near neighbours and broader community-wide consultation. These activities are outlined in Table 5-5 .
	Recognise previous community input on the project and similar issues	Early feedback received during scoping engagement informed subsequent communications, technical assessments and design refinements. Community concerns raised about similar infrastructure projects were considered when preparing information materials and mitigation measures.
	Tailor activities to the: - context, which could include location, type of application, stage of the assessment process, previous engagement undertaken; and - scale, nature and known impacts for the proposal	Engagement activities were tailored to the Project's location, scale and stage of assessment, with the level and type of engagement adjusted based on proximity to the site and stakeholder interest. Direct, targeted engagement was prioritised for nearby landowners and affected stakeholders, while broader information-sharing activities were used to keep the wider community informed. The extent, timing and purpose of each engagement activity are outlined in Table 5-5 .
	Adjust activities (if necessary) in response to community interest and participation preferences	Following early engagement, Ausgrid adjusted the engagement approach during EIS preparation, including issuing an additional Project update newsletter in May 2025 to close the feedback loop, increasing direct engagement with Council, and providing clearer explanations of technical assessments in later communications.

Objectives	Actions	How it is addressed
Timely	Start community participation as early as possible, and continue for an appropriate period	Community and stakeholder engagement commenced in March 2025 during scoping and continued through to March 2026 during EIS preparation.
	Provide regular project updates to the community	Project updates were provided through newsletters, emails, the Project webpage and direct communications at key milestones.
	Ensure the community has reasonable time to provide input	The community was able to provide input over a 12-month period through multiple engagement opportunities.
	Facilitate ongoing discourse with local community networks	Ongoing communication channels, including a dedicated Project email address, phone line and Project webpage, enabled continued dialogue with the local community throughout EIS preparation. Opportunities for future consultation and ongoing engagement are outlined in Section 5.5 and Section 5.5.2 .
	Consider holidays and other community events when setting dates for engagement initiatives	Engagement activities were scheduled to avoid major holiday periods and were held at times suitable for community participation.
Meaningful	Always explain at the end of projects how community views were considered when reaching decisions	Community feedback and how it informed Project design and mitigation measures is discussed in Section 5.4.1 , documented in the Community and Stakeholder Outcomes Report in Appendix C and reflected in the EIS technical assessments.
	Be clear about what aspects of a plan, project or proposal the community can inform	Communications clearly explained the Project scope and sought feedback on potential impacts and mitigation measures within the planning process.
	Have planners and decision makers engage directly with the community	Members of the Project team attended information sessions, meetings and site visits and engaged directly with community members and stakeholders.
	Ensure responses to community input are relevant and proportionate	Community input was reviewed and addressed in a manner proportionate to the nature and scale of the issues raised and was used to inform the identification of appropriate mitigation and management measures.
	Give genuine and proper consideration to community input	As outlined in Section 5.4.1 , community input received during engagement was carefully considered through the environmental assessment process, and taken into account in the development of Project design refinements and mitigation and management measures, where relevant.
	Keep accurate records of community input and participation activities	Records of engagement activities and feedback were maintained and summarised in the Community and Stakeholder Outcomes Report in Appendix C .
	Review the effectiveness of community participation initiatives regularly	Engagement was reviewed at key stages. Feedback following scoping engagement resulted in additional communications, including an interim Project update newsletter published in May 2025.

Objectives	Actions	How it is addressed
	Integrate community input into the evaluation process	Key issues identified by community members are outlined in Section 5.4.1 . Community concerns informed the scope and focus of technical assessments across the EIS, including hazard, noise, visual, traffic, flooding and social and economic assessments, and the development of appropriate mitigation measures.
	Comply with statutory obligations, protect privacy and respect confidentiality	All engagement activities complied with statutory requirements, and personal details of community members were not disclosed in public reporting.

5.2.4 Stages of the engagement process

The engagement process for the Project has been based on four distinct stages:

- **Scoping report consultation:** Early communication to introduce the Project and collect initial feedback on the Project
- **EIS preparation:** Collection of community and stakeholder feedback on the Project to inform the development of the EIS
- **EIS exhibition:** Notifying and outlining the detail of the Project to the community and stakeholders and to collect feedback via the submissions process
- **Ongoing engagement:** Keeping the community and stakeholders informed about Project determination and construction (subject to the granting of consent).

5.2.5 Consistency with DPHI guidelines

Table 5-2 and **Table 5-3** together demonstrate how the Project's engagement approach aligns with the *Undertaking Engagement Guidelines for State Significant Projects* (DPHI, 2024).

Table 5-2 provides a high-level summary of how the engagement process was structured and implemented in response to the overarching DPHI engagement principles.

Table 5-3 then provides more detailed evidence of how these principles were applied in practice, outlining the specific engagement techniques used, stakeholder groups involved, and how community and stakeholder input was captured and considered. Together, the tables demonstrate both strategic alignment with DPHI guidance and practical implementation over the course of the Project's planning and assessment.

Table 5-2: Consistency of engagement process with DPHI guidelines

DPHI guidance	EIS approach
Plan early	Ausgrid prepared a Community and Stakeholder Engagement Plan (CSEP) at the outset of the Project to guide engagement from early planning through preparation of the EIS, consistent with DPHI guidance and the Project SEARs.
Engage as early as possible	Early technical and regulatory engagement commenced prior to community consultation through discussions with Transgrid (from February 2024) and liaison with DPHI. Formal stakeholder and community engagement commenced in March 2025 and continued throughout EIS preparation.
Ensure engagement is effective	Engagement was structured to provide clear, timely and accessible information about the Project and its potential impacts, enabling stakeholders to be informed prior to providing feedback. Application of engagement techniques is detailed in Table 5-3 .
Ensure engagement is proportionate to the scale and impact of the Project	Engagement activities were proportionate to the Project's scale, nature and likely impacts, with targeted engagement for nearby and affected stakeholders and broader information-sharing for the wider community.
Be innovative	Engagement methods were selected to suit the local context and stakeholder preferences, combining face-to-face and digital engagement approaches. Specific techniques are outlined in Table 5-3 .
Be open and transparent about what can be influenced	Ausgrid clearly communicated the Project scope, planning process and matters open to feedback, including how community input would inform technical assessment and mitigation. Key feedback themes and responses are summarised in Section 5.4.1 and detailed in Appendix C .
Implement the community participation objectives	Community participation objectives established in the CSEP were implemented throughout engagement activities. Evidence of implementation is provided in Table 5-3 to Table 5-5 and outcomes are documented in the Community and Stakeholder Outcomes Report in Appendix C and reflected in the EIS.

Table 5-3: Requirements for effective engagement

Objective	How this has been addressed during engagement
Identify the people or groups who are interested in or are likely to be affected by the Project	Prior to commencement of engagement, Ausgrid identified and mapped stakeholders likely to be interested in or affected by the Project, informed by location, land-use context and proximity. Stakeholders included near neighbours (within 1.5 km), the broader community (117 properties within 2 km), local businesses and tourism operators, Cessnock City Council, government agencies, local MPs, and First Nations stakeholders (Mindaribba LALC and RAPs), as outlined in Table 5-4 and detailed in Appendix C .
Use appropriate engagement techniques. This includes: - considering the accessibility of how information is delivered - the avoidance of technical language and jargon so information can be easily interpreted by the audience - the adoption of non-written forms of engagement, where needed	A range of engagement techniques was used to suit the local context and stakeholder needs. These included letters to near neighbours in March 2025, community newsletters distributed in March 2025, September 2025 and February 2026, and pop-up information sessions held at Cessnock, Huntlee and Rothbury across 2025. Engagement also included one on one meetings with near neighbours, a regularly updated Project webpage with FAQs and factsheets, two online surveys, and ongoing access to a dedicated 1800 phone number and Project email address. All information was provided in plain English and supported by visual material such as maps, diagrams and photomontages.
Ensure the community are provided with safe, respectful and inclusive opportunities to express their views	Multiple engagement channels were used to provide inclusive participation opportunities, including face-to-face meetings, pop-up information sessions at accessible venues, online tools, and direct contact by phone and email. Activities were scheduled across weekdays and weekends, with hard-copy newsletters also made available at Cessnock Library to support accessibility in the semi-rural context.
Involve the community, council and government agencies early in the development of the Project, to enable their views to be considered in project planning and design	Early liaison was undertaken with Transgrid (from February 2024) and DPHI, followed by structured engagement with Cessnock City Council, local MPs, Hunter Valley Wine & Tourism Association, ARIA Hunter Valley, near neighbours and First Nations stakeholders, including Mindaribba LALC and Registered Aboriginal Parties. From March 2025, broader community consultation was undertaken through letters, meetings, pop-up information sessions, surveys, and direct phone and email contact, with feedback used to inform technical assessments, project design and mitigation measures presented in the EIS.
Be innovative in their engagement approach and tailor engagement activities to suit the: - context (e.g. sensitivity of the site and surrounds) - scale and nature of the Project and its impacts - level of interest in the Project.	Engagement activities were tailored to the semi-rural context, project scale and stakeholder interest, using a proximity-based approach with targeted engagement for near neighbours within approximately 1.5 km and broader community updates within a 2 km radius. Direct meetings were prioritised for nearby neighbours, while pop-up information sessions, newsletters and online updates were used to reach the wider community, with engagement methods refined over time in response to participation levels and feedback.

Objective	How this has been addressed during engagement
Provide clear and concise information about what is proposed and the likely impacts for the relevant people or group they are engaging with	Clear and concise information about the Project purpose, location and potential impacts was provided using plain language, supported by visual material such as maps, diagrams and photomontages. Information was delivered through newsletters, factsheets, information boards at pop-up sessions and the Project webpage. As the Project progressed, later updates summarised the outcomes of key technical assessments (including hazards and bushfire, visual impact, noise, flooding and heritage) and outlined proposed mitigation measures.
Make it easy for the community to access information and provide feedback	Information was made accessible through three newsletters distributed to approximately 117 properties, hand-delivered letters to near neighbours and a regularly updated project webpage, with hard-copy materials also available locally. Feedback was encouraged through pop-up information sessions, meetings, online surveys, and direct contact via a dedicated project email address and 1800 number (31 emails and 6 phone calls received), with all materials clearly outlining how and when feedback could be provided.
Clearly outline how and when the community can be involved in the process	All communication materials clearly stated what was occurring, when engagement opportunities were available, and how to participate, including session dates and venues, survey timeframes, and contact details. Materials also sign-posted future opportunities for involvement during EIS preparation and exhibition, enabling community members to provide feedback both during formal engagement periods and on an ongoing basis.
Seek to understand issues of concern for all affected people and groups and respond appropriately to those concerns	A broad range of stakeholders was engaged to capture diverse perspectives and identify issues of concern. Key issues raised included safety and hazards (including fire and bushfire risk), visual impact, noise, traffic and access (including Wine Country Drive and Old North Road), flooding (Black Creek), Aboriginal cultural heritage, and economic and tourism impacts. These issues were documented through pop-up information sessions, meetings, emails, phone calls and surveys and are summarised in Section 5.4.1 and detailed further in Appendix C . The issues raised informed the scope of technical assessments and the identification of mitigation and management measures in the EIS.
Provide feedback about how community and stakeholder views were used to shape the project or considered in making decisions	Community and stakeholder feedback identified key concerns relating to visual amenity, noise, traffic, safety and hazards, flooding, Aboriginal cultural heritage, economic impacts and broader environmental issues. Early feedback was addressed through a Project update in May 2025, with further newsletters in September 2025 and February 2026 providing updates on project progress, technical assessment findings and proposed mitigation measures. The Community and Stakeholder Outcomes Report in Appendix C outlines how this feedback informed technical studies, Project design and mitigation measures.
Be able to demonstrate how the demography of the area affected has been considered in how and what engagement activities have been undertaken.	A community profile was prepared to understand the local demographic and land-use context and informed the selection of engagement channels and message design. Given the semi-rural setting and visitor-based local economy, engagement activities and materials were designed using plain-English, highly visual content and delivered through a mix of digital and in-person methods. This included intercept-style pop-up information sessions at accessible local centres and the provision of hard-copy materials at Cessnock Library, alongside online channels, to reach residents, businesses and visitors with differing availability and communication preferences.

5.3 Stakeholders engaged

A stakeholder mapping exercise was carried out to identify stakeholders, landholders and the local community that would be likely to have an interest or be affected by the Project. A full list of the stakeholders engaged is provided in **Table 5-4**.

Table 5-4: Stakeholders engaged

Category	Stakeholder
Community	
Near neighbours (within a 1.5 km radius)	1274 Wine Country Drive, Lovedale 2325 (Business - Lucy's Run Wines) 1337 Wine Country Drive, Rothbury 2320 (Residential) 1338 Wine Country Drive, Rothbury 2320 (Residential) 1356 Wine Country Drive, Rothbury 2320 (Residential) 1364 Wine Country Drive, Rothbury 2320 (Residential) 1368 Wine Country Drive, Rothbury 2320 (Residential) 1401 Wine Country Drive, Rothbury 2320 (Business - Scarborough Cottage) 1406 Wine Country Drive, Lovedale 2325 (Business - Stoic Legion Archery Range) 22 Blackburn Close, Lovedale 2325 (Residential) 27 Blackburn Close, Lovedale 2325 (Residential) 39 Blackburn Close, Lovedale 2325 (Residential) 60 Blackburn Close, Lovedale 2325 (Residential) 61 Blackburn Close, Lovedale 2325 (Residential) 80 Blackburn Close, Lovedale 2325 (Residential) 497 Talga Road, Lovedale 2325 (Business – Villini Estate) 521 Talga Road, Lovedale 2325 (Residential) 2 The Ballabourneen, Lovedale 2325 (Residential) 3 The Ballabourneen, Lovedale 2325 (Residential) 15 The Ballabourneen, Lovedale 2325 (Residential) 24 The Ballabourneen, Lovedale 2325 (Business – Ballabourneen Estate) 26 The Ballabourneen, Lovedale 2325 (Residential) 27 The Ballabourneen, Lovedale 2325 (Residential) 28A The Ballabourneen, Lovedale 2325 (Residential) 28B The Ballabourneen, Lovedale 2325 (Residential) 29 The Ballabourneen, Lovedale 2325 (Residential) 30 The Ballabourneen, Lovedale 2325 (Residential) 728 Old North Road, Rothbury 2320 (Business – Sascha's Retreat) 778 Old North Road, Rothbury 2320 (Business – Ayrfield Cabin at the Olive Grove) 803 Old North Road, Rothbury 2320 (Business – Black Creek Farm Vineyard) 864 Old North Road, Rothbury 2320 (Residential)
Surrounding community (within 2 km radius)	- Hunter Valley Wine & Tourism Association - ARIA Hunter Valley (residential development) - Rothbury, North Rothbury, Lovedale and Huntlee communities - Community members engaged during pop-up information sessions
Government and elected representatives	
Local government and elected representatives	Local Government Cessnock City Council

Category	Stakeholder
	Elected councillors - Mayor Daniel Watton - Ward C Councillors: Cr Sophie Palmowski, Cr Mitchell Lea and Cr Mark Mason - Ward D Councillors: Cr Mitchell Hill
State government	Regulatory and planning agencies - DPHI - TfNSW - DCCEEW – Conservation Programs, Heritage & Regulation Group
	MP Clayton Barr MP (Member for Cessnock)
Federal Government	MP Dan Repacholi MP (Member for Hunter)
First Nations	
First Nations stakeholders <i>(some engagement was undertaken by Apex Archaeology as part of the Aboriginal Cultural Heritage Assessment – refer to Section Aboriginal heritage 6.3)</i>	- Mindaribba LALC - Bungree Aboriginal Association - Traditional Owners and Aboriginal Groups (Wonnarua, Awabakal and Darkinjung peoples) - Regional community groups - Hunter Local Lands Services - Wonnarua Nation Aboriginal Corporation - Office of the Registrar, Aboriginal Land Rights Act 1983 (NSW) - Native Title Services Corp - Gomery Cultural Consultants - Jarban & Mugrebea - DFTV Enterprises Indigenous Corporation - Didge Ngunawal Clan - Long Gully Cultural Services - Mura Gadi Aboriginal Corporation - Merrigarn Indigenous Corporation - Culturally Aware - Widescope - A1 Indigenous Services - Amanda Hickey Cultural Services
Service providers	
Service providers	- Transgrid - NBN - Telstra

5.4 Engagement undertaken

The Project sought to employ numerous avenues for consultation and feedback to ensure a broad and inclusive approach to engagement.

Table 5-5 provides an overview of the engagement activities undertaken to date, including the specific stakeholders and community members engaged. A detailed table of the engagement activities undertaken is provided in **Appendix C**.

Table 5-5: Overview of engagement undertaken

Activities	Stage	Description	Engaged stakeholders
Stakeholder letters, emails and meetings	Scoping engagement	In March 2025, Ausgrid emailed letters to stakeholders introducing the Project and inviting them to meetings, which were held between March and June 2025.	- Government and elected representatives - First Nations stakeholders - Service providers - Surrounding community (within 2 km)
	EIS engagement	Between July 2025 and March 2026, Ausgrid issued 48 stakeholder emails at key Project milestones and to promote pop-up information sessions and made 10 outgoing phone calls to provide Project updates. In addition, seven stakeholder meetings were held during this period.	- Government and elected representatives - First Nations stakeholders - Surrounding community (within 2 km)
Near neighbour letters, phone calls, emails and meetings	Scoping engagement	In March 2025, Ausgrid distributed 28 hand-delivered letters to near neighbours within 1.5 km of the Project, inviting them to one-on-one briefings. Follow-up phone calls and emails were used to arrange meetings, resulting in 11 Project introduction meetings held at Cessnock Library. Neighbours who attended meetings were subsequently provided with a Project update newsletter in May 2025 outlining early feedback and next steps.	Near neighbours (within 1.5 km)
	EIS engagement	Between July 2025 and March 2026, Ausgrid undertook ongoing engagement with near neighbours through regular emails, phone calls and meetings. Project update meetings were held with interested neighbours, and site visits were undertaken as part of the visual impact assessment. Project update newsletters were distributed in September 2025, outlining the planning process and timeline, and in February 2026, summarising the results of technical assessments. Neighbours were also invited to attend pop-up information sessions and provide feedback through an online survey.	
Newspaper advertisement	Scoping engagement	Apex Archaeology placed a newspaper advertisement in The Advertiser on 30 April 2025 inviting First Nations stakeholders to register an interest in the Project.	First Nations stakeholder
Community newsletters	Scoping engagement	On 20 March 2025, a community newsletter was distributed to 117 properties within a 2 km radius of the site and made available at Cessnock Library. The newsletter outlined key Project details, the planning process, contact information and upcoming pop-up information sessions.	- Near neighbours - Surrounding community

Activities	Stage	Description	Engaged stakeholders
	EIS engagement	On 1 September 2025 and 25 February 2026, additional community newsletters were distributed to the same area and made available at Cessnock Library. The September 2025 newsletter shared a Project update and information on the planning process, as well as upcoming pop-up information sessions. The February 2026 newsletter shared a Project update and a summary of the results of technical assessments for issues the community had previously indicated interest in, including noise and visual amenity.	
Pop-up community information sessions	Scoping engagement	On Saturday 29 March and Saturday 5 April 2025, pop-up information sessions were held at Cessnock Village Shopping Mall and Coles Huntlee to introduce the Project to the community and capture feedback. The sessions allowed community members to ask questions, share feedback, and learn more about the Project's local benefits and potential impacts in a face-to-face setting. Around 40 community members engaged with the Project team.	- Near neighbours - Surrounding community
	EIS engagement	Pop-up information sessions were held on Thursday 18 September and Saturday 27 September 2025 at Coles Huntlee and Rusty Jack's Pies and Coffee to provide project updates and seek community feedback. Approximately 20 community members engaged with the Project team across the two sessions. Attendance and interest were lower than those recorded during the sessions held in March and April 2025.	
Online community surveys	Scoping engagement	An online survey was conducted between 28 March and 30 April 2025 to capture feedback about community concerns and values related to the Project. The survey was promoted at the pop-up information sessions and on the Project webpage, with 12 responses received.	All members of the public
	EIS engagement	An online survey was conducted between 12 February and 18 March 2026 to gather feedback on the Project's potential impacts, proposed mitigation measures and opportunities for community benefit sharing. The survey was promoted through the community newsletter and direct emails to the project mailing list. No survey responses were received, reflecting the lower levels of community interest seen throughout EIS engagement.	

Activities	Stage	Description	Engaged stakeholders
Dedicated Project webpage	Scoping engagement	A dedicated webpage (https://yoursay.ausgrid.com.au/rothburybess) was established, outlining the purpose and location of the Project. The webpage also included a copy of the community newsletters, Project FAQs, a 'What is a BESS?' fact sheet and contact details (dedicated phone number and email). The webpage was regularly updated.	All members of the public
	EIS engagement	The dedicated webpage was updated at key Project milestones, including when SEARs were received. All community newsletters were published on the webpage, as well as the details of pop-up information sessions and the feedback survey.	
1800 number and email address	Scoping and EIS engagement	A dedicated 1800 number and engagement email address were established at Project inception. As of 2 March 2026, 31 emails and 6 phone calls had been received via the engagement contact details.	All members of the public
Events	EIS engagement	A member of the Ausgrid Project team was present at a Hunter Central Coast REZ event to answer community questions and ensure that engagement activities were co-ordinated.	All stakeholders

5.4.1 Community sentiment and key issues

Overall, community sentiment has evolved over the course of consultation. Early engagement showed high interest and mixed views within the broader community, with particular concern about safety and visual impacts; however, interest declined over time, while expressions of support increased slightly during later face-to-face engagement.

Among near neighbours, interest remained consistently high, with sentiment varying based on perceived impacts and generally ranging from negative to neutral.

Common issues raised by those who chose to participate in the consultation activities included:

- **Safety and hazards** – concerns focused on the fire risk of a BESS, including the potential for bushfire spread in a bushfire-prone area, impacts on air quality and health, evacuation constraints for nearby residents, and perceptions that BESS chemistry poses broader safety risks. Hazards and risk are addressed in **Section 6.10** and bushfire risk is assessed in **Section 6.11** of this EIS
- **Visual impact** - community members value the scenic landscape of the Hunter wine region and expressed concern that the BESS could detract from local character, with strong preference for the development to be visually screened in a manner consistent with the existing, well-vegetated Rothbury Zone Substation. Visual impacts and screening are considered in **Section 6.6** of this EIS
- **Noise** – Community members identified noise as a key concern, particularly potential operational noise and its tonality, noting the importance of maintaining the quiet rural character of the Rothbury area. Some concerns were also raised about construction noise, with requests to limit weekend works to minimise impacts on residents and nearby businesses. Noise impacts are assessed in **Section 6.7** of this EIS.
- **Traffic and transport** - concerns were raised about traffic safety and access, including turning movements at Old North Road, potential increases in construction traffic along Wine Country Drive, maintaining access during construction, and opportunities to upgrade Old North Road, including the Black Creek causeway. Traffic and transport impacts are considered in **Section 6.8** of this EIS.
- **Aboriginal cultural heritage** - the cultural significance of the Black Creek area was highlighted, noting its importance to local Aboriginal communities and emphasising that Aboriginal cultural heritage extends beyond artefacts to include the broader landscape, which should be protected during Project planning. Aboriginal heritage impacts are assessed in **Section 6.3** of this EIS.
- **Flooding** - community members noted that Black Creek experiences occasional flooding, with long-term residents highlighting historic flood levels and questioning whether flooding could affect the safety of the proposed BESS. Flood impacts are addressed in **Section 6.9** of this EIS.
- **Economic impact** - Community members and local businesses expressed concern that increased noise, visual impacts and perceived safety risks from the Project could negatively affect tourism, visitor numbers and the Hunter wine region's contribution to the local and NSW economy. The economic impact of the Project is outlined in **Section 6.12** of this EIS.

5.5 Future consultation and engagement

5.5.1 EIS exhibition period

During the EIS exhibition period stakeholders will be able to view and download electronic copies of the EIS on the DPHI Major Projects website (<https://www.planningportal.nsw.gov.au/major-projects>). Formal submissions may be lodged through the Planning Portal.

At the start of the exhibition period, near neighbours and members of the Project's mailing list will be contacted via email to notify of the EIS exhibition period and provide information on how to make a formal submission.

Table 5-6 provides detail on the engagement activities Ausgrid proposes to undertake during the EIS exhibition period.

Table 5-6: Proposed future consultation and engagement activities

Activity	Engagement method	Purpose	Target stakeholder group
Stakeholder notification letters	Email correspondence	- Notify stakeholders of the EIS exhibition period - Invite formal submissions via the NSW Planning Portal - Offer further briefings or meetings to discuss issues, concerns and opportunities.	- Stakeholders engaged through meetings to date - Stakeholders who have signed up to the Project's mailing list during previous engagement
Stakeholder meetings (as required)	- Face-to-face meetings - Phone calls - Briefing packs	- Provide updates on the EIS and previous issues raised - Explain relevant technical assessments and mitigation measures - Understand ongoing concerns and risks - Encourage formal feedback via the NSW Planning Portal.	- Near neighbours - Government and elected representatives - First Nations stakeholders
Project webpage update	Update Project webpage content	- Announce EIS exhibition - Provide access to EIS documents and submission details - Encourage formal feedback via the NSW Planning Portal	All stakeholders and community members
Preparation of submissions report	- Update the Project webpage - Send email to stakeholders and registered community members.	Outline and summarise the community input and make that information available to the public.	- Near neighbours - Government and elected officials - First Nations stakeholders - Surrounding community

5.5.2 Ongoing engagement

Ausgrid aims to continue community engagement throughout the development and construction of the Project. Ausgrid will continue to engage with stakeholders, including Cessnock City Council, immediate neighbours, TfNSW, Fire and Rescue NSW and First Nations stakeholders, to provide updates and gather further input as required.

Open communication channels will be maintained through the dedicated Project webpage, phone line and email, and community newsletters to keep stakeholders informed about Project progress and developments.

6.0 Assessment of environmental impacts

6.1 Overview

This section documents a range of environmental assessments. These assessments identify potential environmental impacts that may result from the Project and identify measures to manage or mitigate these impacts as appropriate.

Potential impacts were determined for the following environmental matters:

- Biodiversity
- Aboriginal heritage
- Soils and contamination
- Land use
- Landscape character and visual amenity
- Noise and vibration
- Traffic and transport
- Surface water, groundwater and flooding
- Hazards and risk
- Bushfire
- Social and economic
- Other issues:
 - Non-Aboriginal heritage
 - Waste
 - Air quality.

6.2 Biodiversity

6.2.1 Secretary Environmental Assessment Requirements

Table 6.2-1 sets out the SEARs relevant to biodiversity and where the requirements have been addressed in this EIS.

Table 6.2-1: Relevant SEARs – biodiversity

Relevant SEARs	Where addressed
Biodiversity	
The EIS must address the following specific matters:	
• an assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with Section 7.9 of the <i>Biodiversity Conservation Act 2016</i> (NSW) (BC Act), having regard to the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must: - be prepared using the approved BDAR template; - document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM;	An assessment of the biodiversity values and the likely biodiversity impacts of the Project are included in a BDAR in Appendix E . The BDAR is summarised in this section (Section 6.2).

Relevant SEARs	Where addressed
- assess the impacts associated with all ancillary infrastructure, including the transport route road upgrades; - include an assessment for serious and irreversible impacts (SAIL) in accordance with Section 9.1 of the BAM; - include a strategy to offset any residual impacts of the development in accordance with the BC Act; and - be finalised by an accredited assessor as BAM-compliant within 14 days of submission; unless Conservation Programs, Heritage and Regulation Group (CPHR) and the Department of Planning, Housing and Infrastructure (DPHI) determine the proposed development is not likely to have any significant impacts on biodiversity values;	
• an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the <i>Fisheries Management Act 1994</i>, and a description of the measures to avoid, minimise and rehabilitate impacts;	Potential impacts to listed aquatic threatened species are discussed in Section 6.2.4 and the BDAR in Appendix E .
• a cumulative impact assessment of biodiversity values in the region from nearby developments; and	Cumulative impacts are discussed in Section 6.14 .
• if an offset is required, details of the measures proposed to address the offset obligations.	Biodiversity offsets are discussed in Section 6.2.4.4 and Appendix E .

6.2.2 Methodology

A BDAR was prepared by Niche (2026) to assess potential biodiversity impacts associated with construction and operation of the Project. The BDAR is included in **Appendix E** and summarised in this section.

The BDAR has been prepared to meet the requirements of the Biodiversity Assessment Method 2020 (BAM) (DPIE, 2020) established under Section 6.7 of the BC Act.

The 'streamlined assessment module - small area' (Appendix C of the BAM) applies to the Project because the proposed vegetation clearing does not exceed the small-area development threshold. The mapped biodiversity values on the site are also not associated with core Koala habitat under the Biodiversity and Conservation SEPP.

The spatial terms used in the BDAR, which differ from terminology used elsewhere in this EIS, are defined in **Table 6.2-2** and shown in **Figure 6.2-1**.

Table 6.2-2: Spatial terminology used in the BDAR

Term	Description
Subject area	Lots 1 and 2 of DP1318566 at 1309 Wine Country Drive, Rothbury, NSW.
Subject land	The footprint of the Project that will be physically disturbed during construction and operation. The Subject land is equivalent to the Project Area referred to in the EIS and covers 4.56 ha.
Assessment area	A 1,500 m buffer surrounding the Subject land, encompassing approximately 985 ha.

The Subject land was assessed in the BDAR as a site-based assessment.

The BDAR methodology included desktop reviews to identify landscape features and potential ecological values, application of the BAM vegetation integrity assessment to define vegetation zones, field surveys for flora, fauna and habitat constraints, assessment of biodiversity impacts, and development of mitigation measures to avoid or minimise potential impacts.

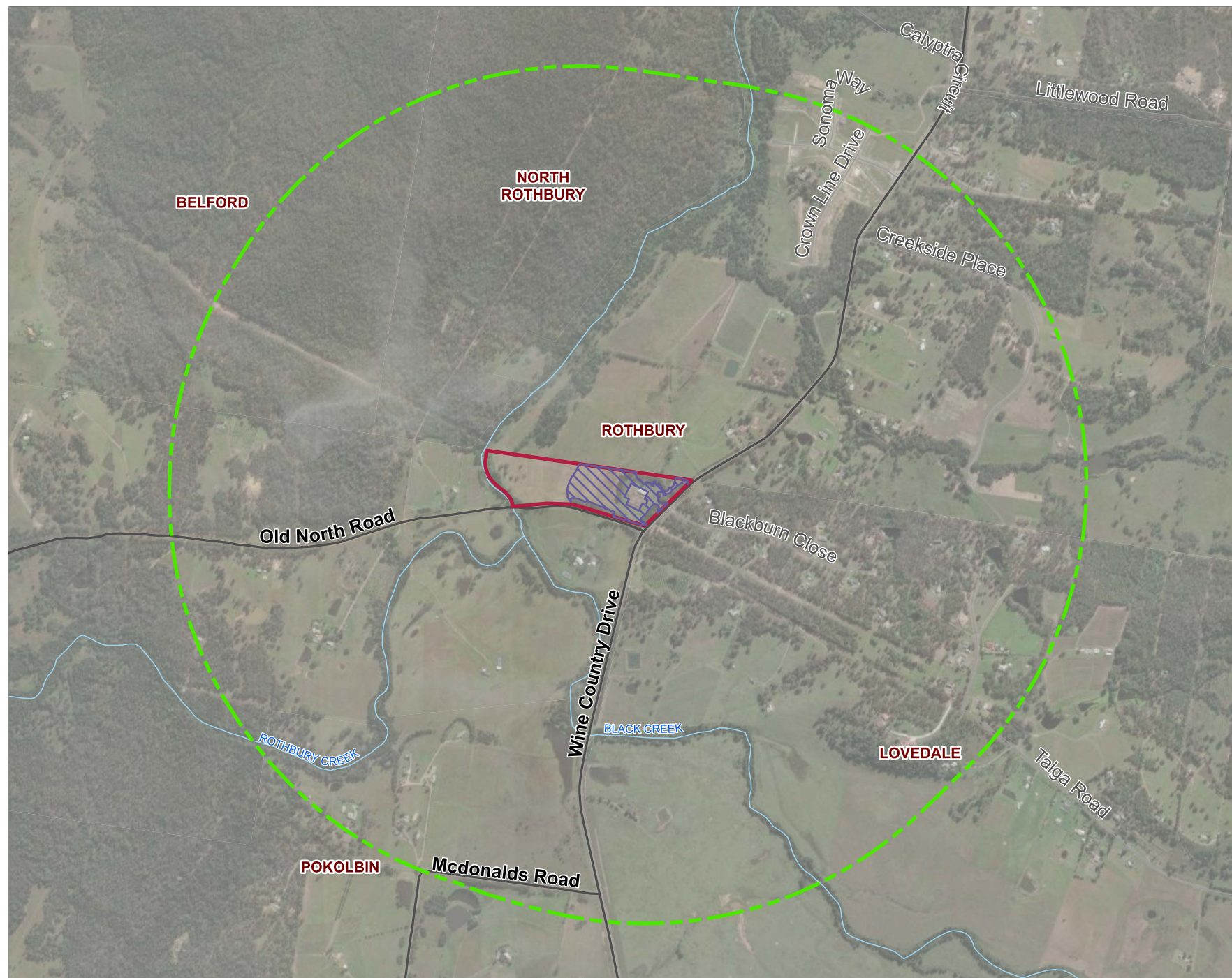
The BDAR methodology included desktop reviews to identify landscape features and potential ecological values, application of the BAM vegetation integrity assessment to define vegetation zones, field surveys for flora, fauna and habitat constraints, assessment of impacts on biodiversity, and the identification of mitigation measures to address potential biodiversity impacts.

6.2.2.1 Desktop searches

A desktop review of existing information relevant to the BDAR assessment area was undertaken, using the following key sources:

- *Biodiversity Assessment Method (BAM) and BAM Calculator (BAM-C)* (DPIE, 2020)
- *BAM Operational Manual – Stage 1* (DPIE, 2020)
- BioNet datasets (NSW DCCEEW, 2025):
 - Atlas fauna and flora records within a 10 km search area of the Subject land
 - Threatened Biodiversity Data Collection
 - Vegetation Classification
 - NSW Mitchell Landscapes – Version 3.1
- *EPBC Protected Matters Search Tool (PMST)* (DCCCEW, 2025) – 5 km search area
- *Interim Biogeographic Regionalisation for Australia (IBRA) v7.0* (Cth DCCEEW, 2025)
- *NSW Survey Guide - Surveying threatened plants and their habitats* (DPIE, 2020)
- *NSW State Vegetation Type Map Version C2.0M2.1 (SVTM)* (NSW DCCEEW, 2025)
- *NSW Land Use 2017 mapping* (NSW DCCEEW, 2025)
- *eSpade 2.1 spatialviewer* (DPIE, 2025)
- *Guidance to Assist a Decision-Maker to Determine a Serious and Irreversible Impact* (DPIE, 2019)
- Relevant ecological community listings:
 - Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions - endangered ecological community listing (TSSC, 2010)
 - Central Hunter Valley eucalypt forest and woodland: a nationally protected ecological community (NSW DCCEEW, 2016).

**FIGURE 6.6-1:
ASSESSMENT AREA**



Legend

-  Subject Area
-  Subject Land
-  1500m Assessment Area
-  Watercourse
-  Main road
-  Local road

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6.2.2.2 Field surveys

Walkover survey

To identify potential habitat constraints for threatened flora and fauna, a systematic walkover survey of the Subject area was completed on 28 October 2025. Vegetation zones and microhabitats were visually inspected for features suitable for threatened species, with key indicators such as rocky outcrops, drainage lines, host plants, soil conditions and disturbance levels recorded and mapped.

Native vegetation surveys

The BAM plot requirement was determined based on the area of each plant community type (PCT) affected. Plot-based vegetation surveys were conducted throughout the Subject area on 28 October 2025, comprising six vegetation integrity plots, three of which are applicable to the Subject land. Further details on native vegetation and PCTs are provided in **Section 6.2.3.3** and **Section 6.2.3.4**.

Threatened flora survey

Habitats and microhabitats within the Subject land were assessed on 28 October 2025 and 28 November 2025 to identify potential habitat for threatened species, with areas deemed unsuitable excluded from further assessment. Candidate threatened species were identified through the BAM-C, with four threatened flora species identified and three retained for assessment. *Prasophyllum* sp. *Wybong* was excluded due to unsuitable habitat.

Targeted surveys for *Acacia pendula* (endangered population), *Persoonia pauciflora* (North Rothbury Persoonia) and *Eucalyptus pumila* (Pokolbin Mallee) were undertaken in accordance with BAM (Section 6.4) and the *NSW Guide to Surveying Threatened Plants and Their Habitats* (DPIE, 2020).

Threatened fauna survey

No threatened fauna surveys were required or undertaken within the Subject land.

6.2.3 Existing environment

6.2.3.1 Landscape features

A summary of the landscape features of the Subject land is provided in **Table 6.2-3**.

Table 6.2-3: Landscape features

Landscape features	Description
IBRA bioregions and subregions	The Subject land lies within the Sydney Basin IBRA Bioregion and Hunter IBRA Subregion.
NSW (Mitchell) landscapes	The Subject land is located in the Central Hunter Foothills, characterised by undulating lowlands and hills underlain by Permian sedimentary geology.
Rivers, streams, estuaries, and Strahler stream order	No waterways occur within the Subject land; Black Creek, a fifth-order stream and Key Fish Habitat, is located approximately 220 m west of the Subject land.
Wetlands	No listed wetlands are mapped within the Subject land. One small dam is present in the northern portion of the Subject land.
Connectivity features	Native vegetation within the Subject land is highly fragmented. The nearest connected vegetation follows the Black Creek riparian corridor to the west.
Geological features	No significant geological features (e.g., caves, cliffs, rock formations) are recorded within or adjoining the Subject land.
Soil hazard features	No known soil hazard features are within the Subject land.
Areas of outstanding biodiversity value (AOBV)	No AOBV are mapped within the Subject land.

6.2.3.2 Vegetation cover

Native vegetation cover within the Assessment area was estimated to be 752.2 ha, representing approximately 76% of the total vegetation cover.

6.2.3.3 Vegetation within the Subject land

The Subject land includes approximately 4.56 ha and comprises native vegetation, non-native vegetation and a small waterbody, as outlined in **Table 6.2-4** and shown in **Figure 6.2-2**.

Table 6.2-4: Vegetation within the Subject land

Vegetation	Area (ha)	Description
Native vegetation – PCT 3315 – Central Hunter Ironbark Spotted Gum Forest	0.48	Small areas initially mapped as Central Hunter Ironbark Grassy Woodland (PCT 3431) were reclassified as PCT 3315 following survey in accordance with Appendix D of the BAM. Further details on PCT 3315 are provided in Section 6.2.3.4 .
Non-native vegetation – exotic pasture	4.07	The SVTM maps most of the Subject land as 'not classified', reflecting highly modified exotic pasture, roads and existing infrastructure.
Water	0.01	A small dam is present in the northern part of the Subject land.
Total	4.56	

6.2.3.4 Plant Community Types

Native PCTs were identified based on floristic composition and landscape attributes in accordance with the NSW PCT classification described in the BioNet Vegetation Classification system. Surveys confirmed that vegetation within the Subject land aligns with PCT 3315 – Central Hunter Ironbark Spotted Gum Forest (Moderate condition), covering approximately 0.48 ha, as identified in **Table 6.2-4** and shown in **Figure 6.2-2**.

This PCT forms part of the Grassy Woodlands Formation and the Coastal Valley Grassy Woodlands Class, which are typically characterised by open eucalypt canopies and a mixed grassy–herbaceous understorey. Within the Subject land, the vegetation retains moderate diversity but exhibits clear signs of past disturbance, including structural alteration and a high abundance of invasive weeds. These disturbances have reduced the native understorey integrity and contributed to a patchy distribution of native species across the PCT.

6.2.3.5 Planted and non-native vegetation

Plot-based surveys show that non-native vegetation dominates much of the Subject land and wider Subject area, with exotic grasses and forbs occurring at high cover. Additional weed species further indicate substantial disturbance and reduced ecological integrity across the area.

6.2.3.6 Threatened Ecological Communities

A desktop assessment was undertaken to identify any Threatened Ecological Communities (TECs) listed under the BC Act or EPBC Act that may occur within the Subject land.

NSW BC Act TEC

Vegetation within the Subject land corresponds to a single TEC listed as Endangered under the NSW BC Act: *Central Hunter Ironbark–Spotted Gum–Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions*. Although in a highly modified condition, plot data confirmed the vegetation meets the TEC definition. The extent of this TEC is shown in **Figure 6.2-2**.

EPBC Act TEC

A review of PCT 3315 within the Subject land confirmed it does not meet the criteria for the EPBC-listed TEC *Central Hunter Valley eucalypt forest and woodland* (Critically Endangered). The vegetation does not satisfy the required condition or patch size thresholds, lies outside the relevant landform and lithological settings, and the patch is below the minimum 2 ha requirement.

6.2.3.7 Vegetation zones and integrity

Two vegetation zones were identified within the Subject land, comprising one native PCT and one non-native vegetation zone.

PCT 3315 – Central Hunter Ironbark Spotted Gum Forest occurs as a moderate condition vegetation zone covering approximately 0.48 ha. This zone forms part of the Grassy Woodlands Formation and corresponds to the Central Hunter Ironbark–Spotted Gum–Grey Box Forest TEC listed as Endangered under the BC Act. It supports a native vegetation cover of approximately 76% and forms part of a patch greater than 100 ha in size.

The remaining 4.07 ha consists of non-native vegetation (PCT 0), representing highly modified exotic pasture with no native cover. This area also forms part of a broader patch size class exceeding 100 ha.

Vegetation integrity was assessed for the native vegetation zone (PCT 3315), which recorded a composition score of 20.2, structure score of 38.5, function score of 66, and an overall vegetation integrity score of 37.2. No hollow bearing trees were recorded within this zone.

6.2.3.8 Habitat suitability for threatened species

Habitat suitability was assessed to determine the likelihood of species credit species occurring within the Subject land, with findings informing the BAM-C candidate threatened species list. The BAM-C identified 29 predicted ecosystem credit species and seven fauna species credit species for consideration. Habitat assessments confirmed that six fauna species credit species were unsuitable due to the absence of required habitat features or geographic constraints. One species, the Swift Parrot (*Lathamus discolor*), was retained for further assessment. The Swift Parrot is listed as endangered under the BC Act and critically endangered under the EPBC Act and is identified as a Serious and Irreplaceable Impact (SAIL) species under the *Biodiversity Conservation Regulation 2017* (BC Regulation).

Approximately 0.71 ha of Swift Parrot Important Habitat Mapping occurs within the Subject land, as shown in **Figure 6.2-3**, including 0.42 ha of native vegetation. No key habitat features such as hollow-bearing trees are present. Given mapped Important Habitat Mapping and Swift Parrot records within 5 km, the species is assumed to occur within the Subject land.

In line with the BAM, targeted surveys were not required due to the presence of Important Habitat and no elevated SAIL risk.

FIGURE 6.2-2:
VEGETATION AND THREATENED
ECOLOGICAL COMMUNITIES



Legend

- Subject area
- Subject land
- Operational Footprint
- BAM plot locations
- Watercourse
- Main road
- Local road

Validated vegetation

- 0 Non-native (Niche, 2025)
- 4023 Coastal Valleys Riparian Forest, Low (Niche, 2025)
- 3315 Central Hunter Ironbark-Spotted Gum Forest, Moderate (Niche, 2025)
- 9997 Waterbodies, Non-native (Niche, 2025)

BC Act TEC

- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Central Hunter Ironbark-Spotted Gum - Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions

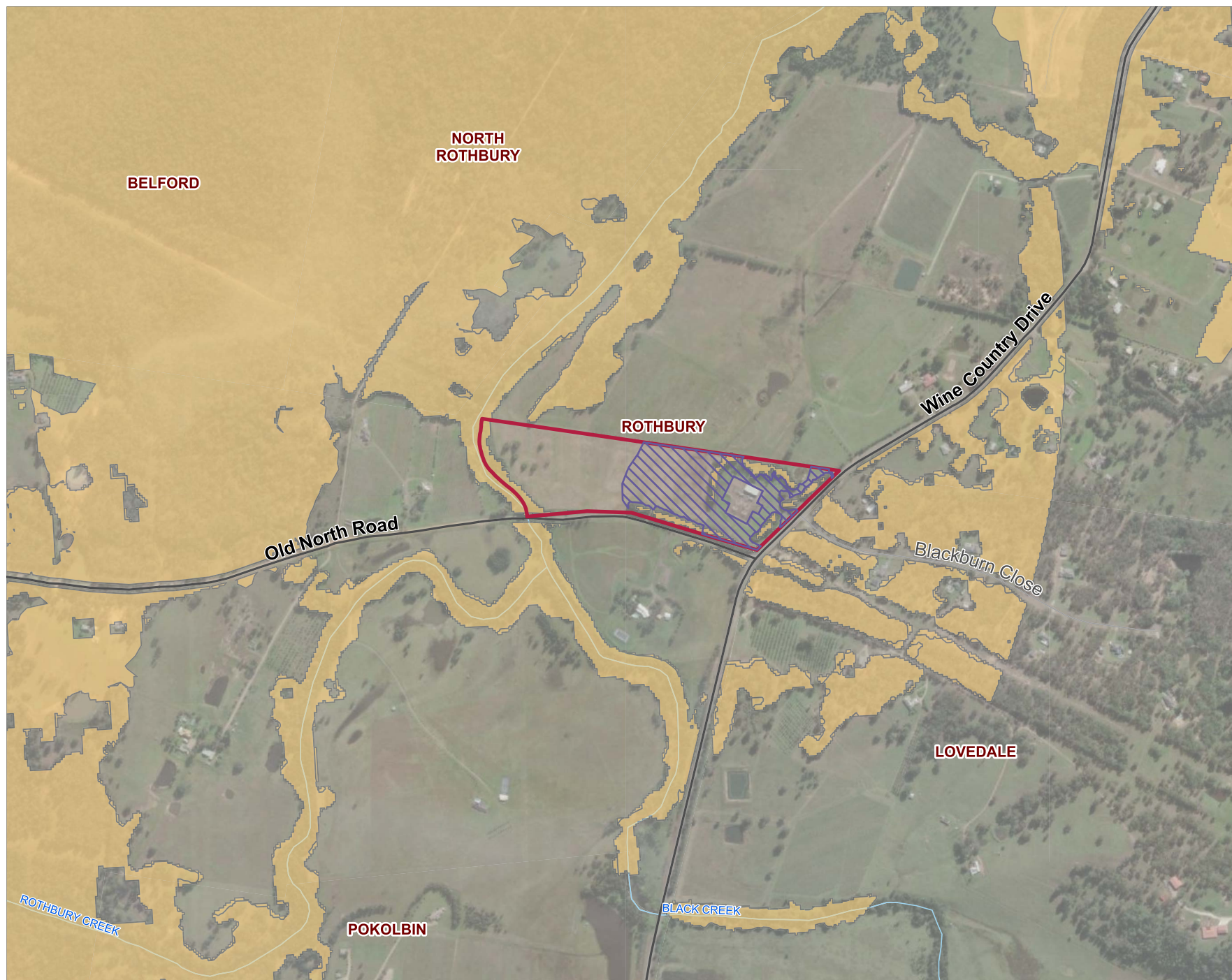
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**FIGURE 6.2-3:
SWIFT PARROT IMPORTANT
HABITAT**



Legend

-  Subject area
-  Subject land
-  Main road
-  Local road
-  Watercourse
-  Swift Parrot Important Habitat Mapping

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6.2.4 Impact assessment

The Project has the potential to result in direct, indirect and prescribed impacts on biodiversity values, with most impacts occurring during construction due to vegetation clearing. Construction and operational impacts are summarised below.

6.2.4.1 Construction

Direct impacts

Construction would result in minor direct impacts on vegetation and one TEC as a result of ground disturbance during construction, including the clearing of 0.48 ha of PCT 3315 – Central Hunter Ironbark–Spotted Gum Forest (Moderate condition), which aligns with the BC Act-listed Central Hunter Ironbark–Spotted Gum–Grey Box Forest TEC. Clearing would remove vegetation integrity within the impacted area.

Vegetation to be cleared is shown in **Figure 6.2-4** and avoidance, mitigation and management measures to address direct impacts are outlined in **Section 6.2.5**.

Indirect impacts

Construction of the Project may result in minor indirect impacts, such as noise, dust and weed spread on surrounding vegetation, threatened species and habitat (refer to **Table 6.2-5**) These impacts would be effectively managed through the mitigation measures outlined in **Section 6.2.5**.

FIGURE 6.2-4:
IMPACTED VEGETATION



Legend

-  Subject area
-  Subject land
-  Vegetation to be removed
-  Vegetation to be indirectly impacted
-  Main road
-  Local road
-  Watercourse

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Table 6.2-5: Summary of indirect biodiversity impacts during construction

Indirect impact	Location of impact	Frequency	Duration	Likelihood and consequences
Inadvertent impacts on adjacent habitat or vegetation	Within and adjacent to the Subject land (within 100 m)	Consistent throughout construction	Short to medium term	Minor disturbance to adjacent habitats from soil disturbance, construction activities and vehicle movements, with low-level risk of sedimentation or contamination.
Reduced viability of adjacent habitat due to edge effects	Adjacent (within 200 m) to the Subject land within existing remnant vegetation	Ongoing throughout construction	Long term	Additional fragmentation may occur, but impacts would be limited due to the already degraded condition of surrounding vegetation.
Reduced viability of adjacent habitat due to noise, dust or light spill	Within and adjacent to the Subject land (within 100 m)	Irregular frequency throughout construction (associated with certain construction activities)	Short term	Construction activities may cause temporary disturbance to fauna, but impacts are expected to be minor given the low habitat value of the Subject land.
Spread of weeds and pathogens	Within and adjacent to the Subject land (within 100 m)	Occasional introduction of weeds and pathogens via machinery and materials	Long term	Potential introduction of weeds or pathogens via machinery or materials, manageable through standard weed hygiene controls in a Weed Management Plan as part of the Project's Construction Environmental Management Plan (CEMP).
Increased risk to fauna of starvation/exposure or loss of shade/shelter	Within and adjacent to the Subject land (within 100 m)	Consistent throughout construction	Short term	Minor fauna displacement may occur during vegetation clearing but is expected to be limited due to the small footprint and highly modified vegetation.
Loss of breeding habitat	Within and adjacent to the Subject land (within 100 m)	Consistent throughout construction	Long term	Loss of limited low-quality habitat may reduce breeding opportunities for some fauna, but impacts are expected to be low due to the degraded condition of the site.
Trampling of threatened flora species	Within and adjacent to the Subject land (within 100 m)	Consistent throughout construction	Long term	No threatened flora species were recorded, and the Subject land is unlikely to support habitat for candidate species. The likelihood and consequence of trampling impacts are therefore low.
Inhibition of nitrogen fixation and increased soil salinity	Within and adjacent to the Subject land (within 100 m)	Consistent throughout construction	Long term	The likelihood and consequence of nitrogen fixation inhibition or increased soil salinity are low due to the small footprint of the Subject land.

Indirect impact	Location of impact	Frequency	Duration	Likelihood and consequences
Rubbish dumping, removal and disturbance of rock including bush rock.	Within and adjacent to the Subject land (within 100m)	Consistent throughout construction	Short to long term	Impacts would be mitigated through standard management measures in the Project's CEMP.

Prescribed impacts

Prescribed impacts under Clause 6.1 of the BC Regulation relate to indirect effects on biodiversity that occur outside the vegetation clearing footprint. For this Project, the relevant prescribed impacts during construction include:

- **Disturbance to fauna using human-made structures** – existing built structures provide minimal habitat value, and construction would result in only low impacts on fauna use of these features
- **Impacts on non-native vegetation used by fauna** – the 4.07 ha of exotic pasture has very low ecological value and provides little habitat or food resources for threatened species, so impacts from its removal would be low
- **Reduction in habitat connectivity** – the 0.48 ha of fragmented native vegetation does not contribute to meaningful habitat linkages for threatened species; its removal would have negligible impact on connectivity
- **Changes to waterbodies and hydrological processes** – removal of the small dam in the northern area would have low impact due to its limited ecological value
- **Vehicle strike of fauna from an increase in traffic** – a temporary increase in construction traffic may elevate fauna strike risk, but slow speeds and restricted access areas mean impacts would remain low.

Mitigation and management measures for prescribed impacts are provided in **Section 6.2.5**.

6.2.4.2 Operation

Direct impacts

No direct impacts to biodiversity values are expected during operation.

Indirect impacts

Routine access, maintenance and asset management may result in minor indirect ecological impacts. These may include:

- Disturbance to adjacent vegetation from vehicle or equipment access
- Minor edge effects such as increased light, noise, or microclimate changes
- Weed or pathogen spread through vehicle or personnel movements
- Loss of breeding habitat if maintenance works inadvertently affects nearby vegetation
- Trampling of flora from informal access
- Low-level soil or nutrient changes near infrastructure.

These impacts are consistent with construction-phase indirect impacts (refer to **Table 6.2-5**) and are expected to be effectively managed through the mitigation measures in **Section 6.2.5**.

Prescribed impacts

No prescribed impacts are expected during operation.

6.2.4.3 Serious and irreversible impacts

The BAM-C identified the Swift Parrot as a potential SAI species. The Project would result in the loss of 0.71 ha of mapped Important Habitat (including 0.42 ha of native vegetation). This loss is not considered significant to the species' overall foraging habitat. The Project would therefore not result in a SAI.

6.2.4.4 Biodiversity offsets

Ecosystem and species credits are required to offset residual biodiversity impacts associated with the Project.

The BAM-C identified that clearing 0.48 ha of PCT 3315 would result in the loss of vegetation integrity, requiring nine ecosystem credits. This vegetation corresponds to the BC Act-listed Central Hunter

Ironbark–Spotted Gum–Grey Box Forest TEC. The impacted area has a current VI score of 37.2, a future VI score of 0, and therefore a change in VI of -37.2, with a biodiversity risk weighting of 2.

Species credits are also required for the loss of 0.48 ha of Swift Parrot foraging habitat. The Swift Parrot is listed as Endangered under the BC Act and Critically Endangered under the EPBC Act. Based on the mapped Important Habitat intersecting the Subject land, the BAM-C identified a requirement for 13 species credits, with a very high biodiversity risk weighting of 3.

These credit requirements must be secured to offset the unavoidable residual impacts of the Project in accordance with the NSW Biodiversity Offsets Scheme.

Prescribed impacts

There are no prescribed impacts expected to result from operation of the Project.

6.2.5 Mitigation and management measures

The avoidance principles outlined in Section 7.1 of the BAM have guided the Project's location and design. Measures to avoid, minimise, mitigate or manage potential biodiversity impacts arising as a result of the Project are detailed in **Table 6.2-6**.

Measures to prevent indirect impacts on adjacent vegetation, such as soil erosion and sediment controls, water quality management measures and dust suppression, are outlined in **Section 6.4** (Soils and contamination), **Section 6.5** (Land use), **Section 6.8** (Traffic and transport), **Section 6.9** (Surface water, groundwater and flooding), and **Section 6.13** (Other issues).

Table 6.2-6: Mitigation and management measures – Biodiversity

ID	Mitigation/management measure	Timing
B-1	The following measures to minimise biodiversity impacts will be included in a Biodiversity Management Plan (BMP), prepared as part of the CEMP, and implemented during construction: - Monitoring of retained vegetation, including scheduled inspections by suitably qualified personnel to confirm vegetation condition is maintained and no unauthorised disturbance has occurred. Inspection outcomes will be documented in site inspection records and reported through routine CEMP compliance reporting. - Mapping and communication of clearing and protection area, including clearly defined clearing extent, exclusion zone, tree protection zones and revegetation areas. - Approved clearing extents will be shown on construction drawings, demarcated on site prior to works, and verified through site inspections. - Pre-clearance procedures and inspections, undertaken by a suitably qualified ecologist and documented through pre-clearance checklists and inspection reports, including: - Demarcation of all approved clearing areas prior to works - Installation and maintenance of temporary fencing around approved clearing extents and tree protection zones for the duration of works - Identification and marking of habitat trees within or adjacent to clearing areas - Completion of a pre-clearing inspection prior to any vegetation removal - Scheduling of pre-clearing surveys outside the Swift Parrot foraging period (May–August). If Swift Parrots are observed foraging within or adjacent to the proposed clearing area, temporary buffers will be implemented and/or the timing of works in that area will be modified in consultation with the Project ecologist.	Pre-construction Construction

ID	Mitigation/management measure	Timing
	- Ecologist supervised vegetation clearing, with clearing activities supervised by a suitably qualified ecologist to identify fauna present and implement appropriate management measures to avoid or minimise harm, in accordance with the BMP - Fauna management protocols, including procedures for a suitably qualified ecologist or licensed wildlife handler to manage unexpected fauna encounters, fauna displacement and injured fauna. Fauna incidents and responses will be recorded and included in CEMP compliance reporting. Compliance with this mitigation measure will be demonstrated through maintained site records, inspection reports, ecologist clearance and supervision reports, and inclusion of outcomes in regular CEMP compliance reporting.	
B-2	A Weed Management Plan will be prepared and implemented as part of the CEMP to control the introduction and spread of weeds, pests and pathogens during construction. The Weed Management Plan will apply to all construction areas, including laydown areas, access tracks, material stockpile sites, disturbance footprints, site compounds and adjacent retained vegetation. The Weed Management Plan will include the following measures: - Hygiene controls, including ensuring all vehicles, plant and equipment enter the site clean; implementing wash down procedures; and inspecting all imported fill, mulch, topsoil and landscaping materials to confirm they are weed free - Weed monitoring and inspection, including a pre-construction baseline weed assessment and regular inspections of disturbed and adjacent areas, with additional inspections following high risk activities such as earthworks or material importation - Weed control and response, including the timely implementation of appropriate control measures where weeds are identified, prioritising declared and high-risk species, and modifying or temporarily suspending works if required to prevent further spread - Reporting and documentation, including maintaining a weed register and reporting inspection outcomes, infestations and control actions in routine CEMP compliance reports, with notification of any declared or significant infestations.	Pre-construction Construction
B-3	Prior to construction commencing, nine ecosystem credits and 13 species credits will be secured to offset the unavoidable residual impacts of the Project in accordance with the NSW Biodiversity Offsets Scheme.	Pre-construction
B-4	Vegetation clearing will be avoided and minimised to the greatest extent practicable, with priority given to the retention of existing vegetation onsite. Mature trees and other vegetation that provide important habitat or ecological functions will be retained where practical, consistent with the avoidance and minimisation measures outlined in the BMP.	Detailed design Construction
B-5	As far as practical, high-noise activities will be avoided during peak Swift Parrot foraging months (generally May to August) to minimise disturbance, in accordance with measures contained in the BMP.	Construction

6.3 Aboriginal heritage

6.3.1 Secretary's Environmental Assessment Requirements

Table 6.3-1 sets out the SEARS relevant to Aboriginal heritage and where the requirements have been addressed in this EIS.

Table 6.3-1: Relevant SEARs – Aboriginal heritage

Relevant SEARs	
Heritage	Where addressed
The EIS must address the following specific matters:	
An Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the <i>Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW</i> (OEH, 2011) and the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW, 2010), identifying, describing, and assessing any impacts to any Aboriginal cultural heritage sites or values associated with the site (including impacts from any proposed earth works, construction works and road upgrades), including results of archaeological test excavations (where required), undertaken in accordance with the relevant standards and requirements;	An ACHAR has been prepared and is provided in Appendix F and is summarised in this section (Section 6.3). The ACHAR identifies, describes, and assesses impacts to any Aboriginal cultural heritage sites or values associated with the site.
Evidence of adequate consultation with Aboriginal communities in determining and assessing impacts, identifying and selecting options for avoidance of Aboriginal cultural heritage and identifying appropriate mitigation measures (including the final proposed measures), having regard to the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECCW, 2010).	A description of consultation with Aboriginal communities is provided in Section 6.3.2. Further details are provided in Chapter 5.0 and the ACHAR in Appendix F.

6.3.2 Methodology

An ACHAR has been prepared by Apex Archaeology (2026) to identify the Aboriginal cultural heritage values of the Project Area and assess the potential impact of the Project on those values. The ACHAR is provided in **Appendix F**.

The Aboriginal heritage impacts associated with the Project identified in the ACHAR, and the recommended mitigation and management measures are summarised in this section.

The ACHAR was conducted in line with:

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

A desktop assessment was carried out to review the landscape context of the site, with specific consideration of its potential for past Aboriginal land use and the likelihood of survival of associated archaeological materials. The assessment included a search of publicly available databases, reports and map data, a review of previous archaeological assessments in the wider region and the preparation of a predictive model for Aboriginal archaeological values within the site

A pedestrian survey was undertaken within the site on 9 July 2025. A survey track of length of 1,625 m and 2 m width was inspected alongside the RAPs for archaeological material. Some areas of the site

were inaccessible with high vegetation cover and no visibility, so areas of exposure were targeted as a priority. The total survey coverage was approximately 9,750 m². Further information regarding the effective survey coverage is detailed in **Appendix F**.

After the pedestrian survey was completed, test excavation of the site was confirmed as necessary, and 14 test pits were excavated to depths of up to 1 m. The test excavation, observed by the RAPs, confirmed the presence of Aboriginal artefacts within intact deposits and concluded that this area retains high archaeological sensitivity. The results of the archaeological test excavation are provided in **Section 6.3.3.7**.

Based on the results of the desktop and field surveys, an Aboriginal Cultural Heritage Significance Assessment was undertaken as part of the ACHAR. The assessment considered social, historic, scientific and aesthetic values relevant to Aboriginal heritage and was prepared in accordance with the ACHCRs, the Burra Charter and *the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*.

6.3.2.1 Aboriginal stakeholder consultation

Consultation with Aboriginal stakeholders was undertaken for the Project in accordance with clause 60 of the *National Parks and Wildlife Regulation 2019*. Consultation followed the four consultation stages set out in the ACHCR, to consider Aboriginal cultural values, including intangible values.

Consultation began in April 2025 when Aboriginal stakeholders were invited to register their interest in the Project. In total, 13 Registered Aboriginal Parties (RAPs) registered their interest:

- Wonnarua Nation Aboriginal Corporation
- Mindaribba LALC
- Gomery Cultural Consultants
- Jarban & Mugrebeg
- DFTV Enterprises Indigenous Corporation
- Amanda Hickey Cultural Services
- Didge Ngunawal Clan
- Long Gully Cultural Services
- Mura Gadi Aboriginal Corporation
- Merrigarn Indigenous Corporation
- Culturally Aware
- Widescope
- A1 Indigenous Services.

The RAPs were provided with relevant information about the Project and the site and were invited to provide their feedback on the methodology proposed to be used to assess Aboriginal cultural heritage impacts arising from the Project. Responses were received from four RAPs; all responses were favourable and endorsed the proposed methodology. No alternatives to the methodology were suggested or requested by the RAPs.

The draft ACHAR was provided to all RAPs on 19 January 2026 for their review of the findings with comments accepted until 16 February 2026. A1 Indigenous Services and Amanda Hickey Cultural Services acknowledged receipt of the report. One comment was received from the Wonnarua Nation Aboriginal Corporation in relation to an incorrect reference to Country associated with the Project. This was rectified in the final ACHAR, provided in **Appendix F**.

6.3.3 Existing environment

6.3.3.1 Landscape context

Geology

The site is underlain by Permian formations of the northern Sydney Basin, including the Farley and Rutherford Formations, which contain fine-grained marine sediments such as shale, siltstone and sandstone deposited in low-energy nearshore environments. The Maitland Group in the region consists of Mulbring Siltstone and Muree Sandstone, formed under alternating deeper marine and deltaic conditions, and the Branxton Formation, which contains marine fossils such as bryozoans, brachiopods and molluscs. The youngest unit, the Singleton Coal Measures, comprises interbedded coal seams, claystone, sandstone and conglomerate deposited in swampy lowland environments toward the end of the Permian.

These geological formations shape the area's landforms and soils, which in turn influence how well archaeological materials are preserved. Stable, clay-rich sediments may protect buried deposits, while areas affected by erosion or past disturbance are less likely to retain intact cultural material.

Soil landscapes

The site lies within the Branxton Soil Landscape, which is characterised by undulating hills, small creek flats and numerous drainage lines spaced 400 m to 1.5 km apart. Soils consist of a shallow A1 horizon of dark reddish-brown sandy loam over brown sandy loam, grading to clay subsoils with yellow, grey or orange mottling, indicating periodic waterlogging and variable drainage. These soils have moderate to low water-holding capacity and variable erodibility, which influence land stability and surface processes.

These soils have moderate to low water-holding capacity and variable erodibility, which influences land stability and surface processes. These characteristics can affect archaeological preservation, as fluctuating drainage and erosion can compromise the integrity of subsurface cultural material.

Black Creek is located on the western extent of the site and is approximately 200 m west of the Project Area. Black Creek is classified as a third-order watercourse under the Strahler system (Strahler, 1952). Black Creek connects to the Hunter River approximately 10 km to the north and is considered an area of importance to the local Aboriginal groups. Several unnamed ephemeral watercourses are also present in the vicinity.

Flora and fauna

The existing vegetation within the Project Area comprises areas of planted native screening and introduced perennial grasses.

The surrounding vegetation comprises patches of native bushland dominated by Spotted Gum (*Corymbia maculata*), Red Ironbark (*Eucalyptus fibrosa*), and Narrow-leaved Red Ironbark (*Eucalyptus crebra*), with Swamp Oak (*Casuarina glauca*) along drainage lines. These species historically provided Aboriginal people with food (berries, tubers, seeds, leaves, nectar), materials for tools (canoes, shields, coolamons), and supported fauna such as wallabies, possums, birds, amphibians, and reptiles.

6.3.3.2 Ethnohistoric context

Ethnohistorical evidence is based on the reports of colonisers and does not tend to include the Aboriginal perspective, leading to a Eurocentric view of Aboriginality. Additionally, historical records can be contradictory and incomplete regarding the exact tribal boundaries and locations of ceremonial or domiciliary activities of Aboriginal people. Despite this, such records still contain valuable information for establishing past conditions for Aboriginal people.

Information regarding the ways in which Aboriginal people likely used pre-contact landscapes is available through two primary sources: archaeological (i.e., survey and excavation) data and historical records. This section builds on this foundation by summarising relevant ethnohistoric information for the site and environs.

The site is generally recognised as part of the Wonnarua language group, with neighbouring groups including Geawegal, Darkinjung, Worimi, Awabakal, Wiradjuri and Kamilaroi. Historical accounts describe fluctuating relationships between these groups, with conflicts often linked to Kamilaroi expansion, though these ambitions were curtailed by European settlement.

Prior to European settlement, Aboriginal groups in the central Hunter Valley lived in close connection with the land, their social structures and daily practices shaped by both cultural traditions and environmental conditions. While the specific identity of the original inhabitants remains uncertain, early settler accounts provide insight into the traditional lifestyles of Aboriginal people in the region.

The environment played a central role in shaping traditional life. While coastal groups relied on marine and estuarine resources, hinterland communities such as those in the Hunter Valley depended on freshwater systems and terrestrial plants and animals. Early European accounts described the region as lightly wooded but rich in plant life, including nectar-producing species, edible berries, and a fruit resembling custard apple. These resources, along with animals such as kangaroos, wallabies, possums, birds, and freshwater fish, formed a vital part of the Aboriginal diet and cultural practices.

Early observations within the Hunter Valley mention Aboriginal people setting fire to patches of land to encourage grass revegetation that the kangaroos would feed on. Setting fire was also noted as being used in preparation for ceremonial and communication signalling.

Trade and exchange were important aspects of Aboriginal life. Historical records describe the movement of goods such as spears, opossum fur cord, iron tomahawks, seashells, and glass between coastal and inland groups. These exchanges reinforced social ties and extended across vast distances. Recent studies of ground-edged axes found in the Hunter Valley show that materials were sourced from locations as far away as Mount William in Victoria and Mount Isa in Queensland.

A range of raw materials have been known to be used by Aboriginal people for flaking to create stone implements. The types and quality of materials, as well as the methodology used to manufacture these implements are detailed in **Appendix F**.

6.3.3.3 Land use history

Indigenous occupation

In general, Aboriginal land use of an area is based on a number of factors:

- Proximity to permanent water sources
- Proximity to ephemeral water sources
- Ease of travel
- Topography of areas; flatter areas are likely to have more permanent inhabitants.

Aboriginal occupation of Australia likely began around 60,000 years ago (Mulvaney and Kamminga 1999; Bowdler et al 2003; Attenbrow 2010), with evidence from sites such as Madjedbebe in Arnhem Land (Clarkson et al, 2017) and multiple locations across NSW, including the Cumberland Plain, Cranebrook Terrace (Stockton and Holland, 1974), Parramatta (JMcDCHM, 2005), and Pitt Town (Apex Archaeology, 2018).

Sea level changes significantly influenced settlement patterns. During initial occupation, sea levels were up to 130 m lower, and many early coastal sites are now submerged (Attenbrow, 2010). Stabilisation around 6,500 years ago coincided with increased inland habitation and a marked rise in Holocene sites, likely reflecting population growth (Hughes & Lampert, 1982). From around 5,000 years ago, archaeological assemblages show greater reliance on local stone, and by 4,000 years ago, groups began reducing mobility and establishing more permanent settlements within defined biogeographic zones (McDonald, 2008).

Post-contact occupation

European settlement in the Rothbury area began in 1826 when Scottish settler John Campbell received a 2,560 acre land grant in the valley of Black Creek. The construction of the convict-built Great North Road between 1826 and 1836 was crucial in opening the Hunter Valley to further settlement, including the Rothbury area, by linking Sydney with the interior.

From the 1820s onwards, settlers began establishing cattle and sheep farms across the valley. The sandy river flats supported crops, while the surrounding land provided excellent grazing. From the 1860s, vineyards began to appear, with the Bouffier family among the first to cultivate grapes in the area.

The discovery of coal in the late 19th century marked a turning point in Rothbury's development. In 1892, George Brown struck coal on the former Campbell estate. The seam's high-quality coal attracted investment, and by 1910, the Rothbury Colliery had opened under the direction of Edward and Henry Merewether. A village of 116 allotments was established in 1912 to house mine workers, and a public school followed in 1916.

Rothbury's most significant historical event occurred in 1929 during a major industrial dispute. Following a prolonged lockout, tensions escalated when mine owners attempted to reopen the colliery with non-union labour. On 16 December, a protest by thousands of miners turned violent when police opened fire on the crowd, killing 29-year-old miner Norman Brown and injuring several others. The incident, known as the Rothbury Riot, remains one of Australia's most infamous episodes of industrial conflict.

By the 1920s, the population had grown significantly, supported by an expanding rail network that transported coal from numerous local collieries. Rothbury's post-contact history reflects the broader trajectory of colonial Australia shifting from agricultural settlement to industrial development driven by natural resource extraction.

Aerial imagery from 1977 to 2010 shows progressive changes in land use within the site. In 1977, the site was used for viticulture and by 1991, the vineyard had been cleared, and the land repurposed for grazing or pasture. In 2006, the Ausgrid Rothbury Zone Substation was constructed in the eastern portion of the site and since 2007, the site has not undergone any major changes, the only noted change is the vegetation growth around the substation for screening. The western and Black Creek-adjacent areas remain undeveloped and may retain archaeological potential.

6.3.3.4 Archaeological context

Previous assessments assist in understanding the archaeological context of the area and in forming predictions for the location of Aboriginal cultural material within a landscape.

6.3.3.5 AHIMS

Basic and extensive searches of the AHIMS database were undertaken on 14 April 2025 for previously registered sites and a review of previously completed archaeological assessments within a 1 km buffer of the site. This identified 12 sites, of which 11 comprised artefact sites, one was associated with an area of potential artefact deposit, and one was associated with grinding grooves. None of these sites were identified as being located within or directly adjacent to the Project Area. The closest site is noted as approximately 250 m from the Project Area.

6.3.3.6 Previous archaeological assessment

Regional archaeological assessment

Various archaeological assessments and have been undertaken in the wider region. These assessments span from 1941 to 2024 and typically identified stone artefact scatters and isolated finds, with these open sites representing the most common archaeological evidence throughout the area.

Site distribution patterns reflect strategic landscape use, with Aboriginal sites concentrated along major waterways including the Hunter River and its tributaries, as well as along creek lines, river terraces, and adjacent flats. Sites were commonly located on elevated landforms near water sources, with higher archaeological potential identified within 50-150 m of creek lines and drainage features.

Most recorded sites demonstrate low to moderate archaeological significance due to factors including small artefact assemblages, limited tool diversity, surface contexts, and historical disturbance from agricultural and development activities. The dominance of surface sites with minimal buried deposits is likely to be due to both natural preservation conditions and the mobile lifestyle of Aboriginal groups in the region. Most artefact scatters are thought to reflect short-term visits and general resource gathering, rather than long-term or permanent occupation.

Local archaeological assessment

An Aboriginal Heritage Assessment of the Rothbury Zone Substation site was conducted in 2005 (Environmental Resources Management (ERM), 2005). A desktop review indicated no previously recorded Aboriginal sites within the study area. Subsequent field surveys did not identify any Aboriginal cultural material, however the visibility during the survey was somewhat constrained due to ground cover. The area was noted as having been subject to prior disturbance from land clearing and pastoral

use. The assessment acknowledged the possibility that isolated artefacts could be present and obscured by vegetation.

ERM's assessment concluded that the archaeological potential of the eastern portion of the study area was considered to be low and no further archaeological investigation was deemed necessary. The western portion of the site, extending up to 150 metres from Black Creek, was considered a zone of higher sensitivity and recommended to be avoided to mitigate the potential for disturbance to previously unrecorded cultural material.

In 2024, Apex Archaeology undertook an Archaeological Due Diligence (ADD) assessment of the site to inform early planning for this Project. The ADD formed the initial phase of assessment for the ACHAR. The assessment included a desk-based review of the AHIMS database, archaeological literature, and environmental factors such as proximity to water, landform, vegetation, and disturbance levels. No registered Aboriginal sites were identified within or immediately adjacent to the study area (200 m radius). A pedestrian survey was undertaken to verify archaeological sensitivity on the ground. No Aboriginal sites or objects were identified during this survey, although surface visibility was generally low due to dense grass cover. The central and eastern portions of the site were identified as having low archaeological sensitivity. However, the western portion of the site, located within 50-150 m of Black Creek, was identified as retaining moderate subsurface archaeological potential (RB-PAD-01, AHIMS #37-6-4651) and avoidance of this was recommended. The ADD concluded that while most of the site posed minimal risk to Aboriginal cultural heritage, the western portion warranted further archaeological investigation if development was to proceed in that area.

An Aboriginal Heritage and Archaeological Assessment was also undertaken to inform Stage 1 of the Huntlee New Town Development near Branxton, NSW, located immediately to the west of the site. This assessment concluded that the Stage 1 project posed a low risk to Aboriginal cultural heritage. However, it reiterated that conservation of previously recorded potential archaeological deposits (PADs) was essential.

6.3.3.7 Archaeological predictions

Considering the landscape context of the site, as well as the local and regional archaeological data, predictions of the nature, extent and integrity of the Aboriginal archaeological record of the Project Area were made using a predictive model.

Archaeological sites identified within the Hunter region typically include artefact scatters and isolated artefacts in open contexts, grinding groove sites, and rock shelters with archaeological deposits. Their distribution is strongly influenced by environmental factors, particularly proximity to water and landform type. Sites are most often found on gently sloping terrain within 50 to 150 m of watercourses, with grinding grooves commonly located on sandstone near streams.

The landscape characteristics of the area influence the types of potential sites likely to be present. Site types associated with sandstone outcrops such as grinding grooves, rock art sites, petroglyphs (rock engravings), and sandstone rock shelters with art and/or archaeological deposit, are not considered likely to occur due at the site to the absence of exposed sandstone platforms. Cultural shell middens, commonly found along the coast and in estuarine settings, are not expected this far inland. The area is not associated with sand dunes, a landform sometimes linked to Aboriginal burials. Culturally modified trees are considered unlikely due to the extensive vegetation clearance and disturbance that has occurred across the landscape.

Open artefact scatters and isolated stone artefacts are considered the most likely site types to occur within the Project Area. These are expected to be located on gently sloping terrain and low rises in proximity to water, particularly from 50 to 150 m of drainage features. Areas further from water or subject to extensive historical modification are considered to have low archaeological sensitivity. The Project Area is expected to contain low-density archaeological material, if present.

Archaeological field survey results

During the pedestrian survey for the Project, ground disturbance was identified to be moderate within the site, due to historical clearance and agriculture, as well as the construction of the Rothbury Zone Substation on the eastern portion of the site.

As discussed in **Section 6.3.3.6**, the pedestrian survey conducted for the Project in July 2025 confirmed an area of potential archaeological deposit (PAD) within the western portion of the site. The area bordering Black Creek and extending approximately 300 m from the creek line was identified as likely containing PADs at depth, as shown in **Figure 6.3-1**.

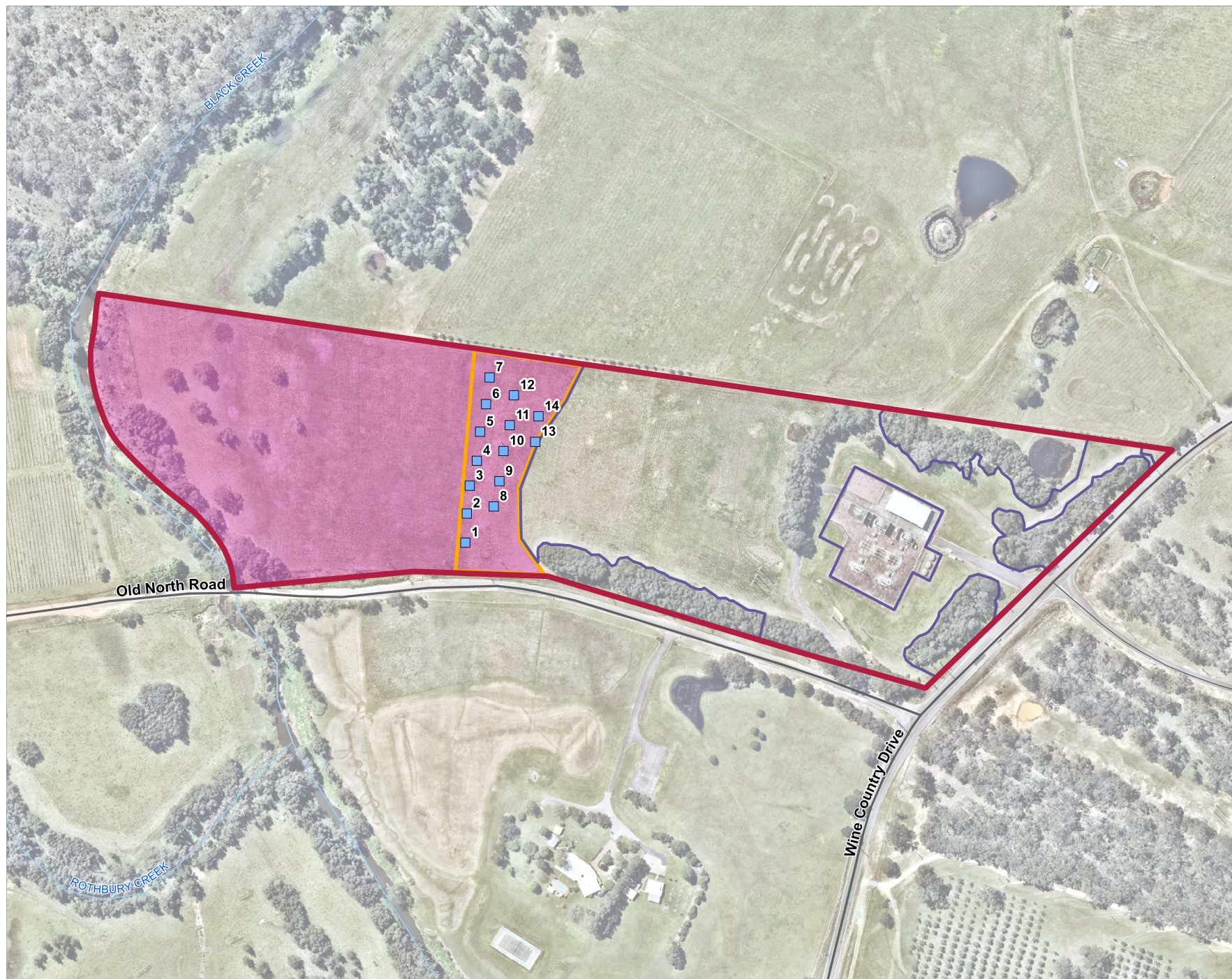
Archaeological test excavation of the site was confirmed as necessary to determine the nature and extent of a portion of the PADs. In total, 14 test pits were excavated, confirming the presence of Aboriginal archaeological material within the PAD area in the western portion of the site, including multiple stone artefacts recovered from test pits at varying depths which were potentially of significant antiquity. The locations of the test pits are shown in **Figure 6.3-1**.

The survey recovered 80 artefacts from 13 of the 14 test pits, which indicates the presence of a near-continuous scatter of objects across the area of test excavation.

The artefact deposit showed variation in material, size, and technology with depth, indicating extended or repeated occupation. Despite some disturbance from past land use, parts of the deposit retained stratigraphic integrity. Deeper layers contained indurated mudstone/silicified tuff (IMST) flakes, manuports, and large retouched flakes, suggesting possible Early Holocene or Late Pleistocene occupation, which is uncommon in the Hunter Valley. Although undated, the site has strong potential to inform regional research on Aboriginal occupation. Further details from the analysis of the Aboriginal lithic objects recovered from the test excavation at the site are provided in **Appendix F**.

The test excavation survey identified that the western portion of the site retains higher archaeological sensitivity due to deeper intact deposits, while the central and eastern areas have been more heavily disturbed by historical land use.

FIGURE 6.3-1:
POTENTIAL ARCHAEOLOGICAL
DEPOSITS AND TEST PITS



Legend

-  The site
-  Project Area
-  Archaeological test pit
-  Area of PAD tested
-  Potential Archaeological Deposits (RB-PAD-01)

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Scientific, cultural, historical, and aesthetic values

A desktop review of the existing environment was undertaken, incorporating archaeological and ethnohistorical data for the site and the surrounding area, findings from the archaeological survey, and consultation with RAPs. A summary of this information is provided in **Table 6.3-2**. This information supported the assessment of potential impacts on Aboriginal cultural heritage.

Table 6.3-2: Social, historic, scientific, and aesthetic values relevant to the Project

Values	Assessment
Social	The Aboriginal community are best placed to make a determination of the social or cultural value of the site. No specific comments regarding the social value of the areas to Aboriginal people have been received from the RAPs to date, although it is noted that all areas with evidence of Aboriginal occupation hold significance to Aboriginal people, and can be considered cultural landscapes.
Historic	The site is not known to be associated with any specific Aboriginal individuals or historical events and thus is considered to have limited significance under this criterion.
Scientific	Aboriginal cultural material was recovered from 13 of 14 test pits across the PAD area, indicating a widespread subsurface archaeological deposit. The deposit showed stratigraphic variation in raw material types, artefact size, and technology with depth, suggesting extended and possibly repeated occupation phases. While some disturbance from historical land use was evident, parts of the deposit retained rough chronological stratification. The presence of artefacts in deeper spits, including IMST flakes, manuports, and large unifacially retouched flakes, indicates potential for Early Holocene or even Late Pleistocene occupation, which is rare in the Hunter Valley. Although no dating was obtained, the site has strong potential to contribute to broader regional research questions about the timing, nature, and continuity of Aboriginal occupation in the Hunter. The site is therefore assessed as having high scientific value.
Aesthetic	Generally, aesthetic value is determined by the response evoked by a setting or landscape. While the site is located within a semi-rural setting on relatively level ground, the landscape is modified and lacks prominent natural features such as elevated vistas, watercourses, or distinctive landforms that might contribute to Aboriginal aesthetic or spiritual appreciation. No surface expressions of Aboriginal cultural heritage were identified. Accordingly, the site is considered to have limited significance under this criterion.

6.3.3.8 Statement of Archaeological Significance

The site is considered to have moderate to high archaeological significance, based on its research potential, rarity, and the partial integrity of a stratified subsurface deposit. A total of 80 Aboriginal objects were recovered from 13 of 14 test pits, with deeper artefacts suggesting a longer sequence of occupation potentially extending into the Early Holocene. While the upper layer of material deposit has been disturbed by historical land use, parts of the deeper deposit appear to retain stratigraphic integrity. The assemblage is broadly representative of regional lithic technology, but its depth, variation by spit, and potential chronological value elevate its significance. Overall, the deposit within the site has the potential to contribute meaningful insights into Aboriginal occupation in the Hunter Valley and is therefore assessed as being of high archaeological significance.

6.3.4 Potential impacts

6.3.4.1 Construction

Due to the presence of deposit of Aboriginal cultural material detected during the archaeological test excavations, full avoidance of Aboriginal cultural material is unlikely to be possible during construction due to the nature and extent of the proposed activities.

Ground disturbance resulting from construction activities, such as excavation, trenching, or other subsurface works, has the potential to directly affect archaeological materials or stratigraphy. However, the Project is located in the central portion of the site, which is more heavily disturbed and has lower

archaeological sensitivity. Construction activities would not occur in the western portion of the site, where the archaeological deposit appears more intact.

Mitigation measures, outlined in **Section 6.3.6**, have been proposed to minimise the potential impact of the works on the archaeological resource within the site.

6.3.4.2 Operation

The ACHAR considers that there would be no impacts on Aboriginal cultural heritage as a result of the operation of the Project.

6.3.5 Cumulative impacts

An assessment of the cumulative Aboriginal cultural heritage impacts is provided in **Section 6.14**.

Chapter 7.0 includes an assessment of ecologically sustainable development, intergenerational equity, and the known and potential resource with regards to Aboriginal heritage within the broader region.

6.3.6 Mitigation and management measures

Mitigation and management measures that would be implemented for the Project to address potential impacts to Aboriginal heritage are outlined in **Table 6.3-3**.

Table 6.3-3: Mitigation and management measures – Aboriginal heritage

ID	Mitigation/management measure	Timing
AH-1	An Aboriginal Cultural Heritage Management Plan (ACHMP) will be developed in consultation with the RAPs to guide the implementation of avoidance measures, an unexpected finds protocol, and cultural heritage awareness training for all contractors and personnel. The ACHMP will guide the appropriate management of any Aboriginal cultural material encountered during construction (as per AH-4).	Pre-construction Construction
AH-2	Cultural Heritage Awareness Training will be provided for all employees during the site induction. The training will be developed in consultation with the RAPs.	Pre-construction Construction
AH-3	The area of moderate subsurface archaeological potential (RB-PAD-01, AHIMS #37-6-4651) will be clearly fenced and signposted prior to construction to prevent disturbance. The exclusion zone will be shown on site plans, communicated during site inductions, and monitored every 3 months by a suitably qualified heritage professional throughout works.	Pre-construction Construction
AH-4	Should unanticipated Aboriginal archaeological material be encountered during construction of the Project, all work will cease in the vicinity of the find and an archaeologist contacted to assess the find and advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation will be undertaken, if required, prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.	Construction
AH-5	In the unlikely event that human remains are encountered during construction works, all activity in the vicinity of the find will cease, and NSW Police and the Coroner's Office notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both Heritage NSW and the RAPs for the Project will be required.	Construction

6.4 Soils and contamination

6.4.1 Secretary's Environmental Assessment Requirements

Table 6.4-1 sets out the SEARs relevant to soils and contamination and where the requirements have been addressed in this EIS.

Table 6.4-1: Relevant SEARs – soils and contamination

Relevant SEARs	
Land	Where addressed
The EIS must address the following specific matters:	
a detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, land contamination, permissibility, strategic context and existing site constraints;	Site suitability is discussed in Section 2.3 . A detailed justification of the suitability of the site is provided in Section 7.1 .
- an assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: - a soil survey to determine the soil characteristics and consider the potential for salinity, acid sulfate soils, and erosion to occur;	Potential impacts on existing land uses and adjacent land are detailed in Section 6.5 .
a cumulative impact assessment of nearby developments	Soil characteristics are discussed in Section 6.4.3.1 . Potential impacts to soils during construction and operation are detailed in Section 6.4.4.1 and Section 6.4.5.1 , respectively. Appropriate management measures are provided in Section 6.4.6 .
a preliminary investigation into potential contamination across the site, in accordance with the State Environmental Planning Policy (Resilience and Hazards) 2021 (Hazards SEPP) (as required).	Potential cumulative impacts are detailed in Section 6.14 .
	A site investigation into potential contamination across the site was conducted for the Project and is summarised in this section (Section 6.4). Further details are provided in the Detailed Site (Contamination) Assessment in Appendix G .

6.4.2 Methodology

6.4.2.1 Soils and contamination

A Detailed Site (Contamination) Assessment was undertaken by RCA Australia (2026) to assess the potential contamination status of the Project Area and consider its suitability for the Project. The Detailed Site (Contamination) Assessment is provided in **Appendix G** and summarised in this section.

The assessment of soils and contamination was undertaken in compliance with, or consideration to, the following relevant legislation, regulatory guidance documents and data sources:

- EP&A Act
- CLM Act
- POEO Act
- Environmentally Hazardous Chemicals Act 1985* (NSW)
- Fisheries Management Act 1994*
- Cessnock LEP (Part 7.1 – Acid sulfate soils)
- NSW Work Health and Safety Regulation 2017*

- *Protection of the Environment Operations (General) Regulation 2009*
- *Protection of the Environment Operations (Waste) Regulation 2005*
- *NSW EPA register of notified contaminated sites*
- *Contaminated Land Guidelines: Sampling Design* (NSW EPA, 2022)
- *National Environment Protection (Assessment of Site Contamination) Measure*
- *Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, 2020)
- *Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2017)
- *National Environment Protection (Assessment of Site Contamination) Measure* (NEPC, 2013)
- *Technical Report 10, Health screening levels for petroleum in soil and groundwater* (CRC CARE, 2011)
- *Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds* (Standards Australia, 2005).

The assessment comprised a review of the Project Area's historical information and previous investigations, observations and data recorded during fieldwork, and laboratory analytical data.

The assessment included a review of contaminated materials and acid sulfate soils (ASS) in the Project Area, identifying potential impacts on human health and the receiving environment, and mitigation measures to minimise any impacts.

Fieldwork

A site inspection was undertaken by a suitably experienced environmental engineer from RCA Australia on 29 and 30 May 2025 to observe any visual or olfactory evidence of contamination within the Project Area.

Concurrently, intrusive investigation involving the collection and analysis of soil samples for contaminants of concern was also undertaken. During the fieldwork, 59 soil samples were collected from 18 locations within the Project Area for the purpose of characterising the potential for contamination and to provide an indicative assessment of material likely to be excavated as part of the Project. The sampling locations are shown in **Figure 6.4-1**.

From each sampling location, soil samples were collected from encountered materials at the near surface and at approximately 0.5 m, 1 m and 2 m below ground surface (mbgs). Soil samples were assessed with the photoionisation detector (PID) for the presence of volatile compounds.

A selection of the collected samples were submitted for laboratory analysis. Samples were analysed for Total Recoverable Hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene, naphthalene (BTEXN), Polycyclic Aromatic Hydrocarbon (PAH), metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury), electrical conductivity, pH, pesticides and herbicides.

Geotechnical investigation

A geotechnical investigation was conducted concurrently within the Project Area in May 2025 by RCA Australia, comprising 21 boreholes and test pits. The investigation locations are shown in **Figure 6.4-1**.

The associated Geotechnical Assessment (RCA Australia, 2025) provides details on the fieldwork and laboratory test undertaken as part of the investigation. Relevant details have been summarised in this section.

FIGURE 6.4-1:
BOREHOLE AND TEST PIT LOCATIONS



Legend

- The site
- Project Area
- ◆ Approximate drilling rig borehole location
- ✕ Approximate excavator auger borehole location
- Approximate test pit location

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6.4.3 Existing environment

6.4.3.1 Geology and soils

Surface geology

A review of eSPADE v2.2 (DPIE, 2025) indicates that the Project Area is of the Farley Formation, part of the Permian period stratigraphy of the northern Sydney Basin. The Farley Formation is a marine sedimentary unit that underlies the Greta Coal Measures and is associated with the Dalwood Group. It comprises poorly sorted, light- and dark-grey, micaceous sandy siltstone, silty sandstone, mudstone and shale.

Site sub-surface conditions

Observations made of the soils and materials encountered during intrusive investigation works onsite are included in **Table 6.4-2**.

Table 6.4-2: Site sub-surface conditions

Unit	Description	Depth (m below ground level)
Fill	Clay/silt materials associated with earthworks/mounds to the west of the existing Rothbury Zone Substation.	0.0 to 1.1 m
	Surficial gravel fill materials were encountered.	1.0 to 0.15 m
Topsoil	Sand and fill materials across the Project Area.	0.0 to 0.5 m
Alluvial soils	Below the topsoil or fill, soils consist mainly of silty or clayey sand, with zones of low- to medium-plasticity sandy clay. Deeper in the alluvial profile, gravel and cobble layers occur.	1.0 to 1.5 m
	Some cemented alluvial soils were observed or inferred, and the profile generally transitions from weaker upper soils to denser, stronger soils at depth.	4.3 to 5.5 m
Residual soil/extremely weathered material	Generally, of hard consistency and exhibited engineering properties low to medium plasticity sandy clay and silty clay/clayey silt.	4.5 to 6.0 m

Soil erosivity and stability

Intrusive investigations identified that the soils within the site comprise very loose to loose silty and clayey sands within the upper soil profile. These materials exhibit low strength characteristics and are considered highly susceptible to erosion under natural conditions.

The site also displays poor existing drainage, with areas of soil saturation occurring following rainfall due to limited surface water conveyance. These conditions contribute to reduced soil cohesion within the upper profile.

Overall, the site is characterised by inherently low soil stability associated with its loose alluvial soils and existing drainage limitations.

Soil landscapes

The Project Area lies within the Branxton soil landscape, which is characterised by undulating hills, small creek flats and numerous drainage lines spaced 400 m to 1,500 m apart.

Soils consist of a shallow A1 horizon of dark reddish-brown sandy loam over brown sandy loam, grading to clay subsoils with yellow, grey or orange mottling, indicating periodic waterlogging and variable drainage. These soils have moderate to low water-holding capacity and variable erodibility, which influence land stability and surface processes.

Historical land disturbance such as clearing, has likely altered the natural soil structure and increased erosion susceptibility across the Project Area.

Acid sulfate soils

A review of the NSW Planning Portal Spatial Viewer and Cessnock LEP indicated that there is no known occurrence of ASS within the Project Area.

This was supported by the findings in the Detailed Site (Contamination) Assessment which reviewed the acid sulfate risk map and identified no known occurrence of ASS materials on the site.

ASS are therefore not expected within the Project Area.

6.4.3.2 Hydrogeology and geology

Surface water

Black Creek is located adjacent to the western boundary of the site, around 200 m west of the Project Area. Black Creek is classified as a third-order watercourse under the Strahler system (Strahler, 1952) and connects to the Hunter River approximately 10 km to the north.

There is one constructed farm dam within the Project Area and a second farm dam located beyond the Project Area in the northeast corner of the site to the west of the planted screening vegetation.

Further details on surface water features are provided in **Section 6.9**.

Groundwater

The inferred groundwater flow direction within the Project Area is considered likely to be towards Black Creek in the west.

There are no registered or known groundwater wells within the Project Area. A search of the WaterNSW groundwater database (WaterNSW, 2026) identified five registered groundwater wells within 3 km of the Project. One groundwater bore (ID: GW050646) was identified around 275 m east of the Project Area and is registered for stock use; however, the status of the well is 'abandoned'. Further details of the groundwater bores are included in **Section 6.9**.

During the field investigation, groundwater or seepage was recorded at 10 of the 21 test pit locations at depths ranging from between 0.8 m and 4.0 m. The investigation was conducted following a recent period of wet weather, which may have influenced observed groundwater levels.

Flood prone land

The site is subject to flooding due to overland flow drainage from the local catchment and from regional (riverine) flooding of Black Creek. The existing flood environment at the site is characterised by shallow localised flooding during more frequent events and deep, high hazard inundation during rare extreme floods, reflecting the site's location within a low-lying area of the Black Creek floodplain.

Further detail on flood risk is provided in **Section 6.9**.

6.4.3.3 Contamination

A review of the NSW EPA Contaminated Land Record of Notices (NSW EPA, 2025) by RCA on 8 July 2025 confirmed that the site (and land immediately adjacent to the site) was not the subject of:

- Orders made under Part 3 of the CLM Act
- Notices available to the public under section 58 of the CLM Act
- An approved voluntary management proposal under the CLM Act that has not been fully carried out and where NSW EPA approval has not been revoked
- Site audit statements provided to the NSW EPA under section 53B of the CLM Act that relate to significantly contaminated land
- Copies of anything formerly required to be part of the public record
- Actions taken by NSW EPA (or the previous State Pollution Control Commission) under section 35 or 36 of the *Environmentally Hazardous Chemicals Act 1985*.

NSW EPA notified contaminated sites

A search of the EPA's List of Notified Sites did not identify any notified sites within or immediately adjacent to the site.

POEO Act online public register

A search of the NSW EPA online POEO Act public register indicated that the site (and land located immediately adjacent to the site) was not the subject of a licence, application, notice, audit, pollution study or reduction program.

Contaminated land public record

Searches were conducted across multiple regulatory and historical registers, including gasworks, cattle dip sites, asbestos insulation, unexploded ordnance, naturally occurring asbestos, and per- and polyfluoroalkyl substances (PFAS) sources. No evidence of contamination or hazardous materials at the site or in its vicinity was returned by these searches. Further review of the *PFAS National Environmental Management Plan* (HEPA, 2025) confirmed no historical or current activities associated with PFAS contamination.

Previous investigations

Assessments were undertaken in 2005 for the construction of the Rothbury Zone Substation (Parsons Brinkerhoff, 2005). Soil samples from 10 boreholes were tested for pH, metals, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, xylene (BTEX), organochlorine pesticides (OCP), polychlorinated biphenyls (PCB), polycyclic aromatic hydrocarbons (PAH) and total phenols. Soil testing confirmed that all contaminant levels were below (the then current) regulatory limits for commercial/industrial use. Based on these findings, the site was deemed suitable for redevelopment for commercial/industrial use.

Potential sources of contamination

Based on a review of the site history and observations during the site inspection as part of the Detailed Site (Contamination) Assessment, potential sources of contamination include:

- Historical agricultural activities conducted on or near the site
- The potential presence of hazardous building materials associated with the former residential dwelling within the site.

Contaminants of potential concern (CoPC) associated with historical agricultural activities are metals, pesticides and herbicides. Potential off-site sources of contamination include both the historic and current use of pesticides and herbicides within the surrounding vineyards.

It is unknown if the former residential dwelling contained asbestos building materials or lead-based paint; however, if asbestos containing materials were used in historical buildings onsite this may have resulted in surface soil contamination. Subsurface contamination may also be present if excess building materials were inappropriately disposed of within the site at the time of construction or during demolition.

The site inspection found no visual or olfactory indications of contamination, nor any asbestos materials within the Project Area. There was no evidence of drums and/or waste, chemical storage, former petroleum facilities, or indications of buried waste material.

6.4.4 Construction impacts

6.4.4.1 Soils

Construction works for the Project would involve vegetation removal, ground disturbance, excavation, transport, storage and reuse of soils, use of heavy machinery and other construction activities. These activities have the potential to destabilise and expose the soils onsite.

There is potential for dispersion where soils are disturbed by construction activities within the Project Area. Vehicle movement may cause soil compaction, or disturbance and dispersion of soil including dust generation. Higher impact activities such as vegetation clearance and earthworks are likely to result in increased dispersive behaviour, when soil is remoulded, compacted or pulverised.

The occurrence of highly erodible sands within the sub-surface profile, particularly when loose and dry, represents a moderate to high potential for dispersion under wind or water flow. The likelihood of erosion increases where more substantial earthworks are undertaken, potentially resulting in waterlogging and a decline in soil structure. This is most likely to occur in areas containing silty/clayey sands and sandy clays within the Project Area, where the magnitude of impact is assessed as moderate.

Potential impacts on surface water quality associated with erosion are discussed in **Section 6.9**.

With the implementation of the proposed mitigation and management measures outlined in **Section 6.4.6**, the erosion and sedimentation impacts on soils as a result of the Project are considered to be low.

6.4.4.2 Contamination

Soils

While no known sources of existing contamination are present in proximity to the site, the potential exists for soil contamination to occur during construction due to accidental spills or leaks of hazardous substances, such as chemicals, fuels and oils. These substances may enter the soil through direct contact or surface runoff, particularly in areas of disturbed ground. The severity of any contamination event would depend on the volume and type of substance released, the duration of exposure, and the effectiveness of immediate containment measures.

Appropriate management and mitigation measures will be implemented to prevent any pollution incidents, as detailed in **Section 6.4.6**. The likelihood of widespread contamination is considered low.

Surface water and groundwater

Construction activities have the potential to affect local hydrological systems and water quality within the Project Area.

Excavation, grading, and soil stockpiling during construction activities could disturb and loosen material, which may be transported by stormwater runoff into nearby surface water features, including Black Creek. This could lead to sedimentation, potentially altering the creek's hydrological functioning and affecting its ecological health. The likelihood of sedimentation occurring is assessed to be moderate, given the proximity of works to surface water and the nature of ground disturbance, while the magnitude of impact could be moderate to high if sedimentation significantly disrupts aquatic habitats or flow regimes.

There is potential for the release of pollutants within the Project Area during construction, such as from a spill of oil or other event, which could result in contamination of surface water. Runoff of contaminated surface water could result in the mobilisation of contaminants into waterways, causing pollution. The likelihood of such events is low, provided mitigation measures are implemented, but the magnitude of impact would be high in the event of a major spill, due to potential harm to water quality and aquatic ecosystems. Potential impacts of surface water contamination on water quality are discussed in **Section 6.9**.

During ground-disturbing construction activities associated with the Project, such as excavation, there is potential for contamination of groundwater. The geology underlying the site was identified as the low-permeability Permian Farley Formation, comprising siltstone, mudstone, and shale, which would likely limit contaminant migration. Consequently, the likelihood of groundwater contamination is very low, and the magnitude of impact is assessed as low, given the limited connectivity and absence of sensitive groundwater dependent ecosystems (GDE).

Appropriate management and mitigation measures will be implemented to prevent materials and pollutants entering drainage lines and waterways, and to minimise sedimentation, pollution incidents and potential groundwater contamination, as detailed in **Section 6.4.6**.

With the implementation of appropriate mitigation and management measures, the residual impacts on surface water and groundwater are expected to be low.

Human health

Health impacts arising from construction have the potential to affect the construction workforce, workers on adjacent properties and nearby residents.

Project-related human health impacts are primarily associated with inhalation of dust, ingestion of and dermal contact with dust and soil by human receptors within and surrounding the Project Area. Excavation activities during construction have the potential to disturb and expose potentially contaminated soils in the Project Area. Volatile contaminants are not expected; however, would present an inhalation risk, if present.

The detected concentrations of the relevant COPC in the soil samples analysed were below adopted human health direct contact assessment criteria, and no unacceptable land contamination impacts have been identified.

Therefore, the likelihood of adverse human health impacts from soil disturbance during construction is considered low, and the magnitude of impact is assessed as low, given the absence of significant contamination and the temporary nature of exposure.

The Project is not located in a drinking water catchment and no registered groundwater wells for irrigation, recreational, drinking, or industrial purposes have been identified within 500 m of the Project Area. Consequently, the likelihood of groundwater contamination resulting in human health impacts during construction is very low, and the magnitude of impact is negligible, given the limited potential for exposure pathways.

6.4.5 Operational impacts

6.4.5.1 Contamination

Soils

No excavation works are proposed during operation; therefore, soil disturbance and soil mobilisation is not anticipated and, as a result, no erosion or sedimentation impacts are expected during operation of the Project.

Typical operation of the Project would involve the handling of potentially contaminating materials such as chemicals, fuels or oils which, in the event of a spill, could result in the contamination of soils within the Project Area. The likelihood of soil contamination from accidental spills during operation is considered low to moderate, depending on the volume and nature of the substance released. The magnitude of impact could be moderate, as contamination may require remediation and could affect soil quality within the Project Area. However, the Project Area would be predominantly hardstand so the likelihood of it infiltrating underlying soils is reduced, as any spills would be more readily contained, captured, and managed through appropriate spill response measures. Mitigation measures outlined in **Section 6.4.6** will be implemented to prevent leaks and contain spills. With these measures in place, the residual impact of soil contamination during operation of the Project is assessed as low.

Operational activities associated with the Project could result in contamination of surface water and groundwater.

During operation, a diesel generator would be located onsite to provide backup power. Should the generator malfunction or be refuelled incorrectly, there is the potential for diesel spills, which could result in contamination of groundwater and surface water. Contamination of water resources could also occur if transformers leak oil. The likelihood of such contamination events is considered low to moderate, as spills or leaks are possible during routine operation. The magnitude of impact could be moderate to high, depending on the volume of material released and the proximity to drainage lines or groundwater pathways, as contamination may require remediation and could affect water quality and ecological receptors. However, the Project Area would be predominantly hardstand so the likelihood of it reaching underlying soils or migrating into adjacent water bodies is reduced, as any spills would be more easily contained, intercepted, and managed through established spill control and drainage systems. With appropriate management and mitigation measures in place, as outlined in **Section 6.4.6**, the residual likelihood and magnitude of impacts during operation of the Project are assessed as low.

Human health

Health impacts arising during operation have the potential to affect operation and maintenance personnel.

No excavation works are proposed during operation and therefore disturbance to potentially contaminated soils is not anticipated, and exposure to contaminated soils is considered unlikely.

Operation of the Project could involve leaks or spills of transformer oils, dielectric fluids or coolants from the battery units, which may contain hazardous contaminants. Exposure to these substances can cause adverse health effects if contact or inhalation occurs. The likelihood of such exposure is considered low, as spills are infrequent but possible during routine maintenance. The magnitude of impact could be moderate to high, depending on the volume and nature of the substance released, as exposure to hazardous chemicals can have significant health implications.

The human health impacts associated with hazardous substances and measures to reduce impacts identified are provided in **Section 6.10**.

With the implementation of mitigation and management measures outlined in **Section 6.4.6**, the residual adverse impact on human health is assessed as low, given the effectiveness of spill prevention and containment procedures.

6.4.6 Mitigation and management measures

The mitigation and management measures that would be implemented during construction and operation of the Project are detailed in **Table 6.4-3**.

Table 6.4-3: Mitigation and management measures - soils and contamination

ID	Mitigation/management measure	Timing
SC-1	A construction Soil and Water Management Plan (SWMP), including an Erosion and Sediment Control Plan (ESCP), will be prepared in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) (the "Blue Book"). These plans will be prepared by a Certified Practitioner of Erosion and Sediment Control (CPESC) or an accredited soil scientist and implemented for the duration of construction. The ESCP will include protocols and measures for: - Minimising the risk of erosion and sedimentation, with a priority on minimising the extent and duration of disturbance. Disturbed areas will be vegetated and stabilised as soon as practicable to do so - Handling of soils, including the management of unexpected finds of contaminated materials - Handling of hazardous materials and procedures to manage spills to reduce and address soil and water contamination, including fuel storage and management of transformer oils - Environment control measures to manage the handling of and interactions with any dewatered groundwater - Consideration of nearby projects and monitoring of conditions upstream and downstream during any overlapping construction periods - A documented inspection and maintenance protocol, with erosion and sediment controls inspected at least weekly, prior to forecast rainfall events, and following rainfall events greater than 20 mm in 24 hours, to identify erosion, sediment movement or control failures. Any non-compliance or failure of erosion and sediment controls will be recorded, reported to the Site Supervisor, and rectified as soon as practicable, including immediate repairs or upgrades to controls.	Construction

ID	Mitigation/management measure	Timing
	Where controls are not functioning effectively, works in the affected area will cease until corrective actions are implemented and the risk of offsite impacts is addressed.	
SC-2	All construction personnel will undertake a site induction and training covering the potential for contaminated material to be encountered onsite, typical indicators of contamination (e.g. unusual odours, staining, buried waste, hydrocarbons, asbestos containing materials), and required response procedures if suspected contamination is identified.	Construction
SC-3	If evidence of contamination is uncovered during construction, the following measures will be implemented: • Immediate cessation of ground disturbance at the affected location and within the immediate vicinity, to be directed by the Site Supervisor, with the area isolated to prevent further disturbance • Investigation and assessment undertaken by a suitably qualified environmental consultant, engaged by the Contractor, to determine the nature and extent of contamination and identify appropriate remedial or management actions in accordance with relevant guidelines and regulatory requirements • Documentation and reporting, with findings, assessment outcomes and recommended actions recorded in site inspection records and the Project's contamination register, and included in routine CEMP compliance monitoring. • Implementation of agreed remedial actions, coordinated by the Contractor, prior to recommencement of works in the affected area, where required.	Construction
SC-4	If groundwater is encountered during excavation, works in the affected area will cease where there is a risk of uncontrolled groundwater discharge or potential contamination, until appropriate management measures are identified and implemented. A groundwater quality testing program will be developed and implemented by a suitably qualified hydrogeologist or environmental scientist, engaged by the Contractor. The program will be prepared in accordance with relevant Commonwealth and NSW regulatory requirements and guidelines, including the <i>National Environment Protection (Assessment of Site Contamination) Measure</i>, the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG)</i>, relevant NSW EPA guidance, and applicable Australian Standards for water sampling (e.g. AS/NZS 5667). All observations, sampling results, assessments and management actions will be documented in site inspection records, groundwater monitoring reports and the Project's environmental register, and reported through routine CEMP compliance reporting. Works will only recommence once required management or mitigation measures have been implemented, and the risk of environmental harm has been suitably managed.	Construction

ID	Mitigation/management measure	Timing
SC-5	An Emergency Response Plan (ERP) will be prepared and implemented as part of the Project's CEMP and OEMP. The ERP will be developed in accordance with relevant legislation, standards and Project requirements, and will define clear roles and responsibilities, communication and notification pathways, and response actions for emergency events. The ERP will include procedures for the identification, notification, response and reporting of emergencies, including but not limited to: • Fire (including bushfire and onsite fire incidents) • Flooding and extreme weather events • Spills or releases of fuels, chemicals or hazardous materials • Discovery of contaminated land or groundwater • Fauna incidents requiring emergency intervention • Environmental incidents with the potential to cause off site impacts • Any other incident posing a risk to human health, property or the environment. The ERP will include: • Emergency contact details and escalation protocols • Site-specific response actions and containment measures • Evacuation procedure • Requirements for incident documentation, investigation and reporting • Training and induction requirements to ensure all personnel are aware of emergency procedures. The ERP will be communicated to all site personnel through site induction and toolbox talks, and emergency incidents and responses will be recorded and reported in accordance with the CEMP and OEMP and regulatory requirements.	Construction Operation
SC-6	Hazardous materials such as chemicals, fuels and oils will be handled and stored in accordance with relevant Australia Standards and the <i>Storing and Handling of Liquids: Environmental Protection – Participants Handbook</i> (DECC, 2007).	Construction Operation
SC-7	During construction diesel or other fuels will be stored within an impermeable bunded area sized to contain at least 110% of the stored volume.	Construction
SC-8	During operation, impermeable bunded diesel storage areas will be maintained and visually inspected at least weekly to ensure integrity, with any leaks or spills promptly rectified. All spills and leaks must be recorded in a site register.	Operation
SC-9	In accordance with the relevant Australian Standards, all transformers are to be located on impermeable surfaces with secondary containment. The secondary containment will consist of an impermeable surface with bunding sufficient to contain 110% of the volume of oil within the transformer.	Detailed design
SC-10	During construction, spill kits appropriate to the products used onsite will be readily available in all construction facilities and vehicles.	Construction

ID	Mitigation/management measure	Timing
SC-11	Any hazardous material spills will be made safe as soon as possible by construction personnel, with the Site Supervisor informed immediately and emergency response procedures implemented in accordance with the mitigation measures in SC-5.	Construction
SC-12	An Operational Environmental Management Plan (OEMP) will be prepared and implemented for the Project prior to commencement of operation. The OEMP will establish site-specific operational controls to manage and minimise potential impacts on soil and water resources within and downstream of the Project. The OEMP will include the following: - Procedures for the storage, handling and use of hazardous materials within the Operational Footprint, including requirements for secondary containment, spill prevention measures and weekly inspection of storage areas - Requirement that spill kits will be located in all permanent buildings onsite and operational staff vehicles - Procedures for the management of spills and leaks during operation, prompt containment, clean-up and disposal of contaminated materials, notification to the Site Supervisor, and activation of emergency response protocols where required. - Procedures for the inspection, maintenance and ongoing management of site drainage infrastructure, including open channels, culverts, pits, outlets and water quality control measures, to ensure systems remain functional, free-draining and operate in accordance with manufacturer specifications - Procedures for monitoring and maintaining drainage and water management controls following rainfall events or where blockages, erosion or damage are identified.	Operation

6.5 Land use

6.5.1 Secretary's Environmental Assessment Requirements

Table 6.6-1 sets out the SEARs relevant to land use and where the requirements have been addressed in this EIS.

Table 6.5-1: Relevant SEARs – Land

Relevant SEARs	
Land	Where addressed
The EIS must address the following specific matters:	
- an assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: - agricultural land, flood prone land, nearby drinking water catchments; - Crown lands, mining, quarries, mineral or petroleum rights (if relevant);	Potential impacts on existing land uses and adjacent land are discussed in Section 6.5.4.1 and Section 6.5.4.2. An assessment of impacts on agricultural land is provided in Section 6.5.4.1 and Section 6.5.4.2. Flood prone land and drinking water catchments are discussed in Section 6.5.3.2 and detailed in Section 6.9. These land uses are considered in Section 6.5.3.2 and impacts assessed in Section 6.5.4.1 and Section 6.5.4.2.

Relevant SEARs	
- a soil survey to determine the soil characteristics and consider the potential for salinity, acid sulfate soils, and erosion to occur;	Soil characteristics and potential impacts to soils during construction and operation are detailed in Section 6.4 .
- a cumulative impact assessment of nearby developments;	Potential cumulative impacts are detailed in Section 6.14 .
• an assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including:	An assessment of the compatibility of the Project with existing land uses on the site and adjacent land is provided in Section 6.5.4.1 and Section 6.5.4.2 .
- consideration of the zoning provisions applying to the land, including subdivision (if required);	The zoning provisions that apply to the land are described in Section 6.5.3.1 and considered further in Section 6.5.4.1 and Section 6.5.4.2 .
- completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industries Land Use Conflict Risk Assessment Guide (if required);	A Land Use Conflict Risk Assessment (LUCRA) is provided in Appendix H and summarised in Section 6.5.4.1 and Section 6.5.4.2 .
- an assessment of impact on agricultural resources and agricultural production on the site and region;	An assessment of impacts on agricultural resources and agricultural production is provided in Section 6.5.4.1 and Section 6.5.4.2 .

6.5.2 Methodology

6.5.2.1 Land use and land zoning compatibility

The assessment involved confirming the Project's land use zone under the Cessnock LEP and reviewing the relevant zone objectives to establish the planning intent for the site and reviewing the NSW land use spatial dataset (DPE, 2017) to identify the land uses within and surrounding the site.

The construction and operational characteristics of the Project were then analysed in terms of their potential to alter, constrain or otherwise interact with existing land uses

The Project's operational elements were assessed against the land use zone objectives to determine overall zoning compatibility and identify any potential land use impacts. The assessment of construction and operational impacts on land use and land use zoning compatibility is provided in **Section 6.5.4.1** and **Section 6.5.4.2**.

6.5.2.2 Land use conflict

A LUCRA (AECOM, 2026) has been undertaken for the Project in accordance with the NSW Department of Primary Industries (NSW DPI) *Land Use Conflict Risk Assessment Guide* (NSW DPI, 2011). The LUCRA is provided in **Appendix H**, with key elements summarised in this section.

The assessment evaluates the potential for the Project to be constrained by surrounding land uses, as well as the potential for the Project to affect existing or future land uses in the locality. It also identifies appropriate management and mitigation measures to avoid, minimise or manage land use conflict risks.

The LUCRA applies the structured four step methodology outlined in the NSW DPI Guideline, comprising:

- Information gathering – identifying the proposed land use changes, associated construction and operational activities, and the existing environmental and land use context
- Risk evaluation – assessing the likelihood and consequence of potential interactions between the Project and surrounding land uses to determine an initial risk rating

- Identification of risk reduction measures – developing feasible and reasonable avoidance, minimisation and mitigation strategies to reduce the likelihood or consequence of identified risks
- Documentation of results – recording outcomes of the assessment, including revised risk ratings following mitigation and recommended management actions.

This approach provides a systematic and transparent process for identifying, assessing and mitigating potential land use conflicts, consistent with NSW DPI guidance and standard practice for State Significant Development assessments.

6.5.2.3 Agricultural resource and production

An assessment of impacts on agricultural resources and production was undertaken across the Project Area, adjoining agricultural land and the broader regional context.

Baseline agricultural conditions were established through desktop review and aerial imagery, identifying existing agricultural uses and infrastructure and site history.

A review of the *Land and Soil Capability Mapping of NSW* (DPIE, 2025) was undertaken to understand the site's capacity to sustain agricultural land uses. This dataset applies the NSW Office of Environment and Heritage's eight-class Land and Soil Capability (LSC) system, which provides a state-wide framework for assessing the inherent capability of land to sustain different land uses without causing long-term soil or environmental degradation. It ranks land from Class 1 (very high capability) to Class 8 (very low capability) based on key soil and landscape limitations, helping guide appropriate land use, management practices and development suitability in NSW.

Consultation was undertaken with adjacent landholders to inform local sensitivities, operational practices and considerations relevant to agricultural productivity. Further details are provided in **Chapter 5.0**.

Project construction and operational activities were then assessed to identify potential risks, with impact significance evaluated using a risk-based framework considering likelihood and consequence and overall risk. Where potential risks were identified, appropriate mitigation and management measures were developed to avoid or minimise effects on agricultural land, resources and production.

6.5.3 Existing environment

6.5.3.1 Land use zoning

The Project Area is located on land that is zoned 'RU2 Rural Landscape' under the Cessnock LEP. The surrounding land uses bordering the Project Area are zoned as 'RU2 Rural Landscape' to the north, 'SP2 Classified Road' and 'RU2 Rural Landscape' to the east, and 'RU4 Primary Production Small Lots' to the south and west.

The nearest residential zoning is 'R5 Large Lot Residential' and is located approximately 600 m west of the Project Area. Land zoned as 'C3 Environmental Management' and 'C1 National Parks and Nature Reserves' is located approximately 400 m west and 800 m north-west of the Project Area, respectively.

Surrounding land use zones are shown in **Figure 2-1**.

6.5.3.2 Land use

The Project is located in Lots 1 and 2 of DP 1318566 at 1309 Wine Country Drive, Rothbury, NSW 2320. The land is owned by Ausgrid and currently accommodates the Rothbury Zone Substation in the eastern portion, with cleared rural land extending across the western portion. The site is bounded by Wine Country Drive to the east and Old North Road to the south, with Black Creek immediately to the west and agricultural land and patches of bushland occurring to the north.

Review of the NSW land use spatial dataset (DPE, 2017) identifies land uses within the site as "Residential and Farm Infrastructure" and "Grazing Modified Pastures", as shown in **Figure 6.5-1**. The site has undergone historical vegetation clearing and disturbance and now comprises predominantly pasture grasses, with small areas of mature vegetation retained along site boundaries and the Black Creek corridor. Previous land uses, including viticulture and the construction and operation of the Rothbury Zone Substation and associated transmission infrastructure, have resulted in moderate ground disturbance across parts of the site.

Land surrounding the Project primarily consists of a mix of cleared rural land and commercial agricultural land uses, predominantly vineyards. Agricultural fields directly adjoin the Project's northern boundary, while the wider setting features rural activities interspersed with scattered dwellings and infrastructure. Despite historical disturbance within the site, the immediate land use pattern remains rural, with agricultural production, rural residential holdings and associated infrastructure the dominating surrounding land uses.

The Project is situated within a landscape of flat to gently undulating agricultural land on the Black Creek and Rothbury Creek floodplain, within a low-lying valley framed by nearby ridgelines and several local peaks. This broader context reflects a long-established rural character, where agriculture (including viticulture), rural residential development and utility infrastructure coexist within the Hunter Valley setting.

Mining

The MinView database and web map application (Geological Survey of NSW, 2024) indicates there are no current mining or exploration licences over the site.

Petroleum

There are no petroleum rights, including wells, active exploration licences or licence applications, or petroleum assessment or production leases within or in proximity to the site.

Other land uses

The Project is not located on Crown land, and there are no quarries or mineral extraction activities within 5 km of the site.

Flood prone land

The site is subject to flooding due to overland flow drainage from the local catchment and from regional (riverine) flooding of Black Creek. The existing flood environment at the site is characterised by shallow localised flooding during more frequent events and deep, high-hazard inundation during rare extreme floods, reflecting the site's location within a low-lying area of the Black Creek floodplain.

**FIGURE 6.5-1:
LAND USES**

Legend

-  The site
-  Project Area
-  Local road
-  Main road
-  Watercourse

Land use

-  1.1.0 Nature conservation
-  1.3.0 Other minimal use
-  2.1.0 Grazing native vegetation
-  3.2.0 Grazing modified pastures
-  3.4.0 Perennial horticulture
-  4.4.0 Irrigated perennial horticulture
-  5.4.0 Residential and farm infrastructure
-  5.7.0 Transport and communication
-  6.2.0 Reservoir/dam
-  6.3.0 River

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6.5.3.3 Agricultural land use and productivity

Historical agricultural use

Historical aerial imagery shows that the site initially comprised cleared rural land with minimal development, characteristic of low-intensity agricultural use. By 1975, horticultural activity, presumed to be vineyard plantings, had been established across the western portion of the site. These vineyard areas remained visible through the late 1970s, although their extent and condition suggest they were small-scale and possibly not intensively managed.

By the mid-1980s, agricultural activity on the site had begun to decline, coinciding with the construction of a residential dwelling and associated structures in the eastern portion. Subsequent imagery from the late 1980s through to the 1990s shows a progressive reduction in vineyard activity, with vines no longer appearing to be actively maintained. Additional dams were constructed during this period, indicating a transition away from horticulture.

From the early 2000s onward agricultural activity on the site effectively ceased. The demolition of former structures and the construction of Ausgrid's Rothbury Zone Substation in the eastern portion of the site in 2006 marked a shift to infrastructure use. Since then, the site has consisted of cleared, grassed areas with isolated patches of regrowth vegetation, and no ongoing agricultural production.

Agricultural capability

A review of the *Land and Soil Capability Mapping of NSW* (DPIE, 2025) shows the Project Area is mapped as LSC Class 3 land, which is defined as "high capability land" with moderate soil and landscape limitations that restrict the intensity of agricultural use.

Class 3 land is generally suitable for grazing, horticulture and limited cultivation, provided it is managed to avoid soil degradation. Typical constraints include erosion risk, soil structure decline, shallow soils or waterlogging, requiring moderate management to maintain long-term soil health. Class 3 land is not considered prime agricultural land and relies on practices such as maintaining groundcover and erosion control to remain sustainable.

6.5.4 Potential impacts

This section assesses the potential land use impacts of the Project during construction and operation, including consistency with land use zoning, potential land use conflicts, and implications for agricultural land and productivity.

6.5.4.1 Construction

Land use and land use zoning compatibility

The Project would be constructed on land zoned 'RU2 Rural Landscape' where the planning intent is to maintain rural character, support extensive agriculture and avoid development that constrains surrounding rural land uses.

Although the Project is not a typical rural use, construction activities would occur directly adjacent to the existing Rothbury Zone Substation and associated transmission infrastructure, ensuring all works remain within an established electrical infrastructure setting rather than intact rural land.

The Construction Footprint of the Project has been designed to minimise disturbance by limiting vegetation clearance, earthworks, access roads and Project infrastructure to the smallest practicable areas. All laydown areas, parking and material storage would be contained within the Project Area, avoiding off-site disturbance and preventing temporary fragmentation of the broader rural landscape.

Construction activities, including vegetation clearing, earthworks, establishment of temporary compounds, increased vehicle movements and short-term noise and visual impacts, would be confined to the Project Area and its immediate surrounds. Works would not extend onto land used for grazing or cropping, and no access restrictions, easements, or temporary occupation of neighbouring rural properties are required. Existing agricultural operations on adjacent lands can therefore continue without disruption.

Construction of the Project would not introduce hazards, exclusion zones, contamination risks or biosecurity risks that could restrict agricultural activities or reduce agricultural productivity on adjoining

land. Construction would also not affect drinking water catchments, Crown land or existing mining, quarrying or petroleum interests.

Environmental assessments for soils and contamination, visual amenity, noise, traffic and water confirm that potential construction impacts can be effectively mitigated and would not result in significant impacts on neighbouring properties. Construction impacts will be managed through a CEMP, including erosion and sediment controls, vegetation protection measures and traffic management measures.

Given that the Construction Footprint has been reduced as far as practicable, its location within an existing established electrical infrastructure setting, and the temporary nature of construction impacts, construction of the Project would not constrain agricultural uses, or disrupt farm access, productivity or rural amenity. Accordingly, it is considered that construction activities associated with the Project could be accommodated within the 'RU2 Rural Landscape' land use zone.

Land use conflict

The LUCRA identified the following potential land use conflicts during construction of the Project:

- Disturbance to adjoining vegetation, habitat and fauna (including edge effects and temporary displacement)
- Weed or pathogen spread and incidental off-site disturbance
- Potential disturbance to Aboriginal cultural material
- Risk of off-site contamination from spills or leaks
- Temporary visual impacts from construction activities
- Construction noise affecting nearby sensitive receivers
- Construction traffic impacts on local access and road conditions
- Altered runoff, erosion and sedimentation affecting neighbouring land, including Black Creek
- Dust generation reducing amenity for neighbouring properties.

With the application of appropriate mitigation and management measures, all potential sources of land use conflict during construction are assessed as low risk. Potential impacts on Aboriginal cultural heritage, vegetation along property boundaries, and adjoining habitats would be minimised through pre-construction surveys, delineated no-go zones, exclusion fencing and implementation of relevant sub-plans.

Broader construction impacts, including dust, noise, traffic, runoff, sedimentation, weed spread and temporary visual intrusion would be addressed through the CEMP and its associated management plans.

Agricultural resource and productivity

Construction of the Project would temporarily occupy 4.56 ha of Class 3 land. This is a high capability land type with moderate soil and landscape limitations typically that can support agricultural uses, when appropriately managed. However, the site is not currently used for agriculture and has been previously disturbed by historical land uses and existing infrastructure. As a result, the temporary occupation of Class 3 land during construction would not materially reduce agricultural resources or productivity at either the local or regional scale. The overall impact on agricultural land and its productive potential is assessed as minimal.

6.5.4.2 Operation

Land use and land use zoning compatibility

As discussed in **Chapter 2.0**, the operation of a BESS for electricity generating works is permissible with development consent on land zoned 'RU2 Rural Landscape', which is the case for this development. The land use objectives of the 'RU2 Rural Landscape' land use zone, as described in the Cessnock LEP, are outlined in **Table 6.5-2**, alongside a discussion as to whether the Project supports or conflicts with these objectives.

Table 6.5-2: RU2 Rural Landscape land use zone objectives

RU2 zone objectives	Discussion
Encourage sustainable primary industry production by maintaining and enhancing the natural resource base	The Project supports sustainable primary industry production by contributing to a more reliable electricity network, which underpins the viability of rural industries in the region. The Project does not remove any active agricultural land or soil resources from production, preserving the natural resource base.
Maintain the rural landscape character of the land	The Project is located adjacent to the existing Rothbury Zone Substation and associated electricity infrastructure, consolidating built form within an already modified part of the landscape. The design incorporates perimeter planting as part of the draft landscaping plan (Figure 6.6-19 in Section 6.6) to maintain the broader rural character.
Provide for a range of compatible land uses, including extensive agriculture	The Project is compatible with surrounding agricultural land uses as it operates within a contained footprint, generates minimal traffic or emissions in operation, and does not impose constraints on surrounding agricultural activities such as viticulture, grazing or horticulture.
Enable other compatible forms of development that are associated with rural activity and require an isolated location or support recreation	The Project is suitably located on a relatively isolated parcel already containing similar infrastructure, with no conflict with recreational or rural activities.
Ensure the type and intensity of development is appropriate in relation to the rural capability and suitability of the land	The Project is located on LSC Class 3 land but is not currently used for agriculture and has been previously disturbed by the Rothbury Zone Substation and associated works. The Project is low-intensity, unmanned infrastructure that aligns with the land's capability and does not preclude future rural post-decommissioning.
Maintain and enhance the scenic character of the land	The Project would introduce operational infrastructure that may alter the scenic character of the site by adding built form to the site. However, the Project would be located directly adjacent to an existing substation, meaning the new infrastructure is concentrated within an area that is already visually modified and contains established electrical infrastructure. Landscape planting has been incorporated into a draft landscaping plan to screen and soften views of the Project over time. By situating the Project alongside existing infrastructure and utilising mature vegetation that already provides partial screening, the Project helps maintain the broader scenic quality of the area while reducing the visibility and overall impact of the new infrastructure on the surrounding landscape.
Ensure development does not create unreasonable or uneconomic demands for the provision or extension of services or infrastructure by public authorities	The Project connects directly to the existing Rothbury Zone Substation via a 33 kV underground cable. Whilst some minor upgrades to adjacent roads would be implemented, the Project would not create any unreasonable or uneconomic demands for the extension of services or infrastructure.

RU2 zone objectives	Discussion
Minimise disturbance to the landscape from development caused by vegetation clearing, earthworks, access roads and construction of buildings	disturbed land to minimise vegetation loss. The Project would utilise the existing access point off Old North Road, limiting new disturbance to the landscape. Potential construction impacts on land use and zoning are provided in Section 6.5.4.1.
Ensure development does not intrude into the skyline when viewed from a road or other public place	The Project would introduce operational infrastructure that would be visible by receptors in the area surrounding the Project, which could affect visual amenity. While the proposed infrastructure would comprise tall, uncharacteristic elements (such as the noise barriers), the existing surrounding vegetation would largely filter views to the Project Area. The height of the Project's operational infrastructure has been minimised where possible. The draft landscaping plan proposes vegetative screening to minimise visual impacts from adjacent public areas. Visual impacts of the Project during operation are therefore assessed to be low, as detailed in the LCVIA in Appendix I.

As an unmanned, low-intensity facility, operational activities would be contained within the defined Operational Footprint of the Project and would not alter the overall rural land use character or conflict with the objectives of the 'RU2 Rural Landscape' zone objectives.

Operation of the Project would not affect nearby drinking water catchments, Crown land, mining, quarries, mineral or petroleum rights.

No subdivision, change to lot boundaries or restriction on surrounding land uses would occur, and the Project would coexist with the existing landscape without affecting agricultural capability or rural use in the locality.

Environmental assessments indicate that the Project would generate operational noise exceeding management thresholds at three sensitive noise receivers, result in visual amenity impacts due to the introduction of new infrastructure (with a period of increased visibility while screening vegetation matures), and has potential for altered surface runoff, erosion or contamination affecting local waterways. There is also a low-likelihood risk of off-site impacts from a battery or transformer fire. With the implementation of appropriate mitigation measures identified in **Section 6.2** to **Section 6.13**, these impacts would be effectively minimised and would not constrain land uses on adjoining properties or rural activities consistent with 'RU2 Rural Landscape' zoning.

Accordingly, the impact on land use is assessed as minor, given the Project's relatively small Operational Footprint, its location alongside existing electrical infrastructure, and the compatibility of its operational activities with the 'RU2 Rural Landscape' zone. Surrounding land uses would continue without constraint.

Land use conflict

The LUCRA identified the following potential land use conflicts during operation of the Project:

- Visibility of operational infrastructure affecting visual amenity
- Operational noise affecting nearby sensitive receivers
- Altered runoff, erosion or contamination affecting Black Creek and downstream users
- Potential off-site effects from a battery unit or transformer fire.

Operational infrastructure would be largely screened by existing and proposed vegetation, and no significant visual impacts are anticipated once landscaping is established.

Operational noise levels are predicted to result in minor exceedances at three noise-sensitive receivers, which are considered barely perceptible, and impacts are generally regarded as negligible where all feasible and reasonable mitigation measures have been implemented.

Altered runoff, erosion or accidental contamination during operation of the Project could affect water quality in Black Creek and impact downstream land uses. With appropriate drainage controls, erosion-stabilised surfaces and spill containment measures included as part of the Project design and operational processes, impacts on neighbouring land uses would remain low.

The implementation of appropriate mitigation and management measures for a battery unit or transformer fire, including suitable asset protection zones and separation distances, would ensure that any incident is contained within the site and does not spread to neighbouring land.

Beyond these considerations, no other operational impacts are anticipated to materially affect surrounding agricultural or rural land uses. The Project does not alter existing land use patterns in the site boundary, and ongoing environmental management and monitoring during operation would ensure compatibility with neighbouring land uses.

During operation, all potential sources of land use conflict are considered to be low. The Project would operate within a contained footprint and would not introduce activities or emissions expected to affect neighbouring land uses.

Agricultural resource and productivity

The Project's Operational Footprint would occupy 1.47 ha of Class 3 land. This is a high capability agricultural land type with moderate soil and landscape limitations suitable for mixed agricultural use, when appropriately managed.

The Project would not affect agricultural resources or productivity within the Operational Footprint or the surrounding locality, as the site is already substantially modified, with the eastern portion occupied by the existing Rothbury Zone Substation and the remainder comprising historically cleared and previously disturbed land. No agricultural enterprises currently operate within the site, and the land is no longer used for grazing, cropping or horticulture; therefore, the introduction of a BESS does not result in the loss of any active agricultural land from production or constrain any existing agricultural activities.

The Project would operate primarily as an unmanned, low intensity land use with limited operational vehicle movements and no processes that generate waste streams or land disturbance that would affect surrounding farmland. Routine inspection and maintenance activities would be infrequent and would not impede agricultural access or disrupt neighbouring farm operations. The Project would not generate odour, dust, light spill or operational noise at levels that could interfere with livestock, horticultural operations or rural amenity.

The Operational Footprint is contained within an area already used for electrical infrastructure, ensuring compatibility with the surrounding landscape. The Project would not encroach on or fragment agricultural land, restrict access or impose any limitations that could inhibit agricultural production on adjoining properties. Surface water and stormwater during operation would be appropriately managed to avoid altering drainage patterns that support surrounding agricultural soils or water users.

Given the absence of existing agricultural use, the low impact nature of operations, and the limited interaction with surrounding rural land uses, the Project is not expected to affect agricultural resources or productivity on the site or on nearby land. The Project is therefore considered compatible with the rural agricultural setting, with no anticipated operational impacts or land use conflicts.

6.5.5 Mitigation and management measures

Mitigation and management measures have been developed in the following environmental assessment sections of the EIS to address the potential construction and operational impacts identified in this assessment:

- **Section 6.2 (Biodiversity)** - measures relating to vegetation protection, fauna management, biosecurity, and avoidance of off-site ecological impacts
- **Section 6.3 (Aboriginal heritage)** - measures relating to the preparation and implementation of an ACHMP, including cultural heritage management requirements, cultural awareness training, consultation protocols, and unexpected finds procedure
- **Section 6.4 (Soils and contamination)** - controls for erosion and sedimentation, spoil handling, contamination prevention, and site stability

- **Section 6.6 (Landscape character and visual amenity)** - Visual screening, landscape treatments, vegetation retention and design responses to minimise visual effects
- **Section 6.7 (Noise and vibration)** - construction noise controls, operational noise mitigation, monitoring programs and adaptive management
- **Section 6.8 (Traffic and transport)** - traffic management planning, access controls, construction vehicle scheduling and road safety measures
- **Section 6.9 (Surface water, groundwater and flooding)** - stormwater management, water quality protection, flow path maintenance and flood impact mitigation
- **Section 6.10 (Hazards and risk)** - controls for managing hazardous events, emergency response protocols and ensuring compliance with relevant safety and environmental requirements
- **Section 6.11 (Bushfire)** - measures relating to reducing bushfire risk, including asset protection zones, maintaining safe work areas, and following bushfire preparedness and emergency response procedures
- **Section 6.13 (Other issues)** - measures addressing air quality and waste management.

Collectively, these measures ensure that impacts arising from construction and operation are managed in a manner that avoids, minimises or effectively controls potential effects on adjacent and surrounding land uses.

6.6 Landscape character and visual amenity

6.6.1 Secretary's Environmental Assessment Requirements

Table 6.6-1 sets out the SEARs relevant to landscape character and visual amenity and where the requirements have been addressed in this EIS.

Table 6.6-1: Relevant SEARs – landscape and visual

Relevant SEARs	
Landscape and Visual	Where addressed
The EIS must address the following specific matters:	
• a detailed assessment of the likely visual impacts of all components of the project on surrounding residences (including approved developments, lodged development applications and dwelling entitlements), and key locations, scenic of significant vistas and road corridors in the public domain; and	A Landscape Character and Visual Impact Assessment (LCVIA) has been prepared, which addresses the impacts to the surrounding residences and other key locations and scenic vistas and is provided in Appendix I . A summary of the LCVIA is provided in this section (Section 6.6).
• details of measures to mitigate and/or manage potential impacts (including a draft landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners).	Mitigation measures to manage potential landscape and visual impacts, including a draft landscaping plan, are outlined in Section 6.6.6 .

6.6.2 Methodology

6.6.2.1 Assessment approach

A LCVIA was prepared by AECOM (2026) to assess the potential visual impacts associated with the construction and operation of the Project. The LCVIA is provided in **Appendix I** and summarised in this section. The LCVIA applied best practice industry guidelines, including the following:

- Guideline for Landscape Character and Visual Assessment - Environmental Impact Assessment Practice Note EIA-N04 (Transport for NSW, 2023)
- *Guidelines for Landscape and Visual Impact Assessment (third edition)* (Landscape Institute & Institute of Environmental Management and Assessment (IEMA) 2013).

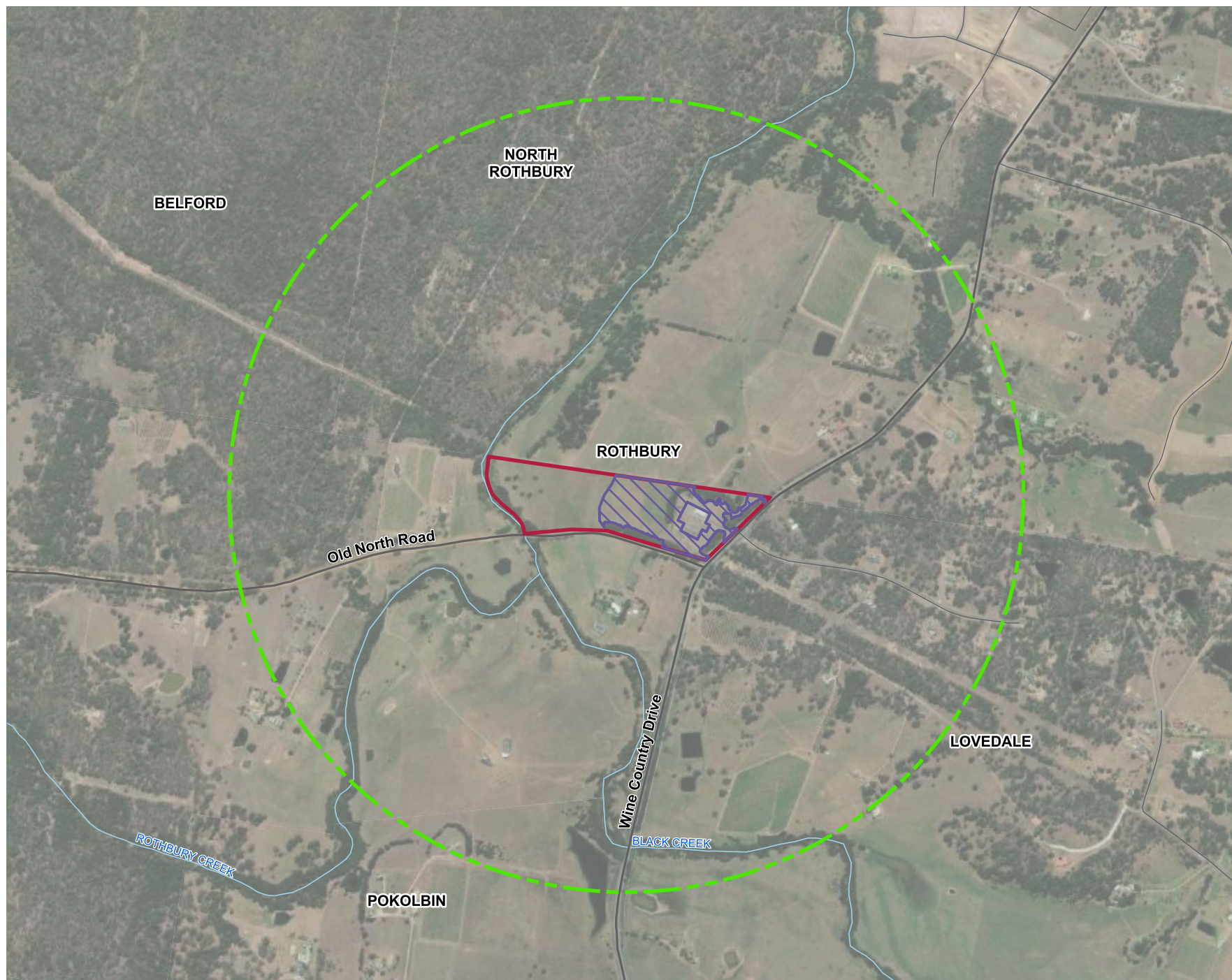
In accordance with these guidelines, key steps in the assessment of landscape character and visual impact include:

- **Contextual analysis** - analysis of the Project's regional and local context. This included a desktop assessment to inform a site inspection undertaken on 15 October 2025 and a description of the existing environment, including the identification of Landscape Character Zones (LCZs)
- **Landscape character impact assessment** - evaluation of the impact of the Project on the LCZs within the study area
- **Visual impact assessment** - evaluation of the existing views and visual amenity surrounding the site to identify and assess possible impacts to the community arising from the Project
- **Mitigation of impact** - development of mitigation measures to reduce adverse landscape character and visual impacts arising from the Project.

6.6.2.2 Study area

The LCVIA study area was defined based on the topography of the surrounding landscape, the number, extent and complexity of LCZs in the vicinity of the Project and the degree of visual containment of the Project. The resulting study area encompasses a 700 m radial study area around the site, as shown in **Figure 6.6-1**. This radius was considered conservative given the flat to gently sloping topography and the level of visual screening provided by surrounding vegetation.

FIGURE 6.6-1:
LCVIA STUDY AREA



Legend

-  The site
-  Project Area
-  Study area
-  Watercourse
-  Local road
-  Main road

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6.6.2.3 Landscape character impact assessment approach

The landscape character impact assessment identifies and assesses the significance of, and the effects of, change resulting from the Project on the landscape as an environmental resource in its own right. The assessment identifies the elements that make a place distinctive by considering how natural components, such as topography, geology, soils, climate, flora and fauna, and cultural influences, including land use, settlement patterns and heritage, interact to create a sense of place.

To provide a structured basis for assessment, the study area was divided into distinct LCZs, each representing areas with consistent characteristics that differentiate them from surrounding landscapes. Details on the LCZs selected for the assessment are provided in **Section 6.6.4**.

For each LCZ, the assessment considered:

- The **sensitivity of the landscape**, which reflects the landscape's susceptibility to change and its value. Susceptibility describes the ability of the landscape to accommodate the Project without undue consequences, while value relates to qualities such as ecological significance, heritage features, scenic attributes or recreational use
- The **magnitude of change**, which considers the type and nature of change, its geographical extent, and the duration and reversibility of effects.

Sensitivity and magnitude were rated as high, moderate, low or negligible and combined using the Landscape Character and Visual Impact Grading Matrix in **Table 6.6-2** to determine an overall impact rating. Ratings of 'high' and 'high to moderate' are considered significant.

Table 6.6-2: Landscape character and visual impact determination matrix (Transport for NSW, 2023)

		Magnitude			
		High	Moderate	Low	Negligible
Sensitivity	High	High	High to moderate	Moderate	Negligible
	Moderate	High to moderate	Moderate	Moderate to low	Negligible
	Low	Moderate	Moderate to low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

6.6.2.4 Visual impact assessment approach

An analysis of the Project's likely visibility was undertaken to identify where it may be seen from the surrounding landscape. This analysis considered topography, vegetation, and existing built form to determine which elements of the Project would be most visible and which visual receptors may experience views of the Project.

Potential visual receptors, including nearby residences, tourism and community facilities, and road users, were identified and mapped. Seven representative viewpoints on publicly accessible land were selected to illustrate typical views toward the Project. Details of the viewpoints selected for the assessment are provided in **Section 6.6.5.3**.

Using these viewpoints, the visual impact assessment evaluated how the Project would alter existing views and overall visual amenity. Impacts were assessed by combining:

- The **sensitivity** of the people experiencing the view, informed by their activity, the importance they place on views, and any indicators of landscape value (e.g. recreation areas, tourist viewpoints)
- The **magnitude of change**, considering scale and nature and scale of visible changes, contrast with existing landscape features, duration and frequency of views, distance, angle of view, geographic extent, and the duration/reversibility of the change.

For each viewpoint, sensitivity and magnitude ratings were combined using the matrix in **Table 6.6-2** to determine overall impact levels, with 'high' and 'high to moderate' ratings considered significant. A qualitative judgement (adverse, neutral, beneficial) was also assigned. Where adverse impacts were identified, mitigation measures were recommended to avoid, reduce or soften visual effects.

Photomontages were prepared in accordance with EIA-N04 for five of the seven viewpoints to illustrate the Project during its operational phase. These are provided in **Section 6.6.5.5**.

6.6.3 Existing environment

6.6.3.1 Site context

Land use

The Project is proposed in land zoned as 'RU2 Rural Landscape'. Extending south from Old North Road, the predominant land zoning is 'RU4 Primary Production Small Lots'. Wine Country Drive, which runs along the eastern boundary of the site, is zoned as 'SP2 Infrastructure (Classified Road)'.

Further to the south, a large area is zoned as 'SP3 Tourist' and includes properties associated with wine production and associated tourist activities, as well as a large area of land proposed for a future golf resort and residential development.

An area of 'R5 Large Lot Residential' zoned land is located to the west and north of the site. This is bounded by bushland to the north-west, which is zoned as 'C1 National Parks and Nature Reserves' and 'C3 Environmental Management'. Further detail on the land use of the surrounding area is provided in **Section 6.5**.

Topography, landform and waterways

The study area consists of flat to gently undulating agricultural land within the Black Creek and Rothbury Creek floodplain, situated in a low-lying valley between nearby ridgelines and several local peaks. Elevation across the broader landscape ranges from 0 m to 301 m AHD. The Project is located in the Hunter River catchment, where Black Creek and Rothbury Creek traverse a landscape of tree-lined creek corridors, remnant bushland, and scattered farm dams set against the backdrop of the Broken Back and Rosebrook Ranges. **Figure 6.6-2** shows the topography and creeks within site and surrounding study area.

6.6.4 Landscape character impact assessment

6.6.4.1 Landscape character zones

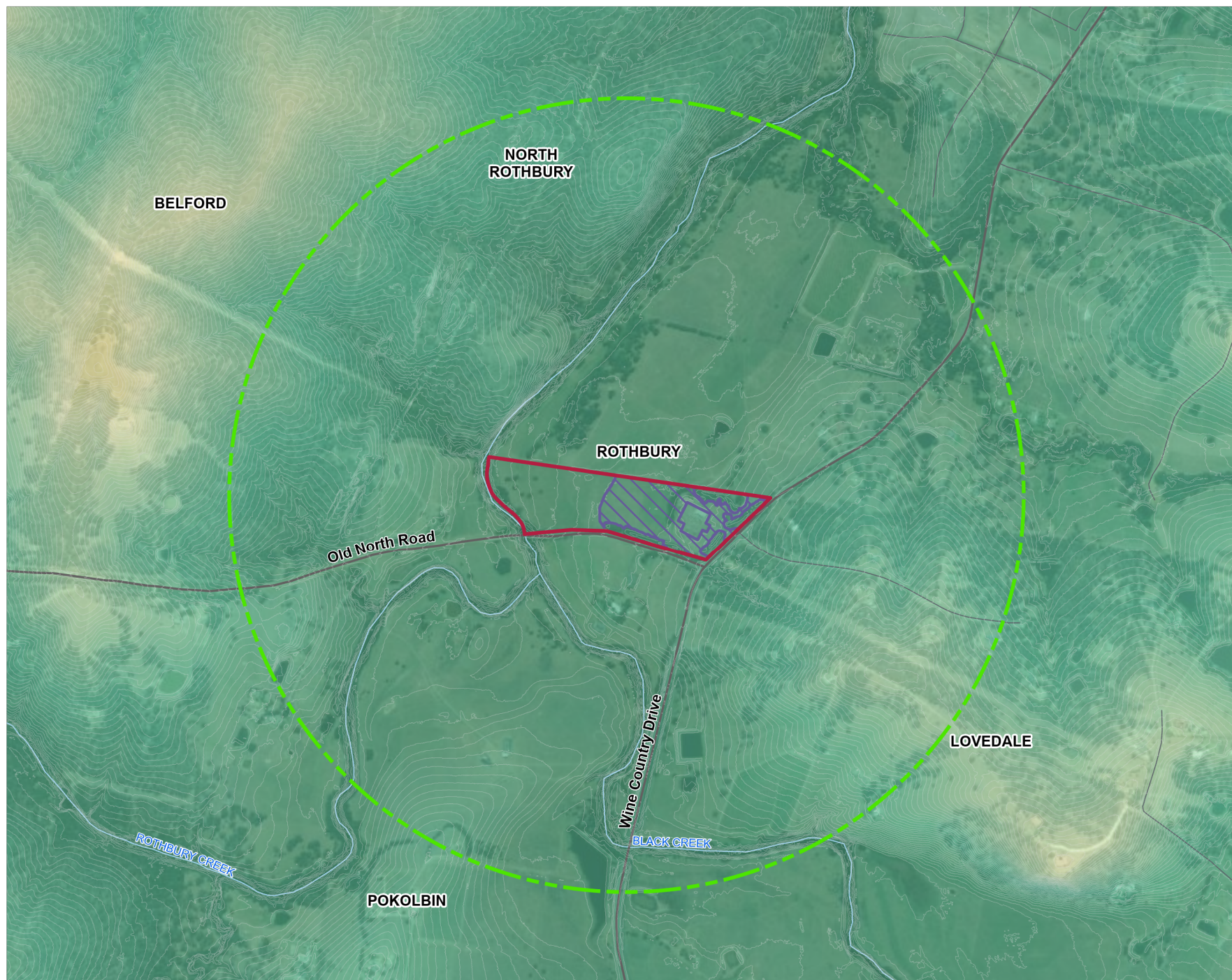
Three LCZs were defined within the study area, as shown in **Figure 6.6-3**:

- LCZ 1: Rural/Residential/Tourism
- LCZ 2: Environmental Living
- LCZ 3: Bushland.

LCZ 1 comprises the majority of the landscape within the study area, with smaller areas of LCZ 2 to the east of the site and a large area of bushland comprising LCZ 3 to the north-west. The Project lies wholly within LCZ 1.

An outline of the existing environment of each LCZ and an assessment of the Project's impact to each is provided in the following sections. Further details are provided in **Appendix I**.

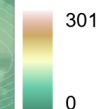
FIGURE 6.6-2:
TOPOGRAPHY AND HYDROLOGY



Legend

- The site
- Project Area
- Study area
- Watercourse
- Local road
- Main road
- Waterbody
- 1m contour lines

Elevation (metres AHD)



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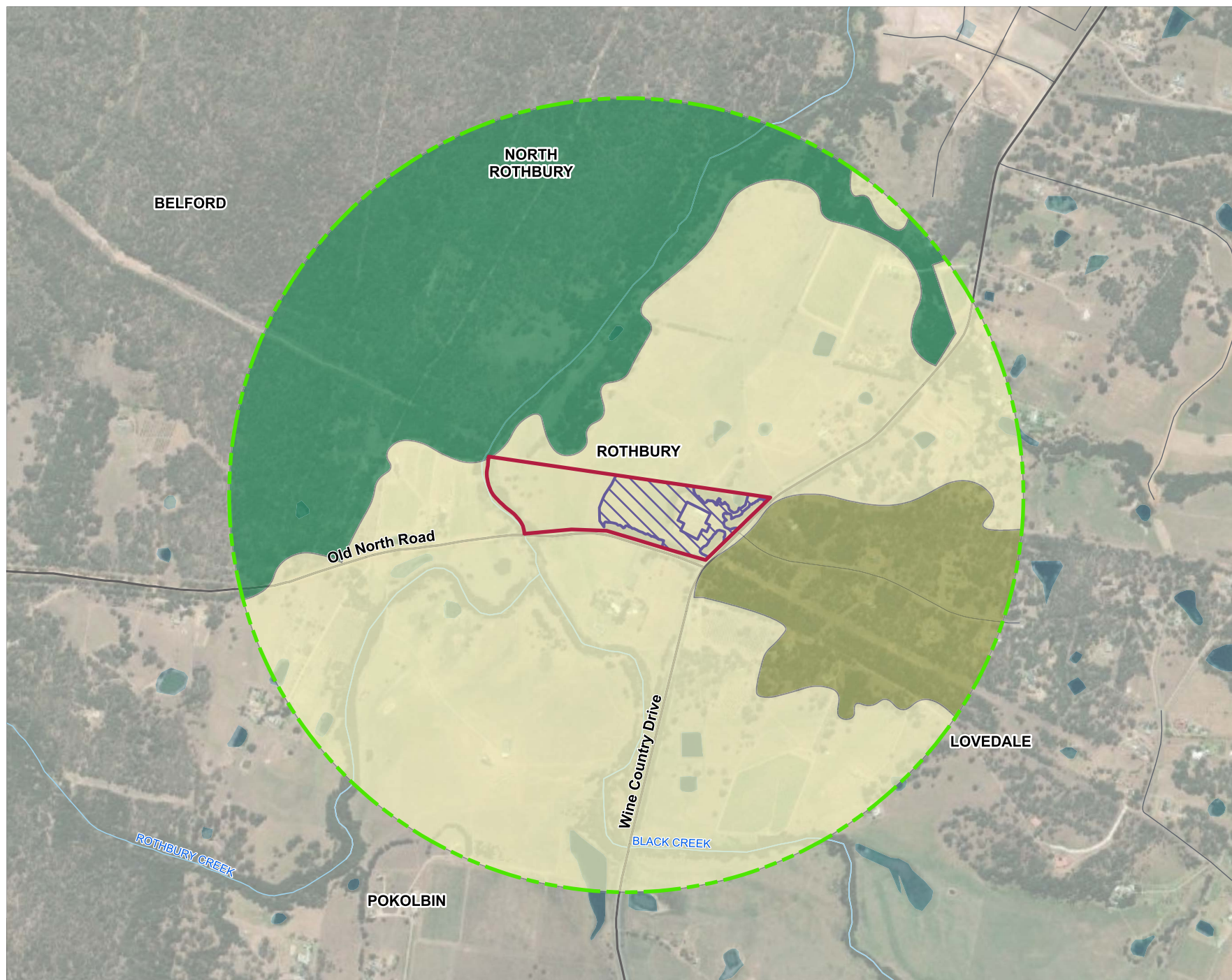
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FIGURE 6.6-3:
LANDSCAPE CHARACTER ZONES



Legend

- The site
- Project Area
- Study area
- Main road
- Local road
- Watercourse
- Waterbody

Landscape Character Zone

- LCZ 1: Rural/Residential/Tourism
- LCZ 2: Environmental Living
- LCZ 3: Bushland

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6.6.4.2 LCZ 1: Rural/ Residential/Tourism

Description

LCZ 1 occupies the largest portion of the study area, extending from the south-west to the north-west, as shown in **Figure 6.6-3**. It is characterised by broad, open, flat to gently undulating paddocks, with a bushland backdrop including the Broken Back and Rosebrook Ranges, and scattered tree stands typical of the wider landscape.

Land uses within the study area include rural production, vineyards, tourist accommodation, and large lot residential development. Built form is sparse and consists of dispersed rural homesteads, often associated with viticulture or tourism, and the existing Rothbury Zone Substation. The landscape pattern is irregular, shaped by waterways and remnant vegetation, with a limited road network dominated by Wine Country Drive and Old North Road. Vegetation is generally open, with tree clusters and riparian corridors along Black Creek and Rothbury Creek. Views characteristic of LCZ 1 are provided in **Figure 6.6-4**.



Figure 6.6-4: Views characteristic of LCZ 1: Rural/ Residential/ Tourism

Assessment

LCZ 1 has high landscape value and moderate susceptibility to change, resulting in an overall **Moderate** landscape character sensitivity.

The Project is located entirely within LCZ 1 and would introduce infrastructure up to 8 m in height across a moderate area of the study area. Although similar to the existing Rothbury Zone Substation, the Project is not consistent with the broader rural character of the LCZ. Vegetation clearance would reduce existing screening and affect scenic qualities.

Impacts would be limited to the immediate Project setting, bounded by Black Creek, Old North Road, Wine Country Drive and the property at 1337 Wine Country Drive, with much of the LCZ remaining unaffected. As the change would be long-term and irreversible, the magnitude of change is assessed as **Moderate**.

Based on Moderate sensitivity and Moderate magnitude of change, the Project would result in a **Moderate (adverse)** landscape character impact for LCZ 1, reflecting the increased scale of infrastructure and loss of screening vegetation within a valued rural and tourism landscape.

6.6.4.3 LCZ 2: Environmental Living

Description

LCZ 2 comprises clusters of properties within bushland settings across the study area and is characterised by a gently undulating landscape with dense to scattered vegetation surrounding homesteads and farm buildings.

Land use is primarily small-scale primary production and compatible rural activities. Built form includes single-storey dwellings on large lots with associated sheds and garages, typically screened by vegetation. The spatial pattern is irregular, shaped by waterways and remnant vegetation, with Blackburn Close forming a key access spine connecting properties east of the site. One heritage item,

the Old North Road remnant, is located within this LCZ south of Blackburn Close and east of the site. Views characteristic of LCZ 2 are provided in **Figure 6.6-5**.



Figure 6.6-5: Views characteristic of LCZ 2: Environmental Living

Assessment

LCZ 2 has moderate landscape value and low susceptibility to change, resulting in an overall **Moderate** landscape character sensitivity.

The Project is located adjacent to the western boundary of LCZ 2 but does not extend into it. No vegetation within LCZ 2 would be removed, and existing screening vegetation along the southern and eastern site boundaries would be retained. No new elements would be introduced within the LCZ, and vegetation within the LCZ would continue to provide vegetation buffering.

As the Project occurs outside LCZ 2, it would result in no direct change to landscape character within the LCZ. Although the change would be long-term, the magnitude of change is assessed as **Negligible**.

With Moderate sensitivity and Negligible magnitude of change, the Project would result in a **Negligible (neutral)** landscape character impact for LCZ2, reflecting the absence of physical change and retention of existing visual screening vegetation.

6.6.4.4 LCZ 3: Bushland

Description

LCZ 3 occupies a large area in the north-west of the study area, with a smaller area in the south-west. It is characterised by dense native bushland along ridgelines, with the Broken Back and Rosebrook Ranges forming a prominent backdrop.

The landscape is enclosed, with continuous canopy cover and a dense ground layer that provides a strong visual backdrop to more open LCZs such as LCZ 1. No built form, watercourses or known heritage items are present within this LCZ. Views characteristic of LCZ 3 are provided in **Figure 6.6-6**.



Figure 6.6-6: Views characteristic of LCZ 3: Bushland

Assessment

LCZ 3 has high landscape value and low susceptibility to change, resulting in an overall **Moderate** landscape character sensitivity.

The Project is located adjacent to the south-eastern boundary of LCZ 3 and does not extend into it. No vegetation would be removed and no new elements introduced within the LCZ. Infrastructure near the boundary would be small in scale relative to the extent of the LCZ.

As the Project occurs outside LCZ3, it would result in no direct change to landscape character within the LCZ. Although the change would be long-term, the magnitude of change is assessed as **Negligible**.

With Moderate sensitivity and Negligible magnitude of change, the Project would result in a change in **Negligible (neutral)** landscape character impact for LCZ3, reflecting the absence of characteristic or quality changes within the LCZ

6.6.4.5 Summary of landscape character impact assessment

Overall, the Project would result in a Low (adverse) effect on landscape character within the study area, with adverse impacts limited to LCZ 1. LCZ 2 and LCZ 3 would experience negligible change due to their distance from the Project and the retention of existing vegetation buffers.

Mitigation and management measures to reduce landscape character impacts are outlined in **Section 6.6.6**.

6.6.5 Visual impact assessment

6.6.5.1 Project visibility

The Project is located within an open paddock landscape, visually defined by dense vegetation associated with riparian corridors, remnant bushland, and planted tree bands. It would be situated adjacent to the existing Rothbury Zone Substation, which is screened by vegetation from Old North Road and Wine Country Drive.

6.6.5.2 Visual receptors

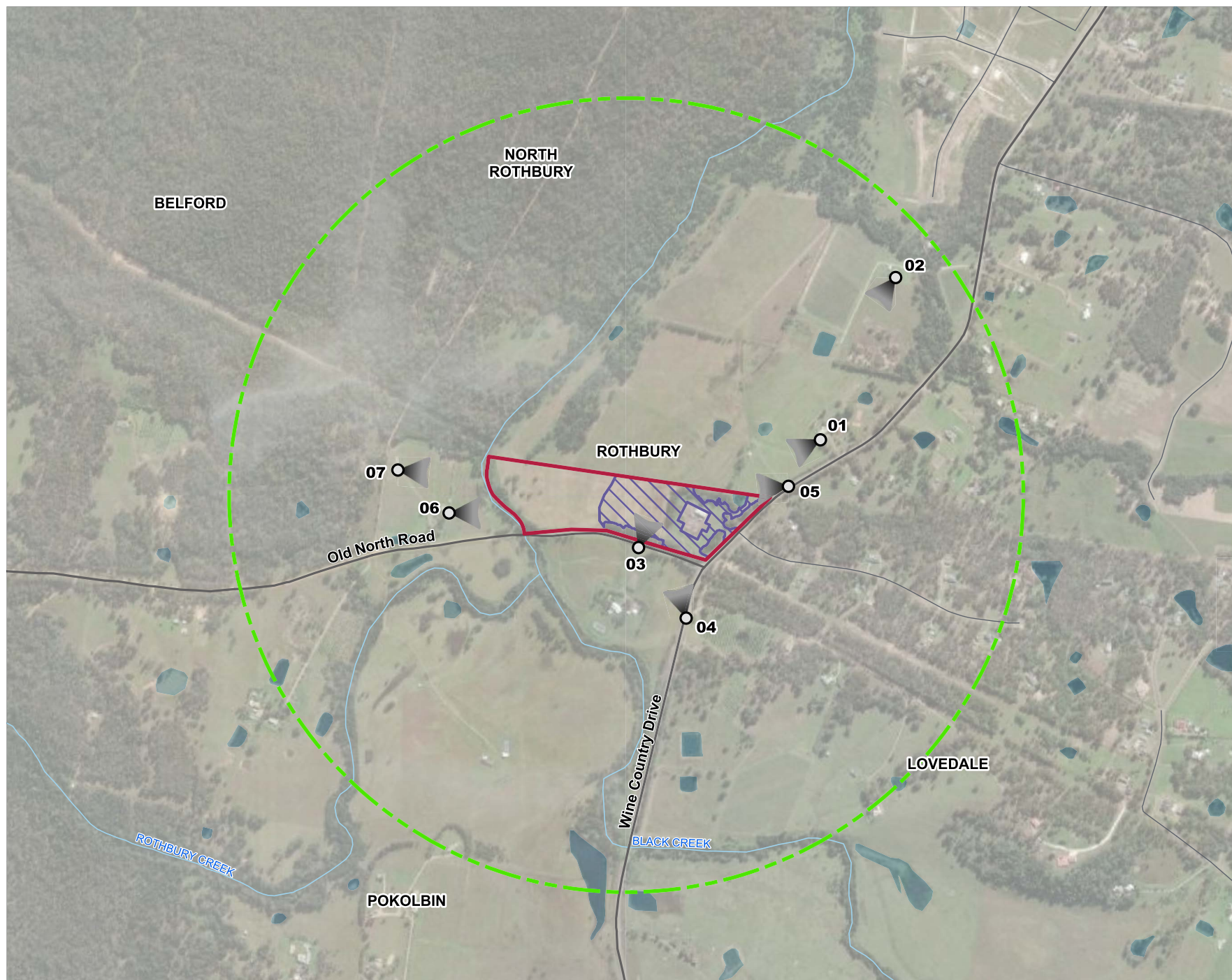
Two visual receptor groups were identified as sensitive to changes in the character of current views:

- Private domain, including:
 - Residents in one of the 20 dwellings within the study area that are not owned by, or otherwise associated with the Project, with three properties potentially experiencing direct views of the Project:
 - 1337 Wine Country Drive (refer to VP01 in **Figure 6.6-7**)
 - 803 Old North Road (a residential home within Black Creek Farm) (refer to VP07 in **Figure 6.6-7**)
 - 864 Old North Road (Quambatook House) (refer to VP03 in **Figure 6.6-7**).
 - Visitors to and workers at commercial properties including Scarborough Cottage (1401 Wine Country Drive) (VP02 in **Figure 6.6-7**) and Black Creek Farm/Winery (refer to VP06 in **Figure 6.6-7**).
- **Public domain**, including motorists travelling on Wine Country Drive and Old North Road.

6.6.5.3 Viewpoints

Seven representative viewpoints were selected to reflect a range of viewing distances and aspects relevant to nearby visual receptors. Viewpoint locations are shown in **Figure 6.6-7**, with further details provided in **Table 6.6-3**.

FIGURE 6.6-7:
VIEWPOINT LOCATIONS



Legend

- The site
- Project Area
- Study area
- Main road
- Local road
- Watercourse
- Waterbody
- Viewpoint

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Table 6.6-3: Viewpoint locations

ID	Location	Approximate viewing distance and direction from Project	Description	Existing setting	Representative receptors	Visual sensitivity
VP01	Residence at 1337 Wine Country Drive	400 m north-east	View from adjacent to a farm shed at 1337 Wine Country Drive, looking south-west.	The view comprises open, gently rolling paddocks in the foreground, partially screened by a dense tree band, with vegetated hillsides and the Broken Back Range forming the distant backdrop. VP01 is shown in Figure 6.6-8 .	Residents of 1337 Wine Country Drive and visitors to the property	High
VP02	Scarborough Cottage accommodation	820 m north-east	View from Scarborough Cottage accommodation, looking south-west.	The view includes open paddocks and vineyards with vegetated hills and the Broken Back Range in the distance. Foreground features include mature trees and fencing, with power poles and lines visible in the middle ground. VP02 is shown in Figure 6.6-11 .	Visitors to the Scarborough Cottage accommodation	High
VP03	Entry Drive to Quambatook House	20 m south (to viewpoint) 188 m south (to residence)	View from driveway to Quambatook House at 864 Old North Road, looking north.	The view features an asphalt driveway connecting to Old North Road, which runs through the middle ground. The road corridor includes turf verges, posts, markers, power lines, and fencing, with a dense line of tall trees on a raised berm beyond. VP03 is shown in Figure 6.6-13 .	Residents of Quambatook House and visitors to the property	Moderate
VP04	Wine Country Drive southern view	170 m south-east	View from south of the driveway into Lucy's Run Wines on Wine Country Drive, looking north-west.	The view follows Wine Country Drive, showing a two-lane road with gravel verge and guardrail. The land falls to an open floodplain where Quambatook House is visible against vegetation along Black Creek. Mature roadside trees are present near Old North Road, with the Old North Road vegetated berm and the Broken Back Range forming the distant backdrop. VP04 is shown in Figure 6.6-14 .	Moderate to high number of motorists travelling along Wine Country Drive towards Huntlee and Branxton.	Low

ID	Location	Approximate viewing distance and direction from Project	Description	Existing setting	Representative receptors	Visual sensitivity
VP05	Wine Country Drive northern view	50 m north-east	View from north of a driveway into the property at 1337 Wine Country Drive, looking south-west.	The view shows the western verge of Wine Country Drive with gravel, turf, overgrown grasses and a power line. Open lawn associated with Quambatook House provides clear views across to planting around the residence and along Black Creek, with mature roadside trees near Old North Road and buffer planting visible in the background. VP05 is shown in Figure 6.6-16 .	Moderate to high number of motorists travelling along Wine Country Drive towards Huntlee and Branxton.	Low
VP06	Black Creek Farm wine tasting deck	155 m west of site and 440 m west	View from the elevated rear deck at Black Creek Farm.	The view shows rows of grape vines extending into the middle ground, with a water tank and mown access path in the foreground. Dense vegetation along Black Creek forms the backdrop, with Old North Road and power lines visible to the right. VP06 is shown in Figure 6.6-17 .	Guests and owners/workers at Black Creek Farm	High
VP07	Residence at 803 Old North Road	270 m west of site and 650 m west	View from residence at 803 Old North Road, on the Black Creek Farm property.	The view presents an elevated outlook across a vineyard to bushland beyond. Grape vines extend from the foreground, with the winery tasting venue to the right and smaller rural structures nearby. Dense vegetation along Black Creek forms the backdrop, with the upper elements of the Rothbury Zone Substation visible above the trees and bush-covered hills on the horizon. VP07 is shown in Figure 6.6-18 .	Owners and visitors to the house.	High

6.6.5.4 Visual impact of construction

Construction would include enabling works, civil, structural, mechanical and electrical installation, followed by testing, commissioning and demobilisation, and is expected to occur between late 2027 and mid-2029 (approximately 22 months), as outlined in **Section 3.4**.

Residents and visitors are considered to have **High** sensitivity to visual change due to the importance of visual amenity to residential outlooks and tourism experiences associated. Nearby residents would experience moderate visibility of construction activities, including vegetation removal and heavy machinery. While vegetation would provide partial screening from most viewpoints, views from 1337 Wine Country Drive would be direct and largely unmitigated.

From surrounding roads, vegetation would generally filter views, with the clearest visibility from Old North Road. While this road carries relatively low traffic volumes compared to Wine Country Drive, existing planting would restrict views to intermittent glimpses of construction activity.

Overall, construction works and machinery would be visually prominent and uncharacteristic of the surrounding rural landscape resulting in a **High** magnitude of change.

Based on High sensitivity and High magnitude of change, the overall visual impact during construction is assessed as **High (adverse)**.

These impacts would be temporary and would not result in permanent visual change. Mitigation and management measures to reduce visual impacts during construction are outlined in **Section 6.6.6**

6.6.5.5 Visual impact of operation

VP01 – Residence at 1337 Wine Country Drive

The Project would introduce new infrastructure in the middle to background of the view, with a scale and form similar to existing farm sheds. While most infrastructure is currently screened by vegetation, some middle-ground trees would be removed, and the proposed noise barriers and ancillary infrastructure would be visible within existing vegetation gaps. These elements would appear relatively recessive if a neutral colouring was selected for these structures.

Visual receptors at this location have a vested interest in the view and would experience it for moderate periods when within the curtilage of their home, but not from inside the dwelling or the area immediately adjacent to it. The visual change would only affect a small portion of the view, resulting in a **Low** magnitude of change.

Given High visual sensitivity and Low magnitude of change the operational visual impact at VP01 is assessed as **Moderate (adverse)**.

Indicative photomontages for VP01 are provided in **Figure 6.6-9** and **Figure 6.6-10**.

VP02 – Scarborough Cottage accommodation

Due to distance, vegetation screening and topography, the Project infrastructure is unlikely to be visible, with only the tops of existing HV power poles currently discernible. The magnitude of visual change is therefore **Negligible**.

Given High visual sensitivity and Negligible magnitude of change, the operational visual impact at VP02 is assessed as **Negligible (neutral)**.

The existing view and central detail for VP02 is provided in **Figure 6.6-11**.



Figure 6.6-8: VP01 – Residence at 1337 Wine Country Drive – existing view



Figure 6.6-9: VP01 – Residence at 1337 Wine Country Drive – photomontage with the built form of the Project, partially screened behind retained vegetation, overlaid with a pink transparency to show the position of the Project within the view



Figure 6.6-10: VP01 – Residence at 1337 Wine Country Drive – photomontage showing the Project as it would be seen within the view (top) and the area of the white dotted box showing the extent of the Project likely to be seen behind retained vegetation (bottom)



Figure 6.6-11: VP02 – Scarborough Cottage accommodation - existing view (top) and detail of the central portion of the view (bottom)

VP03 – Entry Drive to Quambatook House

The Project would introduce new infrastructure, largely screened by existing trees on a berm between the Project and the viewpoint. Limited glimpse may occur through the vegetation, where the lightly coloured noise barriers would contrast with previous views of landscape and sky.

No tree removal is proposed at this location, and although the change would be long-term, it would affect only a small portion of the view. The magnitude of visual change is assessed as **Low**.

Based on Moderate visual sensitivity and Low magnitude of change, the operational visual impact at VP03 is assessed as **Moderate to Low (neutral)**.

An indicative photomontage for VP03 is provided in **Figure 6.6-13**.

VP04 – Wine Country Drive southern view

Most of the Project would be screened by existing vegetation, with visible elements limited to vegetation removal along Old North Road and the noise barriers. Although the noise barriers introduces a relatively large and uncharacteristic built form, it would occupy only a small portion of the view between the remaining tree canopies.

The broader open landscape and vegetation would largely remain unchanged, and whilst replacement planting would take time to mature, the magnitude of change is assessed as **Low**.

For passing motorists, the Project would alter only a small part of the view and be visible for a short duration, with attention like to be drawn to the broader floodplain, Quambatook House and surrounding vineyards.

Based on Low visual sensitivity and Low magnitude of change, the operational visual impact at VP04 is assessed as **Low (adverse)**.

An indicative photomontage for VP04 is provided in **Figure 6.6-14**. The central detail of **Figure 6.6-14** is provided in **Figure 6.6-15**.



Figure 6.6-12: VP03 – Entry Drive to Quambatook House - existing view



Figure 6.6-13: VP03 – Entry Drive to Quambatook House - photomontage with the built form of the Project, mostly screened behind retained vegetation (top) and overlaid with a pink transparency to show the position of the Project within the view (bottom)



Figure 6.6-14: VP04 – Wine Country Drive southern view - existing view (top) and photomontage showing the proposed view (bottom)



Figure 6.6-15: VP04 – Wine Country Drive southern view - detail of Figure 6.6-14 showing the centre of the proposed view, with the battery units and noise barriers visible extending from behind vegetation in the middle ground of the view

VP05 – Wine Country Drive northern view

Within this view, the only potentially visible Project element would be security fencing along the northern site boundary, with all other infrastructure screened by existing vegetation. Given the viewing angle, vegetation screening, and the speed of motorists on Wine Country Drive, any change to fencing is unlikely to be noticeable. The magnitude of change is assessed as **Negligible**.

Based on Low visual sensitivity and Negligible magnitude of change, the operational visual impact rating at VP05 is assessed as **Negligible (neutral)**, reflecting no change to view quality.

The existing view from VP05 is provided in **Figure 6.6-16**.

VP06 – Black Creek Farm wine tasting deck

The Project would not be visible from this location due to dense vegetative screening along Black Creek. As no Project infrastructure would be discernible, the magnitude of change is assessed as **Negligible**.

Based on High visual sensitivity and Negligible magnitude of change, the operational visual impact at VP06 is assessed as **Negligible (neutral)**.

An indicative photomontage for VP06 is provided in **Figure 6.6-17**.

VP07 – Residence at 803 Old North Road

The Project would result in the addition of new infrastructure in the middle to background of the view. The elements would be partially screened by existing vegetation along Black Creek, reducing their visual prominence.

Visual receptors at this location have a vested interest in the view and would experience it over moderate periods while using their veranda. However, the Project is unlikely to be visible from within the dwelling.

The Project would occupy only a small portion of the overall view, and its visual presence would diminish over time as proposed screening vegetation matures. Given the limited extent of change and anticipated reduction in visibility, the magnitude of change is assessed as **Low**.

Based on the High visual sensitivity and a Low magnitude of change, the operational visual impact rating at VP07 is assessed as **Moderate (adverse)**.

The existing view from VP07 is provided in **Figure 6.6-18**.



Figure 6.6-16: VP05 – Wine Country Drive northern view - existing view



Figure 6.6-17: VP06 – Black Creek Farm wine tasting deck - existing view



Figure 6.6-18: VP07 – Residence at 803 Old North Road - existing view

6.6.5.6 Summary of visual impact during operation

A summary of the operational visual impact for each representative viewpoint is provided in **Table 6.6-4**.

Table 6.6-4: Summary of visual impact during operation

Viewpoint	Sensitivity	Magnitude of change	Impact rating	Qualitative rating
VP01 - Residence at 1337 Wine Country Drive	High	Low	Moderate	Adverse
VP02 - Scarborough Cottage accommodation	High	Negligible	Negligible	Neutral
VP03 - Entry Drive to Quambatook House	Moderate	Low	Moderate to low	Neutral
VP04 - Wine Country Drive southern view	Low	Low	Low	Neutral
VP05 - Wine Country Drive northern view	Low	Negligible	Negligible	Neutral
VP06 - Black Creek Farm wine tasting deck	High	Negligible	Negligible	Neutral
VP07 - Residence at 803 Old North Road	High	Low	Moderate	Adverse

Mitigation and management measures to reduce adverse visual impacts during construction and operation of the Project are outlined in **Section 6.6.6**.

6.6.6 Mitigation and management measures

A draft landscaping plan, shown in **Figure 6.6-19**, has been developed to illustrate indicative landscaped areas within the site to mitigate landscape character and visual impacts of the Project.

Onsite planting included as part of the draft landscaping plan will be developed in consultation with affected landowners.

FIGURE 6.6-19:
DRAFT LANDSCAPING PLAN

Legend

- The site
- Project Area
- Operational Footprint
- Laydown area
- Ancillary facilities
- Containerised battery units
- Internal site road
- HV connection infrastructure (subject to separate approvals process)
- 33 kV grid connection
- Noise barrier
- ▲ Project entry/exit
- Main road
- Watercourse

Landscape and mitigation recommendations

- Tree planting in irregular groups to reduce visual

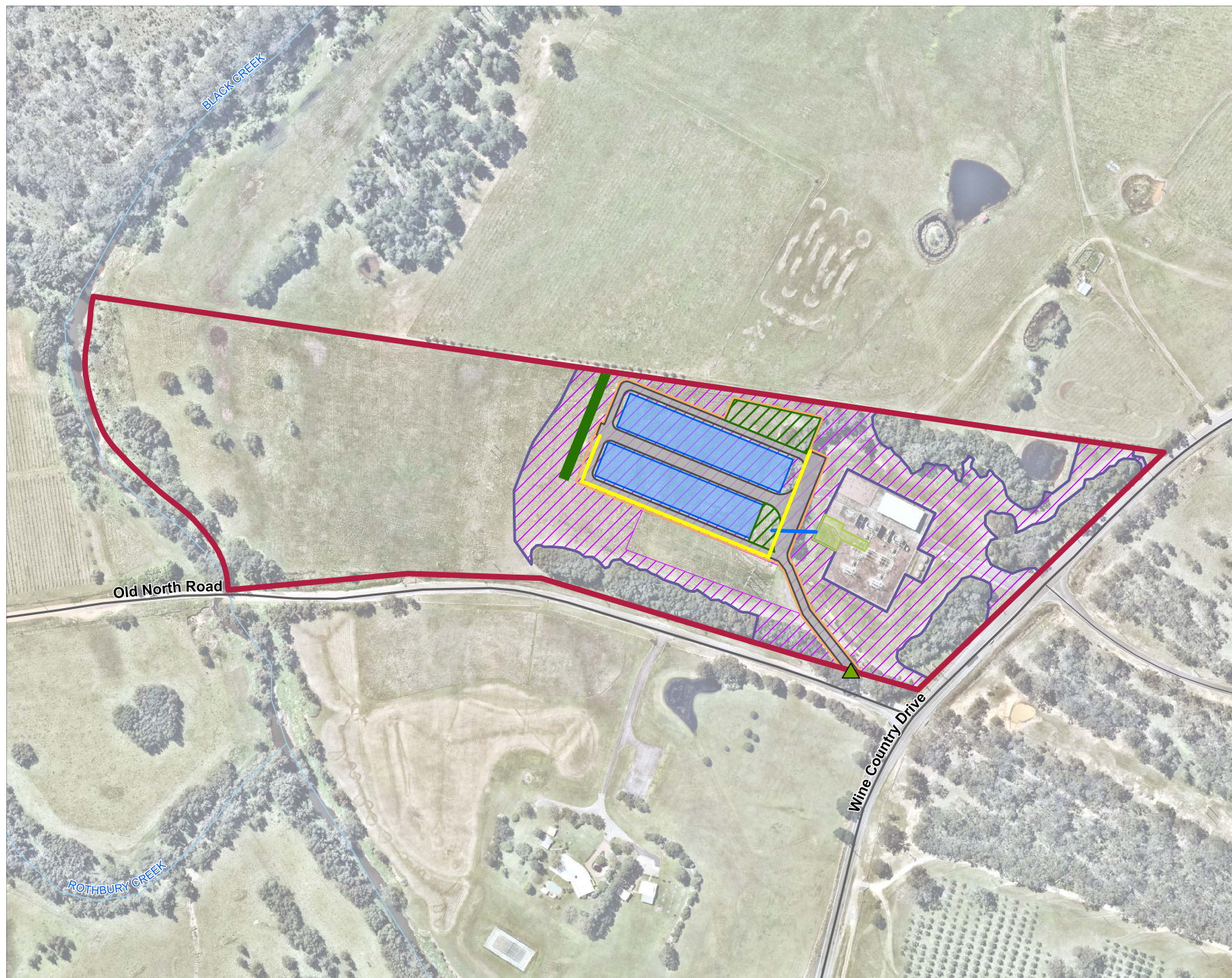
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The proposed mitigation and management measures outlined in **Table 6.6-5** aim to reduce the potential landscape character and visual impacts of the Project.

Table 6.6-5: Mitigation and management measures – landscape character and visual amenity

ID	Mitigation/management measure	Timing
LCVA-1	Removal of existing trees and vegetation that provides boundary screening will be minimised as far as practicable, subject to outcomes of bushfire and fire safety assessments. The justification for vegetation removal, including the assessment outcomes and reasons why retention is not feasible, will be documented in the relevant bushfire or fire safety assessment reports and recorded in the Project's environmental records (e.g. clearing approvals, site inspection records or the Biodiversity Management Plan). This documentation will be used to demonstrate compliance with avoidance and minimisation requirements.	Detailed design Construction
LCVA-2	Existing trees adjacent to the Project Area and within the site, which are not proposed to be removed will be protected. This measure applies to retained vegetation where there is potential for incidental damage from construction activities such as access, plant movement, material storage or ground disturbance. Exclusion zones will be clearly defined and established prior to the commencement of works to protect retained trees and stands of important vegetation. Tree Preservation Zones (TPZs) will be implemented for trees proposed to be retained only, in accordance with <i>AS 4970-2009 Protection of Trees on Development Sites</i>. TPZs will include the installation of durable protective fencing to prevent disturbance, excavation, compaction or damage within the protected area. TPZs and exclusion zones will be shown on construction drawings, communicated to construction personnel and verified through routine site inspections during construction.	Detailed design Construction
LCVA-3	The final landscaping plan will be prepared prior to construction to confirm planting locations, species selection and installation requirements. The plan will be designed to achieve the visual screening and landscape outcomes identified in the EIS and document how these will be achieved. Onsite planting included as part of the landscaping plan will be developed in consultation with affected landowners. Landowners whose properties adjoin the site boundary will be consulted on proposed planting locations, species selection and long-term landscape outcomes. Consultation undertaken will be documented in the final landscaping plan.	Detailed design
LCVA-4	The final Landscaping Plan will be implemented during construction and maintained for the duration of operation. Any planted vegetation that fails to establish or dies during the operational phase will be replaced as soon as practicable with equivalent species to ensure the ongoing achievement of the landscape and visual screening outcomes identified in the EIS.	Construction Operation

ID	Mitigation/management measure	Timing
LCVA-5	A neutral colour palette (e.g. glaucous green or mid-grey) will be used for the noise barriers to blend with vegetation and reduce visual prominence.	Detailed design Construction
LCVA-6	Well-presented and maintained site fencing covered with shade cloth (or similar material) will be installed to reduce the visual impacts of construction. The shade cloth would be removed following completion of construction.	Construction
LCVA-7	The area of disturbance during construction will be limited as far as practical. All areas disturbed by construction and not required for operation of the Project will be rehabilitated in accordance with the final landscaping plan.	Construction
LCVA-8	All lighting will be designed and installed in accordance with <i>AS4228-1197 – Control of Obtrusive Effects of Outdoor Lighting</i> to effectively minimise glare and light spillage beyond the site boundary.	Operation

6.7 Noise and vibration

6.7.1 Secretary's Environmental Assessment Requirements

Table 6.7-1 sets out the SEARs relevant to noise and vibration and where the requirements have been addressed in this EIS.

Table 6.7-1: Relevant SEARs – noise and vibration

Relevant SEARs	
Noise	Where addressed
The EIS must address the following specific matters:	
an assessment of the construction noise impacts (including impacts from proposed road upgrades) of the development in accordance with the <i>Interim Construction Noise Guideline (ICNG)</i>, operational noise impacts in accordance with the <i>NSW Noise Policy for Industry</i> (2017), assess traffic noise having regard to the <i>NSW Road Noise Policy</i> (DECCW, 2011) and cumulative noise impacts (considering other developments in the area), including (where appropriate):	A Noise and Vibration Impact Assessment (NVIA) has been prepared, which provides an assessment of construction and operational noise impacts in accordance with the relevant guidelines and policies. The NVIA is provided in Appendix J and a summary of the NVIA is provided in this section (Section 6.7).
identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours;	An assessment of construction and operational noise impacts associated with site emissions and traffic is provided in Section 6.7.4 and Section 6.7.5 . Noise contours are provided in Appendix J .
details of noise monitoring survey, background noise levels and amenity noise levels at the most-affected residential receivers;	Section 6.7.3 provides details on noise monitoring surveys, background noise levels and amenity noise levels at the most-affected residential receivers.
details of likely daily charging/discharging load profile, manufacturer specification for plant and equipment and noise source inventory (including intensity, quantity, location, directivity and frequency information);	Details of the likely daily charging/discharging load profile is provided in Section 6.7.2.6 . Manufacturer specifications for plant and equipment and noise source inventory are provided in Appendix J .

Relevant SEARs	
- an assessment of 'worst case' noise emission scenarios during periods of discharging and charging;	Section 6.7.2.6 outlines the worst-case noise emissions scenarios during operation and Section 6.7.5 provides an assessment of this scenario.
- consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area; and	Section 6.7.2.4 considers annoying characteristics of noise and Section 6.7.2.4 and Section 6.7.2.6 outline the consideration of meteorological conditions in the noise modelling.
- details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration impacts following application of these mitigation measures and details of any proposed compliance monitoring programs.	Consideration of potential residual noise impacts is provided in Section 6.7.5.3 . Section 6.7.6 provides the mitigation and management measures, including compliance monitoring, to adequately manage noise impacts.

6.7.2 Methodology

A Noise and Vibration Impact Assessment (NVIA) was undertaken by AECOM (2026) to assess the potential noise and vibration impacts during construction and operation of the Project. The NVIA is included in **Appendix J** and summarised in this section.

6.7.2.1 Policies and guidelines

The assessment was undertaken in accordance with the following policies and guidelines:

- *Interim Construction Noise Guideline* (DECC, 2009) (ICNG)
- *Construction Noise and Vibration Guideline (Public Transport Infrastructure)* (TfNSW, 2023)
- *NSW Road Noise Policy* (DECCW, 2011) (RNP)
- *Noise Policy for Industry* (NSW EPA, 2017) (NPfI)
- POEO Act
- *Assessing Vibration: a technical guideline*, Department of Environment and Conservation (DEC), 2006).

6.7.2.2 NVIA methodology

The NVIA involved the following steps:

- Identifying noise sensitive receivers potentially impacted by the Project
- Establishing the existing background noise levels through ambient noise monitoring
- Undertaking a construction noise and vibration impact assessment:
 - Determining Project-specific construction noise management levels applicable to the identified sensitive noise receivers
 - Assessment of the noise generated during construction, including that arising from additional traffic generated by the Project
 - Assessment of the impacts of vibration generated during construction.
- Undertaking an operational noise and vibration impact assessment:
 - Determining Project specific noise trigger levels applicable to the identified sensitive noise receivers

- Assessment of the noise generated during operation, including that arising from additional traffic generated by the Project
- Assessment of the impacts of vibration generated during operation.
- Identification of appropriate mitigation measures to avoid, reduce or manage the Project's construction and operational noise and vibration impacts.

6.7.2.3 Establishing existing noise background levels

Baseline noise monitoring was undertaken to establish the existing ambient and background noise levels.

Unattended noise measurements were conducted with a noise logger located within the boundary of the site at 1309 Wine Country Drive from 4 April to 24 April 2024 (the sample period).

Attended noise measurements were undertaken at the same location as unattended monitoring on 24 April 2024. The measurement was conducted during the daytime period over a 15-minute duration.

The location of the unattended and attended noise measurements is shown in **Figure 6.7-1**.

Monitoring data collected during the sample period that was affected by severe weather conditions or extraneous noise events were excluded from the monitoring, in accordance with NPfI.

From the monitoring data the L_{A1} , L_{A10} , L_{A90} , and L_{Aeq} levels of the noise environment were determined. The L_{A1} , L_{A10} and L_{A90} noise levels are the levels exceeded for 1%, 10% and 90% of the sample period respectively. The L_{Aeq} noise level is the equivalent continuous sound level of the sample period. This level has the same sound energy as the actual noise environment.

The L_{A90} noise levels were analysed to determine a single acoustic background level (ABL) for each day, evening, and night period in accordance with NPfI. The background noise level, or rating background level (RBL) representing the day, evening and night-time assessment periods was then determined based on the median of individual ABLs over the entire sample period.

The L_{Aeq} noise level and the L_{A90} noise level for the day, evening and night-time periods are provided in **Section 6.7.3.1**. The results of each day of measurements are included in **Appendix J**.

6.7.2.4 Construction noise assessment approach

Construction work hours

As detailed in **Section 3.4.1**, construction work would occur during recommended standard hours, as outlined in the ICNG, being:

- Monday to Friday 7.00 am to 6.00 pm
- Saturday 8.00 am to 1.00 pm
- No works on Sundays and Public Holidays.

Electrical fit-outs inside the combined switch and control room building and battery units may be completed outside of standard working hours in accordance with an Out of Hours Work procedure.

These works, which would mainly be conducted using hand tools, are unlikely to be noisy and would be unlikely to result in exceedances at nearby sensitive receivers. These activities have therefore not been considered in the construction noise assessment.

Emergency situations, where work is required to prevent harm to persons or property may also be carried out during out of hours periods. The scope and timing of work associated with emergency situations is unknown, these activities are therefore excluded from the construction noise assessment.

Construction noise criteria

The ICNG applies to the management of construction noise in NSW.

Noise levels resulting from construction activities that are predicted at noise sensitive receivers (e.g. residences, schools, hospitals, places of worship and active recreation areas) are compared to the noise management levels (NMLs) determined in accordance with the ICNG.

Where an exceedance of the NMLs is predicted, the ICNG advises that receivers can be considered 'noise affected' and all feasible and reasonable practices applied to minimise the noise impact.

If construction noise levels at a residential receiver reach 75 dB(A), the receiver is considered to be 'highly noise affected' and restrictions to the hours of construction to provide respite periods are to be considered.

Project-specific NMLs for noise sensitive residential receivers have been calculated for standard construction hours based on the RBL determined from the unattended background noise measurements. All noise sensitive receivers for the Project are considered residential. There are no commercial or industrial receivers in the vicinity of the site.

The construction NML applicable to residential receivers near to the Project are set out in **Table 6.7-2**.

Table 6.7-2: Construction noise management levels, $L_{Aeq,15min}$ at residential receivers

Standard construction hours (RBL + 10)	Outside standard hours (RBL + 5 dB(A))		Highly noise affected level
	Evening	Night	
45 dB(A)	40 dB(A)	39 dB(A)	75 dB(A)

Criteria for noise arising from construction traffic on public roads is determined using the RNP. Under the RNP, thresholds for construction traffic noise increases are:

- 2 dB(A) increase or less: considered negligible and no further assessment required
- Greater than 2 dB(A): further consideration is required against the road category specific criteria (reproduced from the RNP in **Table 6.7-3**. Exceedances of road category specific criteria may require further assessment or mitigation.

Table 6.7-3: Road traffic noise assessment criteria

Road category	Road traffic noise assessment criteria, dB(A)	
	Day (7am 10pm)	Night (10pm 7am)
Local roads	$L_{Aeq}(1 \text{ hour})$ 55 dB(A)	$L_{Aeq}(1 \text{ hour})$ 50 dB(A)
Freeway/arterial/ sub-arterial roads	$L_{Aeq}(15 \text{ hour})$ 60 dB(A)	$L_{Aeq}(9 \text{ hour})$ 55 dB(A)

Construction noise modelling scenarios and noise sources

Based on the anticipated staging of construction activities, a number of construction noise scenarios were modelled for the assessment:

- Scenario 1 – Enabling works
- Scenario 2 – Structural, civil, mechanical and electrical works
- Scenario 3 – Commissioning
- Scenario 4 – Finishes and demobilisation.

For the construction noise assessment, only the three noisiest construction scenarios were assessed:

- Scenario 1 – Enabling works
- Scenario 2 – Structural, civil, mechanical and electrical works
- Scenario 4 – Finishes and demobilisation.

Table 6.7-4 provides a summary of the construction plant and equipment proposed to be used during each scenario, their associated sound power levels (SWL).

Table 6.7-4: Construction noise sources

Construction Scenario	Equipment	SWL per unit, dB(A)
1 – Enabling works	Excavator (5 t)	102
	Front end loader	104
	Truck – dump	110
	Grader	114
	Truck – road	108
	Compactor	101
	Truck – water	113
	Light vehicle (4WD)	103
	Bulldozer	111
	Tub grinder/mulcher	116 ¹
	Chainsaw	114 ^{2,3}
	Diesel generator	103
2 – Structural, civil, mechanical and electrical works	Hand tools	94
	Crane – franna	97 ²
	Vibratory roller	109
	Diesel generator	103
	Pump – concrete	109
	Front end loader	104
	Bobcat	104
	Truck – dump	110
	Excavator (5t)	102
	Grader	114
	Compactor	101
	Truck – water	113
	Truck – concrete	109
	Elevated work platform	97
	Grinder	105 ^{2,3}
	Saw – concrete	118 ^{1,2,3}
	Backhoe	111
	Light vehicle (4WD)	103
3 – Commissioning	Diesel generator	103
	Crane – franna	97 ²
	Light vehicle (4WD)	103
	Elevated work platform	97

Construction Scenario	Equipment	SWL per unit, dB(A)
4 – Finishes and demobilisation	Backhoe	111
	Compactor	101
	Truck – water	113 ¹
	Light vehicle (4WD)	103

Notes:

1. For modelling purposes, the SWL of the loudest piece of equipment in each scenario will represent the overall SWL of the scenario/activity.
2. Sound powers are time weighted (i.e. expected utilisation percentage per 15-minute period) in accordance with the following:
 - a. Concrete saw; chainsaw; grinder – 33%
 - b. Franna – 75%
3. Equipment with special audible characteristics, likely to cause annoyance due to tonality, low frequency noise, impulsive or intermittent noise events. Penalty of +5 dB included in the sound power level.

Construction noise prediction levels

Noise levels arising from construction activities in **Table 6.7-4** were predicted at nearby noise sensitive receivers using the noise modelling software SoundPLAN version 8.2 (industrial standard). A noise model was created to represent 'reasonable' worst-case periods of construction works. The following features were included in the noise model:

- Ground topography
- Ground absorption and reflection
- Meteorological conditions
- Receivers
- Construction noise sources.

Predicted noise levels for all scenarios were assessed during the day only, as all major construction work is expected to be completed during standard construction hours only.

The ICNG recommends assessing sleep disturbance impacts if construction works are planned to extend over more than two consecutive nights. Works outside standard construction hours are not proposed over more than two consecutive nights. Therefore, a sleep disturbance assessment has not been undertaken.

For modelling purposes, the SWL of the loudest piece of equipment in each scenario represents the overall SWL of the scenario. For all construction noise modelling scenarios, plant and equipment is assumed to be operating at the Project Area boundary closest to each noise sensitive receiver, to present the worst-case scenario for each receiver. Identified sensitive receivers and their approximate distances to the Project are outlined in **Section 6.7.3.2**. Neutral atmospheric conditions (i.e., relatively calm, no wind) were assumed for the modelling scenario.

In accordance with RNP, an initial screening test was undertaken to evaluate whether existing road traffic noise levels would increase by more than 2 dB(A) during the peak construction periods. Predicted vehicle volumes for the peak construction periods were assessed against existing traffic volumes in October 2025. Further details are provided in **Section 6.7.2.4**.

Section 6.7.4 summarises the results of the construction noise impact assessment.

6.7.2.5 Construction vibration assessment approach

An assessment of the potential for vibration impacts during construction has been undertaken with respect to both human comfort and structural damage for the nearest residential receivers.

Vibration-producing plant and equipment likely to be used during construction include compactors and vibratory rollers.

Construction vibration impacts have been assessed based on the minimum working distances (up to 25 m for cosmetic damage, and up to 100 m for human comfort) in Appendix D of the *Construction Noise and Vibration Guideline (Public Transport Infrastructure)*.

6.7.2.6 Operational noise assessment approach

Operational noise criteria

Project-specific noise criteria for operation has been established using the procedure set out in the NPfI. The assessment procedure for industrial noise sources has two components that must be satisfied:

- Controlling intrusive noise impacts in the short term for residences
- Maintaining noise level amenity for residences and other land uses.

Project-specific criteria is selected as the lowest of the intrusive noise or amenity noise criteria:

- Intrusive noise criteria** is calculated as the RBL + 5 dB(A) and protects against significant changes in noise levels as a result of industrial development
- Amenity noise criteria** is determined from recommended amenity noise levels in the NPfI that protects against noise impacts such as speech interference, community annoyance and some sleep disturbance, and against cumulative noise impacts from industry.

As detailed in the NPfI, to ensure that residential noise levels (existing plus new) remain within the recommended amenity noise levels for an area, Project amenity noise levels for each new source of industrial noise are recommended to be 5 dB(A) lower than the recommended amenity levels in the NPfI.

These two criteria are then used to determine the Project noise trigger level. If it is predicted that the Project is likely to result in noise levels which exceed the Project noise trigger levels at existing noise sensitive receivers, then mitigation measures need to be considered to reduce the predicted noise level.

The Project noise trigger levels for the Project are presented in **Table 6.7-5**.

Table 6.7-5: Project-specific operational noise levels

Receiver type	Period	RBL, dB(A)	Intrusive criterion $L_{Aeq, 15 \text{ min}}$, dB(A)	Amenity criterion, $L_{Aeq, 15 \text{ min}}$, dB(A)	Project trigger level $L_{Aeq, 15 \text{ min}}$, dB(A)
Residential	Day	35	40	58	40
	Evening	35	40	48	40
	Night	34	39	43	39

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level.

Fact Sheet C in the NPfI sets out corrections for annoying characteristics. The corrections are to be applied having regard to:

- The contribution noise level from the premises when assessed/measured at a receiver location
- The nature of the noise sources and its characteristics.

The criteria for noise generated by operational traffic on public roads are the same as those used for construction traffic, as detailed in **Section 6.7.2.4**.

Baseline operational scenario

Noise emitted from the existing Rothbury Zone Substation has been included in the baseline operational noise scenario for noise modelling purposes. No audible noise was observed from the

existing Rothbury Zone Substation during attended measurements. Previously tested SWL of the substation transformers have therefore been used in modelling the existing substation noise.

As outlined in **Section 1.4.3**, Ausgrid plans to install a HV transformer at the Rothbury Zone Substation. These works would be assessed and determined by Ausgrid separately in accordance with Part 5 of the EP&A Act. As the HV transformer would be operational before the construction and operation of the Project, the predicted SWL associated with the HV transformer has also been included in the baseline operational scenario for the noise modelling.

Further details on the existing noise levels observed during the attended and unattended noise monitoring are provided in **Section 6.7.3.1**.

Operational noise sources

Table 6.7-6 provides a summary of the noise-emitting equipment proposed to operate during the Project's operational stage. These include containerised battery units and transformers. SWLs typical of this equipment have been used for the assessment and are included in **Table 6.7-6**.

Operational noise sources did not exhibit tonal characteristics; therefore, no tonality modifying factor under Fact Sheet C of the NPfI was applied.

Table 6.7-6: Operational noise sources

Noise source	Quantity	Acoustical usage factor (%)	Sound Power Level, dB(A)
Battery units	Up to 148	100	95 (100% duty cycle)
Transformers	Up to 37	100	77

The likely load profile for the battery units would comprise charging during the day and discharging in the evening peak period. If there is a network incident or high demand from the grid, the charging and discharging profile would change to periods outside of these times.

In addition, a backup diesel generator was also included as an operational noise source. However, the backup diesel generator will only activate during emergency shut-down periods, e.g. during lightning events when there is no power and the battery units would be disabled. The generator would power only essential control room functions during emergencies and would not supply power to charge the disabled battery units, nor would it replace the power that the batteries would have provided to the NEM. The only instance where the backup diesel generator and the Project will both be in operation is during routine maintenance testing of the generator.

Operational noise level predictions

SoundPLAN version 8.2 noise modelling software was used to predict the potential noise levels resulting from the Project's operational activities at nearby noise sensitive receivers. The noise model considered significant noise sources and locations, screening effects, receiver locations, ground topography and noise attenuation due to geometrical spreading, air absorption, ground absorption and the effects of the prevailing weather conditions.

The approach to predicting noise generated by operational traffic on public roads was the same as the approach used for predicting noise associated with construction traffic, as detailed in **Section 6.7.2.4**.

6.7.3 Existing environment

6.7.3.1 Rating background levels

Unattended noise monitoring

The existing overall representative ambient noise level and the RBLs for the day, evening and night-time periods for the sample period are presented in **Table 6.7-7**.

The overall representative L_{Aeq} noise levels were determined by logarithmically averaging each assessment period for the entire monitoring period. Some periods of noise logging were excluded due to adverse weather. The data were processed in accordance with NPfI.

Table 6.7-7: Existing background (L_{A90}) and ambient (L_{Aeq}) noise levels

Noise logger ID	Location	L _{A90} RBL, dB(A)			Log average noise (ambient) L _{Aeq} levels dB(A)		
		Day	Evening	Night	Day	Evening	Night
NL1	1309 Wine Country Drive, southern boundary	35	(42) 35 ¹	34	53	50	45

Notes:

1. Measured evening RBL in brackets. According to the Noise Policy for Industry, the community generally expects greater control of noise during the more sensitive evening period than during the less sensitive daytime period. Therefore, the evening RBL has been set to be equal to the daytime RBL.

Attended noise monitoring

The results of the attended noise monitoring are presented in **Table 6.7-8**. The daytime measurement during attended monitoring indicates that residential receivers are not heavily affected by road traffic noise.

Table 6.7-8: Attended noise measurements

Noise source	Date and time	L _{Aeq} dB(A)	L _{A90} dB(A)	Comments
1309 Wine Country Drive, southern boundary	24/04/2024	45	35	Distant road traffic noise on Wine Country Drive, 38-41 dB(A). Bird noise and light cicada noise. Small truck passby on Old North Road, 56-62 dB(A). Car passbys on Old North Road, 51-62 dB(A).

6.7.3.2 Sensitive receivers

The NVIA identified eight nearby noise sensitive residential receivers that could be affected by the Project, as outlined in **Table 6.7-9** and shown in **Figure 6.7-1**.

Table 6.7-9: Nearby sensitive receivers

Receiver	Address	Land use classification	Approximate distance from Project (m)
R1	2 Blackburn Close, Lovedale	Residential	217
R2	803 Old North Road, Rothbury	Residential	415
R3	1337 Wine Country Drive, Rothbury	Residential	272
R4	864 Old North Road, Rothbury	Residential	198
R5	1294 Wine Country Drive, Lovedale	Residential	453
R6	Lot 2 DP84870, Rothbury	Residential	710
R7	1338 Wine Country Drive, Rothbury	Residential	237
R8	39 Blackburn Close, Lovedale	Residential	319

Notes:

1. The winery and residence at 803 Old North Road, Rothbury, has conservatively been assessed together as one sensitive receiver.
2. At the time of the noise monitoring, this property was listed as a guest house/hotel, but it has been conservatively assessed as residential for the purpose of this assessment.

**FIGURE 6.7-1:
NOISE MONITORING LOCATION
AND NOISE SENSITIVE
RECEIVERS**



Legend

- The site
- Project Area
- Noise monitoring location

Sensitive receiver

- Residential

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6.7.4 Construction noise impact assessment

6.7.4.1 Predicted construction noise levels

The predicted construction noise levels for residential receivers derived from the modelling have been assessed against the standard construction hours NMLs. The results of this assessment are provided in **Table 6.7-10**.

Table 6.7-10: Predicted construction noise levels - standard hours (exceedances shown in bold)

Receiver	Standard hours NML, dB(A)	Highly affected level, dB(A)	Construction scenario		
			1 Enabling works (dB(A))	2 Structural, civil, mechanical and electrical works (dB(A))	4 Finishes and demobilisation (dB(A))
R1	45	75	58	58	56
R2	45	75	55	53	52
R3	45	75	56	56	53
R4	45	75	60	59	57
R5	45	75	49	50	47
R6	45	75	45	46	42
R7	45	75	58	56	55
R8	45	75	54	54	51

The results show that construction noise levels are predicted to exceed the NMLs during standard hours at all receivers during the assessed construction scenarios except at R6 during Scenario 1 and Scenario 4. The largest exceedance is up to 15 dB(A) at R4 during Scenario 1. There are no receivers predicted to be 'highly affected' for the construction scenarios assessed.

Mitigation measures to address construction noise impacts to residential receivers are outlined in **Section 6.7.6**.

The ultimate level of impact may change depending on the final construction methodology and detailed design, and further assessment would be undertaken prior to construction, as required.

6.7.4.2 Construction traffic noise assessment

The assessment has considered the potential road traffic noise impacts associated with the use of Wine Country Drive and Old North Road as the construction access route for the Project.

Predicted vehicle volumes during peak construction periods were assessed against existing traffic volumes to determine relative increase in noise emissions. Existing traffic volumes, provided by Trans Traffic Survey, were extracted from traffic count data undertaken between 15 and 21 October 2025.

The resultant noise level change on Wine Country Drive and Old North Road from additional construction traffic volumes is presented in **Table 6.7-11** and was found to be no more than 2 dB(A) at residential receivers along both roads. As such, the Project is expected to be compliant with the road traffic noise criteria during construction, and no consideration of traffic noise mitigation measures is required.

Table 6.7-11: Predicted construction traffic noise

Road	Existing traffic (vehicles per day)		Project related traffic (vehicles per day)		Relative noise increase, dB(A)
	Light	Heavy	Light	Heavy	
Wine Country Drive	31,892	5,841	268	40	0.0
Old North Road	1,850	157	268	0	0.8

6.7.4.3 Construction vibration assessment

Construction activities will involve the use of compactors, vibratory rollers and excavators, which are expected to generate some ground-borne vibration during various construction scenarios.

The nearest sensitive receiver (R4) to the Project is located approximately 198 m from the Project Area, which exceeds the minimum working distances (up to 25 m for cosmetic damage, and up to 100 m for human comfort) from the *Construction Noise and Vibration Guideline (Public Transport Infrastructure)*. Therefore, any cosmetic damage and/or human discomfort resulting from vibration at this receiver would be unlikely.

As there are no vibration sensitive receivers within the minimum working distances, no further assessment of construction vibration is deemed necessary.

6.7.5 Operational noise impact assessment

6.7.5.1 Predicted operational noise levels

For the unmitigated operational scenario, predicted operational noise levels exceed the Project-specific noise criteria at the majority of noise sensitive receivers assessed, with the highest exceedances occurring during the night-time period.

To mitigate the operational impact on nearby sensitive receivers, permanent noise barriers in proximity to the battery units have been included as a component of the Project. The barriers extend partially along the western boundary and completely enclose the southern and eastern boundaries of the battery units. The barriers would have a maximum height of 8 m. The noise barriers would be lined with absorptive material on the internal sides, facing the Project equipment. The indicative location of the noise barriers is shown in **Figure 6.7-2**.

**FIGURE 6.7-2:
NOISE BARRIER LOCATION**



Legend

-  The site
-  Project Area
-  Containerised battery units
-  8m noise barrier
-  Main road
-  Watercourse

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6.7.5.2 Predicted operational noise levels with mitigation applied

Predicted noise levels from the Project with the proposed noise barriers in place are shown in **Table 6.7-12**. Noise levels would be slightly lower under neutral weather conditions than those presented in the table.

A +5 dB(A) increase has been applied to the daytime Project noise trigger level due to the backup diesel generator being a single-event noise source of 15 minute to 1 hour duration, in accordance with the NPfI.

Minor exceedances of the Project trigger levels, in the order of 1 dB(A), are predicted at three sensitive receivers (R1, R3 and R7) during the night-time period. Receiver R1 is also predicted to experience a 2 dB(A) exceedance at night.

In accordance with the NPfI, exceedances up to 2 dB(A) represent a minor impact that is considered barely perceptible. These exceedances are considered negligible if all feasible and reasonable noise mitigation measures have been considered.

With the implementation of the feasible and reasonable noise mitigation and management measures outlined in **Section 6.7.6**, no residual impacts are expected.

Table 6.7-12: Predicted operational noise levels for all receivers with barrier mitigation

Receiver	Project noise trigger level, $L_{Aeq,15min}$, dB(A)			Predicted L_{Aeq} , noise level, dB(A)			Exceedance, dB(A)		
	Day (with backup generator)	Day and Evening	Night	Day (with backup generator)	Day and Evening	Night	Day (with backup generator)	Day and Evening	Night
R1	45	40	39	41	41	41	-	1	2
R2	45	40	39	39	39	39	-	-	-
R3	45	40	39	40	40	40	-	-	1
R4	45	40	39	40	39	39	-	-	-
R5	45	40	39	37	37	37	-	-	-
R6	45	40	39	30	29	29	-	-	-
R7	45	40	39	40	40	40	-	-	1
R8	45	40	39	38	38	38	-	-	-

6.7.5.3 Operational traffic noise assessment

Periodic maintenance staff and contractors are expected to visit the Project; however, it would primarily operate as an unmanned facility. Minimal traffic generation is expected as a result of the operation of the Project.

Noise impacts arising from the Project's operational traffic are not expected to result in an increase of more than 2 dB(A). As such, the Project will be compliant with the road traffic noise criteria during operation.

6.7.6 Mitigation and management measures

Mitigation measures are proposed to reduce the potential noise impacts of the Project to sensitive receivers. The relevant measures that would be implemented during detailed design, construction and operation of the Project are detailed in **Table 6.7-13**.

Table 6.7-13: Mitigation and management measures – noise and vibration

ID	Mitigation/management measure	Timing
NV-1	A Construction Noise and Vibration Management Plan (CNVMP) will be developed and implemented as part of the CEMP. The CNVMP will include as a minimum: • Identification of nearby residences and other sensitive land uses • Description of approved hours of work • Description and identification of all construction activities, including work areas, equipment, and duration • Description of what work practices (generic and specific) will be applied to minimise noise • A complaints handling process, including a protocol for recording all complaints • Noise monitoring and reporting procedures • Overview of community consultation required for identified high impact work.	Pre-construction Construction
NV-2	Sensitive receivers located within 200 m of the active construction area, or at locations where construction noise is predicted to exceed the relevant construction noise management levels will be notified at least seven days prior to the commencement of noise-generating construction activities. Notification will be limited to receivers likely to experience construction noise impacts and will include details of: • The location, timing and duration of construction works • The proposed hours of work • Expected construction noise and vibration levels relative to guideline criteria • Mitigation measures being implemented to minimise noise impacts • A Project contact for enquiries or complaints. Where unplanned or short-term works are required that result in temporary exceedances of noise criteria, impacted receivers will be notified as soon as practicable.	Construction

ID	Mitigation/management measure	Timing
NV-3	Construction activities will be undertaken during standard daytime working hours, as defined in the Interim Construction Noise Guidelines (ICNG). High-noise activities during construction may include, but are not limited to, the use of concrete saws, grinders, chainsaws and mulchers. Works predicted to generate noise at residences above the 'highly noise affected' noise management level of 75 dB(A) will be scheduled during less sensitive daytime periods. Affected receivers will be notified in accordance with the Project's construction noise management procedures.	Construction
NV-4	The offset distance between noisy plant and sensitive receivers will be maximised, where feasible. Noise-emitting plant will be directed away from sensitive receivers where feasible and will be regularly inspected and maintained to ensure it is in good working order. Plant used intermittently will be throttled down or shut down. Plant and vehicles will be turned off when not in use.	Construction
NV-5	Quieter construction methods will be used where feasible and reasonable, such as the use of rubber-wheeled plant instead of steel tracked plant. Where mobile plant is used, noise will be minimised through appropriate measures, including residential-grade mufflers and the silencing of air parking brake engagement. Where any of these measures are not implemented, the Contractor must document the reasons why they are not feasible or reasonable, including any technical, safety or operational constraints. This justification will be recorded in Project environmental records and made available as part of routine CEMP compliance reporting.	Construction
NV-6	Stationary noise sources will be enclosed or shielded as far as practicable whilst ensuring that the occupational health and safety of workers is maintained.	Construction
NV-7	Traffic flow, parking and loading/unloading areas within the Project Area will be planned to minimise reversing movements (and hence triggering reversing alarms). Non-tonal reversing beepers (or an equivalent mechanisms) will be fitted and used on all construction vehicles and mobile plant regularly used onsite.	Construction
NV-8	Loading and unloading of materials/deliveries will occur as far as possible from sensitive receivers. Delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible. Truck drivers will be advised of construction access routes to the Project, parking locations, acceptable delivery hours and other relevant practices e.g. minimising the use of engine brakes, no extended periods of engine idling.	Construction

ID	Mitigation/management measure	Timing
NV-9	Permanent noise barriers will be installed around the Project to achieve compliance with the Project's operational noise trigger levels. At the detailed design stage, the operational noise model will be re-run using the final plant, technology specifications and site layout, including confirmation of source locations, sound power levels and operating scenarios. The height, length, location and design of the noise barriers will be reviewed and refined based on the updated noise modelling, including re-assessment of the proposed barrier dimensions. The final noise barrier design will be consistent with the outcomes of the detailed design noise assessment, rather than the indicative Noise and Vibration Assessment prepared for the EIS (Appendix J) and will be implemented accordingly.	Detailed design Construction Operation
NV-10	To verify operational noise compliance, attended noise measurements will be undertaken at the commencement of Project operation by a suitably qualified acoustic specialist, in accordance with Australian Standard <i>AS 1055 Acoustics – Description and measurement of environmental noise</i> and the <i>NSW Noise Policy for Industry</i>. The monitoring results will be used to confirm compliance with the Project's operational noise trigger levels. Where monitoring identifies exceedances of relevant criteria, additional reasonable and feasible mitigation measures will be investigated and implemented, which may include operational controls, further acoustic treatment or modifications to noise barriers. Attended noise measurements will also be undertaken in response to any substantiated noise complaints during operation, with results used to identify the source of noise and determine whether further mitigation or management measures are required. Monitoring outcomes and any actions taken will be documented and retained as part of the Project's operational environmental records.	Operation
NV-11	An Operational Noise Management Plan (ONMP) would be prepared and implemented for the Project prior to commencement of operation. The ONMP would set out the framework for managing operational noise to ensure compliance with the Project noise trigger levels and relevant assessment criteria. The ONMP would include, but not be limited to: • the applicable operational noise criteria and trigger levels • identification of operational noise sources and sensitive receptors • operational noise control and mitigation measures • a compliance monitoring and verification program, including monitoring locations, frequency and reporting • procedures for responding to noise complaints and non-compliance • roles and responsibilities for implementation and ongoing review of the ONMP.	Operation

6.8 Traffic and transport

6.8.1 Secretary's Environmental Assessment Requirements

Table 6.8-1 sets out the SEARs relevant to traffic and transport and where the requirements have been addressed in this EIS.

Table 6.8-1: Relevant SEARs – traffic and transport

Relevant SEARs	
Transport	Where addressed
The EIS must address the following specific matters:	
an assessment of the peak and average traffic generation, including light vehicles (including shuttle buses), heavy vehicles, heavy vehicles requiring escort, high risk heavy vehicles requiring escort (noting Table 1 in TfNSW Fact Sheet - Transport Management Plans for Over Size and/or Overmass Movements in NSW) and construction worker transportation (including during construction and during pre-construction works);	An assessment of peak and average traffic during construction, including light vehicles, construction workers, standard heavy vehicles, heavy vehicles requiring escort and high-risk oversize and/or OSOM vehicles requiring escort is included in Section 6.8.4 .
an assessment of the likely transport impacts to site access routes, road capacity, conditions, safety and intersection performance (including consideration of local climatic conditions, driver behaviour and crash data), taking into consideration the above listed vehicles, site access points and any crown land;	The preferred access routes for heavy vehicles and OSOM vehicles and the transport impacts to the access routes and site access point are discussed in Section 6.8.4.2. A review of the existing road safety data and casualty crash history is provided at Section 6.8.3.5.
a concept Level Route Analysis required for heavy vehicles requiring escort and high-risk heavy vehicles requiring escort;	There are no heavy vehicles requiring escort or high-risk heavy vehicles requiring escort proposed for this Project. As such this has not been provided.
a cumulative impact assessment of traffic from nearby developments (including mining operations); and	The cumulative traffic impacts of nearby developments are discussed in Section 6.8.7 and Section 6.14 .
- provide details of measures to mitigate and / or manage potential impacts (developed in consultation with the relevant road authorities) including: - a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), - strategic concept designs of proposed road upgrades (including the site access point); and - road maintenance contributions, and any other traffic control measures.	Mitigation measures to address traffic and transport impacts are provided in Section 6.8.8. Road upgrades required to facilitate the Project are discussed in Section 6.8.4.3. A schedule of all required road upgrades is provided in Table 6.8-5. Details on road maintenance contributions and other traffic control measures are outlined in Section 6.8.8. Further details will be provided in a Construction Traffic Management Plan (CTMP).

6.8.2 Methodology

A Traffic Impact Assessment (TIA) has been prepared by Amber Organisation Pty Ltd (Amber) (2026) to assess the potential traffic impacts of the Project during its construction, operation and decommissioning phases. The TIA is provided in **Appendix K** and is summarised in this section.

The TIA has been undertaken in accordance with the TfNSW *Guide to Transport Impact Assessment* (TfNSW, 2024) and relevant Austroads Guidelines and in consultation with Transport for NSW and Cessnock City Council. Further details on consultation are provided in **Chapter 5.0**.

Key aspects of the TIA include:

- Details of both light and heavy vehicle (including OSOM) traffic volumes and proposed transport routes
- An assessment of the potential traffic impacts of the Project on road network function and safety
- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the Project
- Details of measures to mitigate and/or manage potential impacts
- Details of access roads and how these connect to the existing road network, as well as their ongoing maintenance during operation
- Details of proposed road network upgrades to facilitate the Project.

6.8.2.1 Traffic surveys

Traffic surveys were undertaken to establish existing traffic conditions of the surrounding road network. These comprised turning movement counts at key intersections and a tube count survey of roads adjacent to the site.

Turning movement count surveys were undertaken at the following State road intersections on Thursday 16 October 2025, between 6:00am and 10:00am and from 3:00pm to 7:00pm:

- Wine Country Drive/Old North Road intersection
- Wine Country Drive/Blackburn Close intersection.

Seven day tube count surveys adjacent to the site, on Wine Country Drive and Old North Road, were completed between 15 and 22 October 2025 to establish the existing traffic volumes and speeds over a typical week.

The locations of the intersections, traffic surveys and tube count survey are shown in **Figure 6.8-1**.



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FIGURE 6.8-1:
INTERSECTION AND TRAFFIC
SURVEY LOCATIONS

Legend

- The site
- Project Area
- Turning movement count
- Tube count
- Blackburn Close
- Old North Road
- Wine Country Drive
- Watercourse

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6.8.2.2 Traffic assessment

A traffic assessment was carried out to determine the ability of the surrounding road network to accommodate traffic anticipated to be generated during construction, operation and decommissioning of the Project.

The assessment focused on the impacts of light and heavy vehicles, which are predicted to represent the typical traffic impacts of the Project on a day-to-day basis.

Traffic modelling was undertaken for the nearest intersections (Wine Country Drive/Old North Road intersection and Wine Country Drive/Blackburn Close intersection) using Signalised and Unsignalised Intersection Design and Research Aid (SIDRA) intersection modelling software. Modelled traffic volumes are based on the morning and evening peak hours of construction (i.e. the Project's worst-case traffic period).

A growth rate of 1.5% per annum over a two-year period has been conservatively applied to the background traffic to reflect future traffic volumes on the surrounding road network.

The core measures of intersection performance using SIDRA include:

- **Degree of Saturation (DoS)** – a direct measure of congestion level based on the ratio of demand or arrival flow to capacity. A degree of saturation greater than 1.0 indicates oversaturated conditions in which long queues of vehicles build up on critical intersection approaches (Austroads, 2020a)
- **95th percentile Back of Queue distance** - a statistical value which represents the queuing experienced at the approach to the intersection
- **Vehicle delay** – overall vehicle delay at the intersection
- **Level of Service (LOS)** - a qualitative measure used to describe the operating conditions of a section of road or an intersection. LOS scales from A (best) to F (worst). LOS A represents free-flow conditions and minimal delays, while LOS F indicates a forced flow with stop start operation, long queues and delays. The best indicator of the LOS at an intersection is the average delay experienced by vehicles at that intersection. The assessment of LOS is provided in **Section 6.8.4.5**.

The DoS, delay and queue length parameters are used together to assess intersection performance. The assessment considers the net change between the existing traffic conditions and the future scenario during construction or operation, at each intersection.

6.8.2.3 Route assessment

Appropriate routes for heavy vehicles (up to 26 m in length) and OSOM vehicles accessing the site during construction were determined based on a review of the National Heavy Vehicle Regulator (NHVR) Network maps (NHVR, 2025), including:

- NSW Oversize Overmass Load Carrying Vehicles Network Map (Transport for NSW, 2025a)
- Restricted Access Vehicles maps (Transport for NSW, 2025c)
- NSW Special Purpose Vehicle Network maps (Transport for NSW, 2025d)
- Vehicles and routing map for B-doubles (Transport for NSW, 2025b).

Further details of the proposed construction access routes are provided in **Section 6.8.4.2**.

6.8.2.4 Swept path assessment

A swept path assessment using Autodesk Vehicle Tracking software was undertaken to determine whether the proposed access routes would be able to accommodate simultaneous two-way traffic and safe entry and exit to the Project for all vehicle types. Outcomes of the swept path assessment are included in **Section 6.8.4.3**.

6.8.2.5 Turn treatment assessment

Austroads *Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings* (Austroads, 2020b) specifies the turning treatments required on a road at an unsignalised intersection. An assessment of the Wine Country Drive/Old North Road intersection was undertaken to ensure vehicles

can safely enter and leave. The assessment considered expected traffic volumes during the construction peak hours and the road network peak hours.

Details of the intersection upgrades required to comply with the Austroads Guide are provided in **Section 6.8.4.3**.

6.8.2.6 Sight distance assessment

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance which should be provided along the major road at any intersection.

A sight distance assessment has been undertaken for vehicles exiting the site onto Old North Road through to the intersection with Wine Country Drive. An appropriate design speed and reaction time has been adopted for the assessment and SISD determined in accordance with the Austroads Guide. A summary of the sight distance assessment is provided in **Section 6.8.4.4**.

6.8.3 Existing environment

6.8.3.1 Road network

The road network surrounding the Project is comprised of a combination of State and local roads. This network is summarised in **Table 6.8-2**. The key intersections are outlined in **Table 6.8-3**.

Table 6.8-2: Road network

Road	Typical width	Speed limit (km/hr)	Alignment
State roads			
Wine Country Drive	9 to 10 m wide providing a single lane of traffic in each direction with sealed shoulders.	80	General north-south alignment between New England Highway, Branxton and Allandale Road, Cessnock.
Local roads			
Old North Road	6 m wide facilitating two-way traffic movement. West of the site Old North Road is unsealed.	80	General northwest-southeast alignment between Hermitage Road, Pokolbin and Wine Country Drive, Rothbury.
Blackburn Close	5.5 m wide facilitating two-way traffic movement.	50	General east-west alignment extending for approximately 800 m from Wine Country Drive.

Table 6.8-3: Intersection summary

Road name	Intersecting road(s)	Configuration	Control/turn treatments
Old North Road	Wine Country Drive	T-intersection	The intersection of Wine Country Drive/Old North Road is controlled by Give Way signage and line marking, with priority given to vehicles on Wine Country Drive. Basic Left (BAL) and Basic Right (BAR) turn treatments are provided on Wine Country Drive at the intersection.
Blackburn Close	Wine Country Drive	T-intersection	The intersection of Wine Country Drive/Blackburn Close is controlled by Give Way signage and line marking, with priority given to vehicles on Wine Country Drive. A BAR turn treatment is provided on Wine Country Drive at the intersection.

6.8.3.2 Traffic volumes

Wine Country Drive/Old North Road

The survey results indicate the intersection currently carries a low–moderate level of traffic in the order of 565 vehicles in the morning peak hour (7:45am to 8:45am) and 551 vehicles in the evening peak hour (3:00pm to 4:00pm).

The majority of vehicle trips during the morning and evening peak periods are traffic movements along Wine Country Drive, with slightly more traffic movement towards the south during the morning peak hour. The survey results indicate that both roads accommodate a level of traffic consistent with their classification.

Wine Country Drive/Blackburn Close

The traffic survey data indicates that Wine Country Drive currently experiences a moderate level of daily traffic in the order of 6,526 vehicles per day. This is split relatively evenly between northbound and southbound trips.

The majority of movements along Wine Country Drive occur between 6:00am and 6:00pm with the peak hour recorded between 3:00pm and 4:00pm.

Heavy vehicles account for approximately 15.5% of the traffic using the road in both directions. The 85th percentile speed is 88.6 km/hr which is marginally lower than the speed limit of 90 km/hr. Since the survey was completed the speed limit of Wine Country Drive, between North Rothbury and Nulkaba, has been reduced to 80 km/hr.

Overall, the data indicates that Wine Country Drive currently accommodates a moderate level of traffic for its classification as a State road.

Old North Road

The traffic survey data indicates that Old North Road currently experiences a low level of daily traffic in the order of 311 vehicles per day. This is split relatively evenly between westbound and eastbound trips.

The majority of movements along Old North Road occur between 6:00am and 6:00pm with the peak hour recorded between 3:00pm and 4:00pm.

Heavy vehicles account for approximately 8% of the traffic using the road in both directions. The 85th percentile speed is 64.1 km/hr which is lower than the speed limit of 80 km/hr.

Overall, the data indicates that Old North Road currently accommodates a low level of traffic.

6.8.3.3 Public transport services

There are no routine public transport services within the vicinity of the site.

Four school bus routes (S852, S883, S893 and S954) operate along Wine Country Drive and provide access to schools within the region. These services stop at the informal school bus stop at the Wine Country Drive/Old North Road intersection generally between 7:30am-8:00am and 3:40pm-4:40pm on school days.

6.8.3.4 Restricted vehicle access

B-doubles

B-doubles are a combination of a prime mover towing two semi-trailers, all connected by B-couplings. There are certain rules and regulations that limit B-double access to particular roads. Old North Road is not rated for use by B-double vehicles. Approval from the Cessnock City Council would be required for use of B-double vehicles on this road.

Signage indicates that Old North Road is restricted to a gross load limit of 25 tonnes. The load limit is associated with the crossing of Black Creek, located approximately 500 m west of Wine Country Drive. Heavy vehicles associated with the Project are not proposed to travel across this creek crossing.

Further details are provided in **Section 6.8.4.2**.

OSOM vehicles

In general, OSOM loads exceed general access mass or dimension limits of 2.5 m wide, 19 m long, 4.6 m high and 4.5 tonnes (T) Gross Vehicle Mass. OSOM loads are defined as Class 1 vehicles under the Heavy Vehicle National Law. These vehicles are typically used to transport large, indivisible items, such as excavators and bulldozers.

The *NSW Oversize Overmass Load Carrying Vehicles Network Approved Roads map* (NHVR, 2025) shows that the State road network surrounding the Project is OSOM approved, with exception to Old North Road which is not rated for the use of OSOM vehicles. Approval would be required from Cessnock City Council for all OSOM vehicles travelling on Old North Road.

Special purpose vehicles (SPVs)

Vehicles built for a purpose other than carrying goods or passengers (such as a mobile crane, excavator or concrete pump) are defined as Special Purpose Vehicles (SPVs). These vehicles are considered Class 1 OSOM vehicles if they exceed mass or dimensional limits.

There are six SPV access networks for cranes travelling on approved State roads in NSW. Access to the site via the surrounding State road network is achievable for 5-axle all terrain cranes up to 60 tonnes (SPV Level 6 approved roads). Hunter Expressway and Wine Country Drive, which have been identified as access routes to the Project Area, are SPV Level 6 approved roads, subject to conditions. Old North Road is not rated for use by SPV Level 6 vehicles and would require approval from Cessnock City Council for Project use.

6.8.3.5 Crash history

The Centre for Road Safety Crash and Casualty Statistics (CRSCCS) database contains information of all recorded crashes in NSW. A search of the CRSCCS database over a five-year period from 2020 to 2024 was undertaken along Wine Country Drive and Old North Road for 1 km in each direction of the Wine Country Drive/Old North Road intersection.

The review indicated that no crashes were recorded for these sections of road in the past five years. Based on the results of the review, it was concluded that the road network is currently operating in a safe manner.

6.8.4 Construction impact assessment

6.8.4.1 Construction traffic generation

Standard construction traffic

The peak traffic generating potential of the Project is during the construction phase. Trips generated during this phase are primarily associated with the workforce accessing the Project and the delivery of raw materials and plant.

Day-to-day construction traffic comprises the following:

- Light vehicles – associated with transporting the workforce to and from the Project
- Heavy vehicles:
 - Rigid trucks (8 m to 13 m in length) – used to deliver raw materials and smaller plant
 - Truck and dog (up to 19 m in length) – used to transport the majority of materials to and from the site
 - Semi-trailers – used to transport larger equipment and materials
 - B-doubles (up to 26 m in length) – used to transport larger plant
 - Non-high risk OSOM (less than 26 m in length and under 3.5 m wide) – used to transport the battery units, as well as cranes, drum rollers, dump trucks, concrete pumps, excavators, graders, compactors, pile driving/drilling rig, and cable trenching and laying equipment.

OSOM vehicles

No high risk OSOM vehicles are anticipated to be required to construct the Project.

The largest vehicle expected to access the site during construction would be used to transport the battery units. This non-high risk OSOM vehicle would be kept under 3.5 m in width and 26 m in length. This vehicle would be permitted to travel on the Class 1 OSOM network and would therefore not require vehicle escort.

It is anticipated that any SPVs would be able to operate on the approved NSW SPV Network.

Old North Road is not rated for use by OSOM vehicles, including SPVs, and would require prior approval from Cessnock City Council.

Traffic volumes

During the peak construction period (6-month duration), the Project is anticipated to generate up to 190 vehicle trips per day, comprising 120 light vehicle trips and 70 heavy vehicle trips, noting that a vehicle trip represents a trip to or from the site. This would reduce to 95 vehicles trips per day during the average construction period. The forecast traffic volumes expected to be generated during construction of the Project are summarised in in **Table 6.8-4**.

Table 6.8-4: Traffic generation during construction

Vehicle type		Average construction period		Peak construction period	
		Vehicle trips per day (vpd)	Peak hour trips (vph)	Vehicle trips per day (vpd)	Peak hour trips (vph)
Light vehicles		60	30	120	60
Heavy vehicles	Rigid trucks	10	1	20	2
	Truck and dog	10	1	20	2
	Semi-trailers	8	1	16	2
	B-Doubles	2	0	4	0
	Non-High Risk OSOM	5	0	10	0
	HV subtotal	35	3	70	6
Total		95	33	190	66

6.8.4.2 Construction access routes

All construction traffic would access the site via the Hunter Expressway (M15) and Wine Country Drive (B82), which form part of the State Road network, and then along Old North Road, a local road.

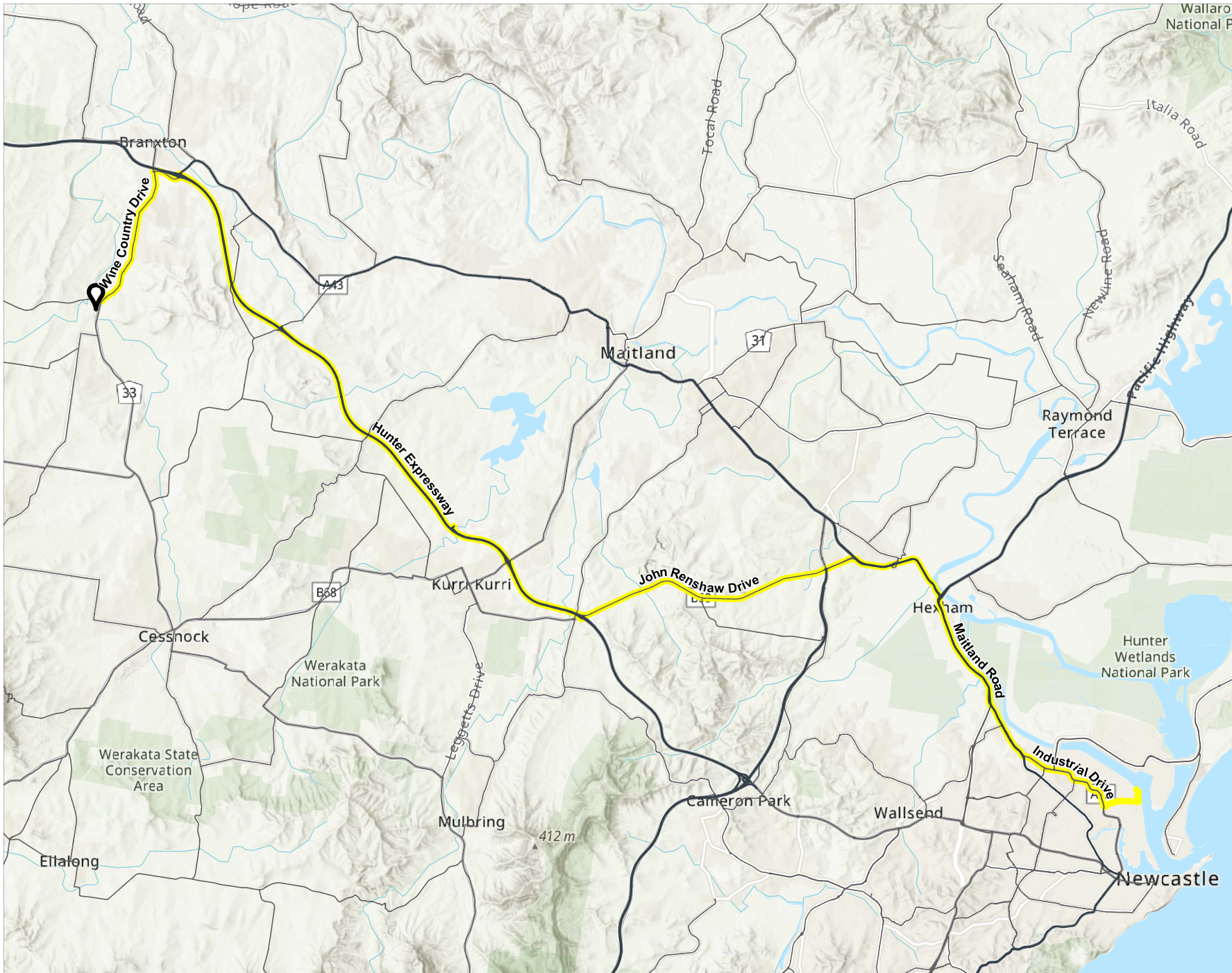
Materials and equipment would generally be sourced from the surrounding area where practicable, with larger plant, including the battery units, expected to be delivered from the Port of Newcastle or Port Botany. The proposed access routes for heavy vehicles from these ports to the site are shown in **Figure 6.8-2** and **Figure 6.8-3**, respectively.

These routes mostly use B-double approved roads within the Class 1 OSOM network; however, the Eastern Distributor and Sydney Harbour Tunnel cannot be used due to 4.3 m height limits and Dangerous Goods restrictions. As the battery units are Class 9 Dangerous Goods (refer to **Section 6.10**), heavy vehicles must use an alternative route west of Port Botany, with final routes to be confirmed through the NHVR permitting process.

Old North Road is unrated and not part of the approved B-double or OSOM network. Relevant permits to use the Old North Road for B-doubles and OSOM vehicles during construction would be obtained from the relevant roads authority prior to their use.

Vehicle access into the site from Old North Road would be from an existing driveway located approximately 70 m west of the Wine Country Drive/Old North Road intersection, as shown in **Figure 3-1**.

Old North Road has a speed limit of 80 km/hr; however, due to the short travel distance between the intersection of Old North Road and the Project entry/exit, it is unlikely that vehicles would be travelling at high speeds when approaching the site.



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FIGURE 6.8-2:
CONSTRUCTION ACCESS ROUTE
FROM PORT OF NEWCASTLE

Legend

- The site
- Construction access route
- Motorway
- Main road

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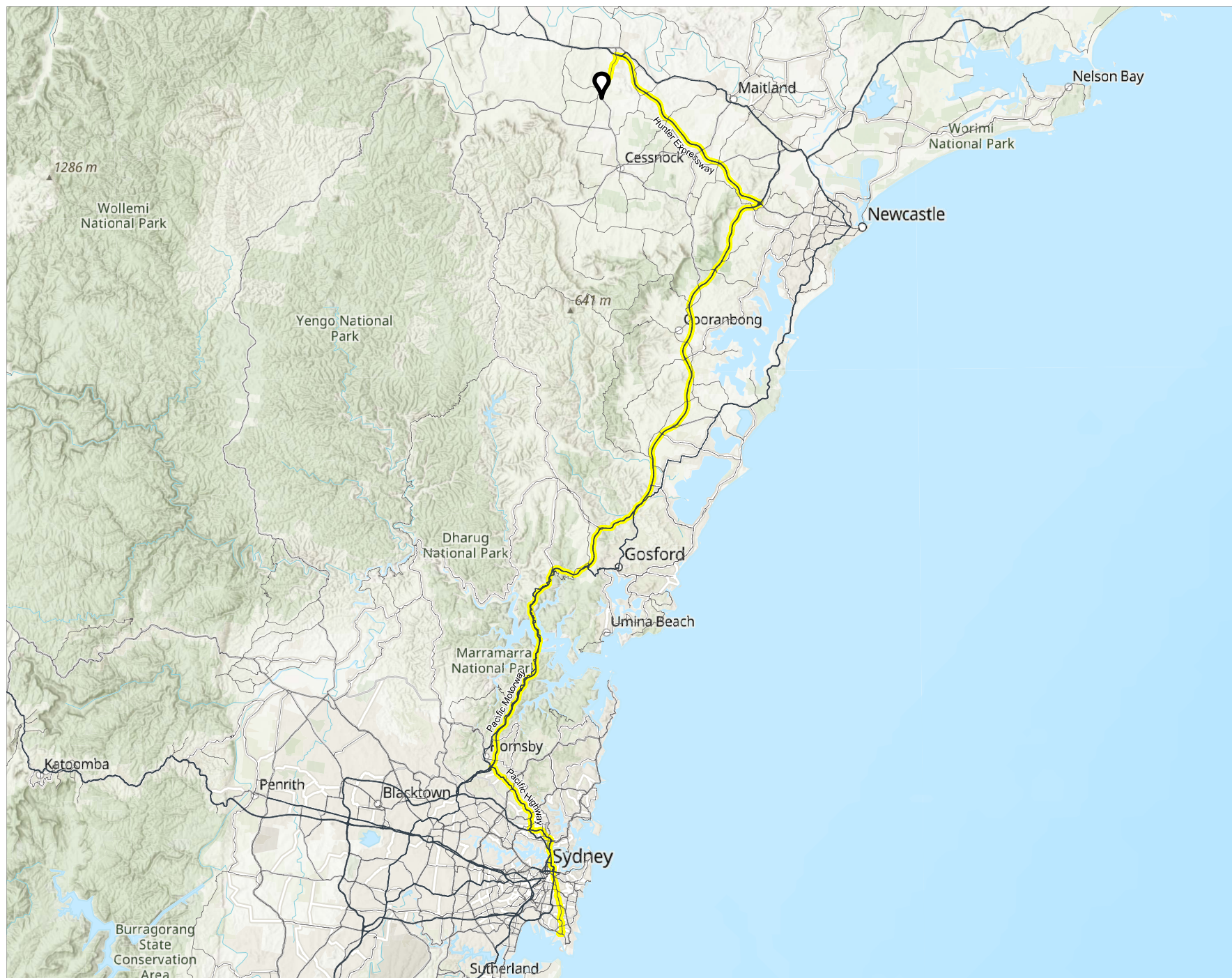
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FIGURE 6.8-3:
CONSTRUCTION ACCESS ROUTE
FROM PORT BOTANY



Legend

-  The site
-  Construction access route
-  Motorway
-  Main road

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6.8.4.3 Proposed road upgrades

The proposed road network upgrades outlined in **Table 6.8-5** are designed to meet the requirements of the Austroads *Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections* (Austroads, 2023) *Guide to Road Design Part 3: Geometric Design* (Austroads, 2021), ensuring the surrounding road network can safely and efficiently accommodate future traffic volumes associated with the Project.

Table 6.8-5: Schedule of proposed road network upgrades

Intersection/road	Requirement	Proposed upgrade
Wine Country Drive/Old North Road intersection	Upgrades at the intersection are required to accommodate construction traffic.	A proposed design would comprise a BAL and rural left-right staggered T-intersection, in accordance with the example design provided in <i>Austroads Guide to Road Design Part 4A</i> .
Old North Road	Increasing existing road width to align with rural road widths in Austroads Guide.	A proposed design would comprise increasing the sealed width of Old North Road between Wine Country Drive and the Project entry/exit. The design of any road widening on Old North Road would be undertaken in consultation with Council.

Project entry/exit

A swept path assessment has been completed for the site access based on B-double vehicle dimensions. The assessment found that 26 m long B-doubles can enter and exit the site; however, simultaneous two-way passing cannot occur by these vehicles at the Project entry/exit.

Given the low number of vehicles using Old North Road under existing conditions (less than 30 vehicles in the peak hours), that B-doubles would be limited to the construction phase of the Project only, and the low number of these vehicles accessing the site during the peak construction phase (up to seven B-double/battery unit vehicles per day), it is considered appropriate to manage heavy vehicle movements using traffic management measures rather than undertake widening at the Project entry/exit.

Heavy vehicles would be required to contact the site manager via radio to ensure there are no other heavy vehicles accessing the site at the same time. This appropriately manages traffic risk in this location given the low level of heavy vehicle movements during the peak construction phase and that exiting vehicles have good sightlines to vehicles on Old North Road. The details of the traffic management measures would be addressed within the CTMP for the Project.

6.8.4.4 Sight distance assessment

A sight distance assessment was undertaken for vehicles exiting the site onto Old North Road and for the Old North Road/ Wine Country Drive intersection.

Based on a design speed of 90 km/hr for Old North Road and a reaction time of 1.5 seconds, a Safe Intersection Sight Distance (SISD) of 201 m is required in the west direction for vehicles exiting the Project onto Old North Road, in accordance with Austroads *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*.

The available sight distance at the Wine Country Drive/Old North Road intersection is greater than 300 m in both directions, which exceeds the Austroads requirements for vehicles to safely enter and exit the State road network. Low level shrubs within the Council-managed road reserve at the Wine Country Drive/Old North Road intersection have the potential to cause minor obstructions to sightlines to the north. Engagement with Cessnock City Council will be undertaken prior to construction commencing to confirm that the vegetation is appropriately maintained by Council in accordance with its standard road maintenance practices, to ensure that sight distance is not adversely affected during construction.

For vehicles exiting the site onto Old North Road, a sight distance of 60 m through to the intersection with Wine Country Drive is achieved to the east, which is considered acceptable due to the fact that approaching vehicles would be travelling at slow speeds, having just turned off Wine Country Drive onto

Old North Road. To the west on Old North Road the sight distance is more than 250 m, which satisfies the SISD requirement of 201 m.

6.8.4.5 Road network and intersection performance

Traffic volumes are expected to be highest during the peak construction period. SIDRA analysis for the two modelled intersections, Wine Country Drive/Old North Road and Wine Country Drive/Blackburn Close, indicates that during construction both will operate at a good LOS (LOS A) for all approaches during the morning and evening peak hours, with negligible queue lengths on all approaches. Average delays per vehicles are forecast to be no greater than 1.4 seconds during peak periods. The DoS for both intersections during peak hours is less than 1.0 which indicates no oversaturation.

Accordingly, both intersections are expected to operate efficiently throughout the peak construction period, with minimal queuing and delays.

6.8.4.6 Public transport services

There are no regular public transport services near the site; however, four school bus services travel along Wine Country Drive and stop at the informal school bus stop at the Wine Country Drive/Old North Road intersection. Construction of the Project may temporarily affect the operation of this stop. Appropriate mitigation and management measures to minimise impacts are provided in **Section 6.8.8**.

6.8.4.7 Construction vehicle parking

Sufficient car parking would be provided onsite for staff during construction to ensure vehicles do not park on the surrounding road network. Therefore, there is not anticipated to be any on-street parking impacts during construction of the Project.

6.8.5 Operational impact assessment

6.8.5.1 Operational traffic generation

During operation, the Project is expected to generate a low amount of traffic, with a maximum of four vehicle movements anticipated per week, associated with maintenance personnel accessing the site.

There would also be occasional heavy vehicles delivering to the site, but only as required for maintenance.

6.8.5.2 Operational routes

Access routes

All operational traffic would utilise the same access routes outlined in **Section 6.8.4.2**, with all vehicles accessing the site via the Project entry/exit point shown in **Figure 3-1**. These access routes are suitable to accommodate the anticipated operational traffic generated by the Project. B-double vehicles are not expected to be required during the operational phase.

Road upgrades

No additional road upgrades would be required to accommodate the Project's operational traffic. All road network upgrades delivered during construction would remain during operation and would be maintained by Cessnock City Council or Transport or NSW, as applicable, in accordance with their standard road maintenance practices.

6.8.5.3 Road network and intersection performance

The increase in traffic of up to four vehicle movements per week during operation would result in a negligible change to the existing traffic environment. Accordingly, the road network is able to readily accommodate the traffic generated by the Project during operation.

6.8.5.4 Public transport services

Given the low number of vehicles accessing the operational Project, no impacts on public transport services, including the four school bus services, are anticipated during operation.

6.8.5.5 Operational vehicle parking

Onsite parking spaces would be provided during operation, which would be sufficient to accommodate one to two maintenance personnel accessing the site per week. On-street parking would not be required and there would be no offsite parking impacts during operation.

6.8.6 Decommissioning impact assessment

The Project has an anticipated operational life of 50 years. At the end of its operational life, above ground infrastructure would be dismantled and removed from the Project Area.

Traffic generation during decommissioning would be similar to that during the average construction period. A Decommissioning Traffic Management Plan would be prepared prior to the decommissioning phase in consultation with the relevant road authorities. This would aim to maintain road safety and road network operations during decommissioning.

6.8.7 Cumulative traffic impacts

The primary traffic impact of the Project is generated during construction, which is anticipated to commence late-2027 and take approximately 22 months.

A review of the DPHI major projects website was undertaken on 7 January 2026 to identify other potential traffic generating activities within the Cessnock City Council LGA. A search was also completed of the Cessnock City Council Application Tracker for development applications within 1 km of the Project.

The search identified five projects occurring in the locality. There is potential for construction of these projects to overlap with the Project. However, the majority of the workforce for these projects are anticipated to travel from the north via the Hunter Expressway and therefore it is unlikely that construction vehicles would pass the site on Wine Country Drive.

Overall, vehicle movements for nearby projects would be distributed on the surrounding road network and are expected to have a minimal cumulative impact on the operation of Wine Country Drive and Old North Road. Further details are included in the cumulative impact assessment in **Section 6.14**.

6.8.8 Mitigation and management measures

The mitigation and management measures for traffic and transport that would be implemented during detailed design, construction, operation and decommissioning of the Project are detailed in **Table 6.8-6**.

Table 6.8-6: Mitigation and management measures – traffic and transport

ID	Mitigation/management measure	Timing
T-1	The informal school bus stop at the Wine Country Drive/Old North Road intersection will be temporarily relocated to a safe nearby location during construction, in consultation with the relevant bus operator and road authority. The temporary stop location will be clearly signed, and affected users will be notified in advance through appropriate community notifications. Traffic control measures at the temporary bus stop will be commensurate with the level of risk and duration of construction activities and may include signage, barriers or traffic control during specific high-risk construction activities only, rather than continuous staffing. The original bus stop will be reinstated once construction activities affecting the area have been completed.	Construction

ID	Mitigation/management measure	Timing
T-2	A Construction Traffic Management Plan (CTMP) will be prepared and implemented prior to commencement of construction, in accordance with AS1742.3 – <i>Traffic control for works on roads</i> and the <i>Work Health and Safety Regulation 2017</i>. The CTMP will include, but not be limited to: • Forecast construction traffic volumes, vehicle types, timing and staging of works, including identification of peak movement periods and high-risk activities • Identification of approved vehicle access points, origins, destinations and haulage routes for construction vehicles and staff, including mapped primary routes and critical locations • Site access and vehicle movement controls, including B-double and OSOM access arrangements from Old North Road, requirements for vehicles to enter and exit the site in a forward direction only, and protocols to limit heavy vehicle movements to one vehicle entering or exiting the site at a time • Traffic control measures and conditions under which they would be implemented, including the use of traffic controllers during constrained sight distance or lane width conditions, delivery or removal of oversized loads, simultaneous construction activities, or other site-specific high-risk scenarios • Permitted construction traffic hours, including management of heavy vehicle movements to avoid peak traffic periods and other sensitive times • Onsite traffic safety measures, including speed limits, driver behaviour requirements, dust suppression measures, and maintenance of internal site roads • Procedures for loading, unloading and material storage to ensure construction activities do not adversely affect public road safety or traffic operations • Management procedures for adverse weather conditions (such as wet, foggy or dusty conditions) where road safety may be affected • Procedures for complaints management, incident response and reporting, and any required contributions to road maintenance. The CTMP will be reviewed and, where necessary, updated in response to changes in construction staging, traffic conditions or safety risks, and will be communicated to all relevant personnel prior to implementation.	Pre-construction Construction

ID	Mitigation/management measure	Timing
T-3	Where two-way passing by 26 m B-double vehicles cannot occur at the Project entry/exit off Old North Road, B-double movements will be managed through site-specific traffic management measures. These will include: • Scheduling deliveries to minimise simultaneous arrivals and departures • Implementing driver communication protocols including radio contact with the site manager and other drivers prior to arrival or departure • Using traffic controllers to manage vehicle movements at the Project entry/exit • Priority will be given to arriving vehicles, with exiting vehicles held internally where necessary, to prevent queuing on Old North Road. Further details of traffic management controls for B-double vehicle movements will be documented in the CTMP.	Construction
T-4	Sufficient onsite car parking will be provided and managed to accommodate construction personnel such that regular or ongoing parking on the surrounding public road network does not occur. Onsite parking will be clearly designated, adequately sized and actively managed, with parking controls and enforcement measures implemented as necessary, in accordance with the CTMP.	Pre-construction Construction
T-5	Pre-condition and surveys of Old North Road and Wine Country Drive will be undertaken prior to construction to establish a baseline condition, in consultation with Cessnock City Council. During construction, these roads will be monitored on a regular basis to ensure they are maintained in a condition generally consistent with the pre-construction baseline, to the extent practicable, and remain safe for public use. Any deterioration or damage attributable to construction of the Project will be identified and rectified by the Contractor in a timely manner. All inspections, identified impacts, maintenance actions and repairs will be documented and recorded and made available for consultation with Cessnock City Council, including post-construction condition surveys where required to confirm reinstatement.	Pre-construction Construction
T-6	Prior to the commencement of any OSOM movements, all required B-double and Class 1 permits will be obtained from the relevant roads authority and/or the NHVR.	Prior to use of the access routes
T-7	Project OSOM vehicle movements will be scheduled through the NHVR permit process, in consultation with Transport for NSW and relevant local councils to avoid conflicts with other OSOM movements in the surrounding area.	Pre-construction Construction
T-8	All applicable route restrictions and travel conditions along the approved construction access routes, and any other routes, will be complied with at all times.	Construction
T-9	Neighbours of the Project will be notified regarding the timing of major deliveries which may require additional traffic control and/or disrupt access. Evidence of consultation must be maintained.	Pre-construction Construction

ID	Mitigation/management measure	Timing
T-10	A Decommissioning Traffic Management Plan will be prepared prior to the decommissioning phase, in conjunction with the relevant roads authorities, to ensure adequate road safety and road network operations are maintained.	Decommissioning

6.9 Surface water, groundwater and flooding

6.9.1 Secretary's Environmental Assessment Requirements

Table 6.9-1 sets out the SEARs relevant to surface water, groundwater and flooding and where the requirements have been addressed in this EIS.

Table 6.9-1: Relevant SEARs – water

Relevant SEARs	
Water	Where addressed
The EIS must address the following specific matters:	
an assessment of the likely impacts of the development (including flooding and pre and post development flood modelling covering the 1% AEP and probable maximum flood level) on surrounding watercourses (including their Strahler Stream Order), groundwater resources and surface water movements, and measures proposed to monitor, reduce and mitigate these impacts including water management;	Potential impacts to surface water, groundwater and flooding are assessed in the Water Impact Assessment (WIA) in Appendix L and summarised in Section 6.9.4. Appropriate mitigation and management measures are outlined in Section 6.9.5.
a site water balance for the development	An initial estimate of water demand and current availability for the Project is provided in Section 6.9.4.1. A conceptual site water balance is provided in Figure 6.9-5.
details of water requirements and supply arrangements for construction and operation (including consultation with suppliers)	Water requirements and supply arrangements are discussed on Section 6.9.4.
a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with <i>Managing Urban Stormwater: Soils & Construction</i> (Landcom, 2004) and <i>Managing Urban Stormwater: Soils and construction – Volume 2A manual</i> (Landcom, 2008);	Erosion and sediment control measures are detailed in Section 6.9.5.
assessment of the impacts of the development on hydrology and groundwater (if extraction or interference is proposed), including any changes to overland flows and groundwater levels on-site or off-site, and detail design solutions and operational procedures to manage impacts;	Impacts on hydrology and groundwater are detailed in Section 6.9.4. Design solutions to mitigate the impacts are provided in Section 6.9.5.

Relevant SEARs	
where the project involves works within 40 metres of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the DPI Guidelines for Controlled Activities on Waterfront Land (2018) and (if necessary) Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (DPI 2003), and Policy & Guidelines for Fish Habitat Conservation & Management (DPI 2003); and Policy & Guidelines for Fish Habitat Conservation & Management DPE, 2013); and	Proximity of the Project to waterfront land is considered in Section 6.9.4 .
- identification of any flood risk on site having regard to adopted flood studies, the potential effects of climate change and any relevant provisions of the <i>NSW Flood Risk Management Manual</i>; - where the development could alter flood behaviour, affect flood risk to the existing community or expose its users to flood risk, provide a flood impact and risk assessment (FIRA) prepared in accordance with the <i>Flood Impact and Risk Assessment – Flood Risk Management Guide LU01</i>; and - detailed design solutions and operational procedures to mitigate flood risk where required.	Discussion of how the Project affects flooding during construction and operation is provided in Section 6.9.4 and detailed in Appendix L. Section 6.9.5 outlines mitigation measures to manage any potential impacts to flooding.

6.9.2 Methodology

A WIA was prepared by GHD Pty Ltd (GHD) (2026). The WIA is provided as **Appendix L** and summarised in this section.

The WIA approach included:

- A review of relevant legislation, policy and guidelines to establish the regulatory context for the assessment. This included, but was not limited to:
 - Environmental Planning and Assessment Act 1979* (EP&A Act)
 - Protection of the Environment Operations Act 1997* (POEO Act)
 - Water Management Act 2000* (WM Act)
 - Managing Urban Stormwater: Soils and Construction* (Landcom, 2004)
 - NSW Flood Risk Management Manual* (2023)
 - Australian Rainfall and Runoff version 4.2* (Babister et al., 2019, updated 2024) (ARR 2019).
- Identification of the existing baseline to characterise site-specific hydrology, water quality, and flood risks
- A structured impact assessment to evaluate potential effects on hydrology, flooding, surface water, and groundwater
- Identification of appropriate measures to avoid or mitigate potential impacts on water receptors.

6.9.3 Existing environment

6.9.3.1 Hunter River catchment

The Project is located within the Black Creek catchment, part of the broader Hunter River catchment, as shown in **Figure 6.9-1**. The Hunter catchment covers approximately 21,500 km² (DPIE, 2024) and extends from the Barrington Tops to Lake Macquarie and west to the Great Dividing Range.

The Hunter River is the main waterway in the catchment, with the Goulburn River as its largest tributary. Water use in the catchment supports a large population and diverse sectors, including town water supply, power generation, mining, industry, agriculture and viticulture.

Elevations range from less than 50 m Australian Height Datum (AHD) on the floodplains to 1,500 m AHD in the Barrington Tops. Around Rothbury, elevations are generally between 50 and 200 m AHD, with topography influenced by agriculture, mining and rural infrastructure.

6.9.3.2 Climate

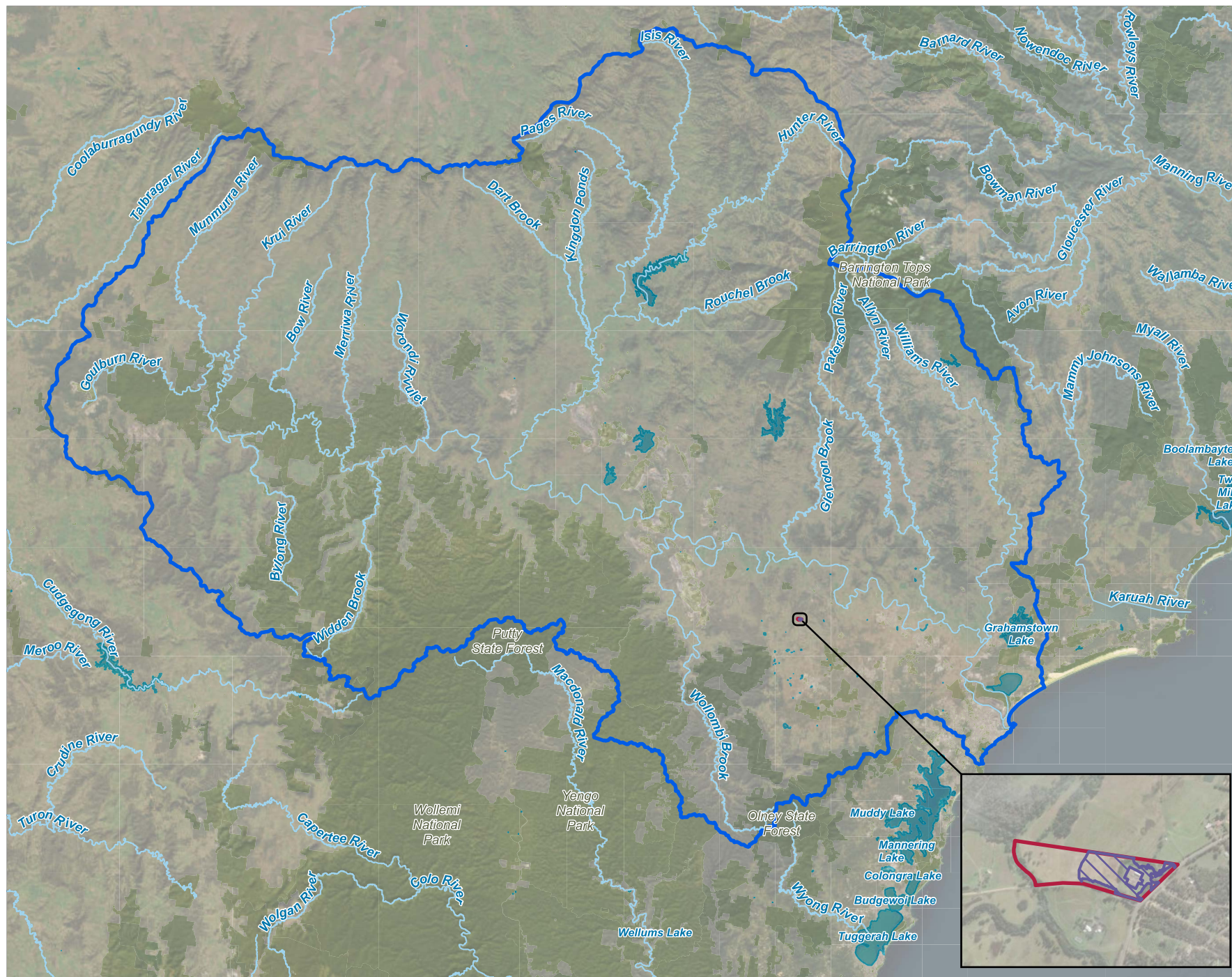
According to BoM (2025) Köppen climate mapping, the site is in a temperate zone with hot summers and no distinct dry season.

Rainfall is relatively uniform across the year, with slightly higher totals from November to March. Average annual rainfall is 762.2 mm, ranging from 375.2 mm in 2019 to 1,285.5 mm in 2022.

Evapotranspiration shows strong seasonality, peaking between November and February. A monthly and annual moisture deficit is present, with evapotranspiration exceeding rainfall by 66.6 mm per year, indicating conditions are consistently moisture-limited.

A moisture deficit, where annual evapotranspiration exceeds annual rainfall, is observed in every month, resulting in an overall annual moisture deficit of 563.6 mm across year. This indicates that environmental conditions are predominantly influenced by evapotranspiration throughout the year.

FIGURE 6.9-1:
HUNTER RIVER CATCHMENT



Legend

- The site
- Project Area
- Hunter River Catchment Area
- Waterbody
- Watercourses

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6.9.3.3 Topography

The site is situated on a generally flat area, with the surface generally sloping north toward a farm dam on an adjacent property. Other parts of the site, generally falls to the west towards Black Creek at slopes of approximately 1 to 5%. Lower elevations of the site include the banks of Black Creek which are relatively steep, up to about 25%. The site topography is shown in **Figure 6.6-2**.

6.9.3.4 Hydrology and drainage

Surface watercourses

Regionally, the site is located within the Black Creek catchment, with Black Creek situated approximately 205 m west of the Project Area. Black Creek is classified as a sixth-order watercourse under the Strahler Stream Classification System (Strahler, 1952) and generally flows south to north before joining the Hunter River approximately 16.5 km downstream. Upstream tributaries include Rothbury, Deadmans, First, Middle and Pokolbin Creeks, which drain predominantly agricultural and urban catchments.

NSW River Styles mapping (NSW DCEEW, 2026) indicates Black Creek is in poor geomorphic condition with moderate recovery potential, reflecting extensive catchment disturbance.

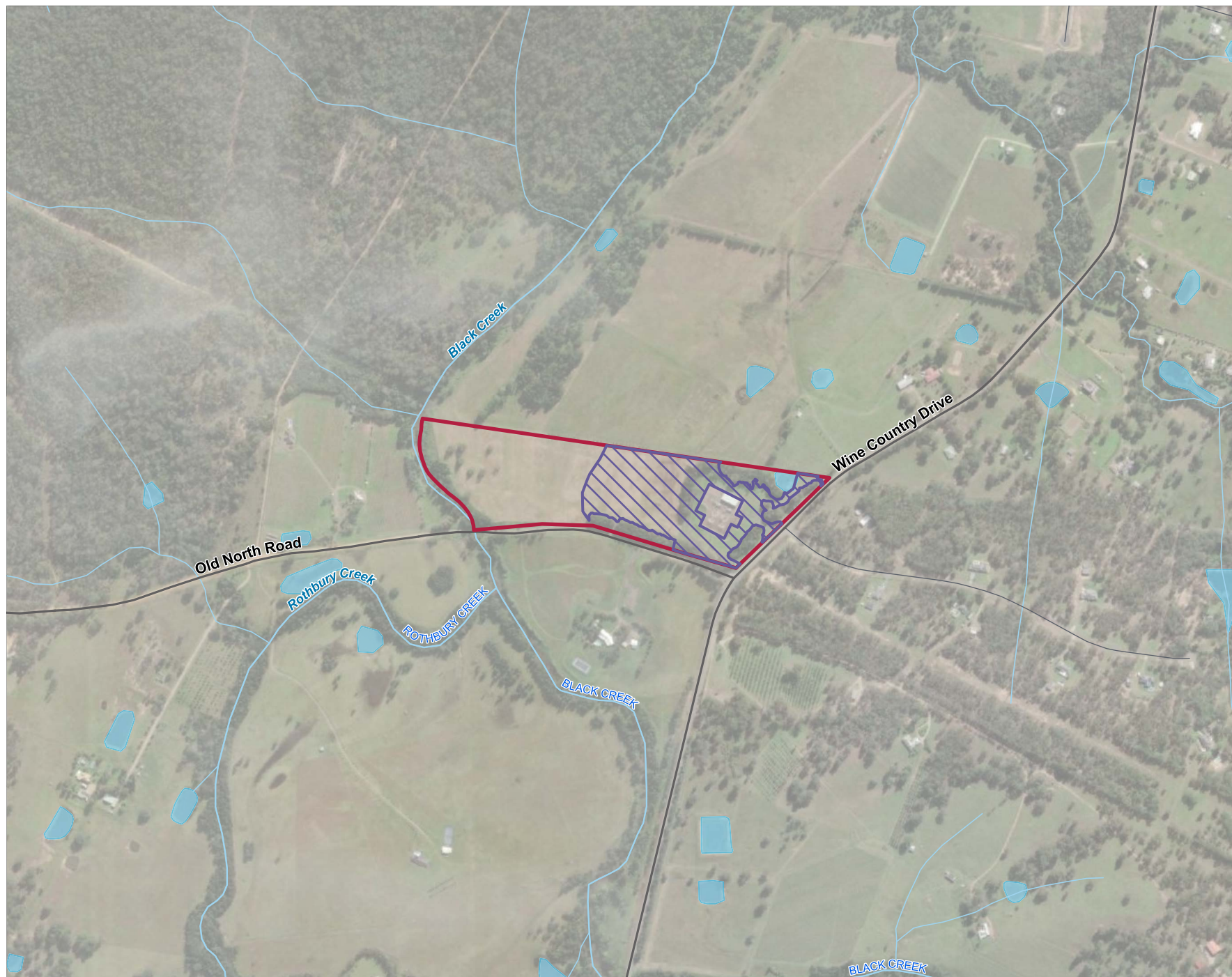
The site is not located within 40 m of waterfront land, as defined by the *Water Management Act 2000*. Watercourses and waterbodies in the vicinity of the site are shown in **Figure 6.9-2**.

Overland flows

During larger events, flow continues north; however, Black Creek overtops its banks and forms flood runners across the surrounding floodplain, generally parallel to the creek and located west and north of the Project Area.

Surface waters around the Rothbury Zone Substation are collected by a series of informal flow pathways, culverts and small farm dams, with runoff ultimately flowing north into the neighbouring farm dam. A larger farm dam is located outside of the Project Area to the north-east and is anticipated to capture a small catchment from Wine Country Drive.

**FIGURE 6.9-2:
WATERCOURSES AND
WATERBODIES**



Legend

- The site
- Project Area
- Waterbody
- Watercourses
- Main road
- Local road

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6.9.3.5 Groundwater

Encountered groundwater

The geotechnical investigation (RCA, 2026) recorded groundwater seepage in 10 of the 21 sampled locations, at depths ranging from approximately 0.8 m to 4.0 m below ground level, with typical levels around 1.0 to 2.0 m. The recorded depths were influenced by heavy rainfall prior to the investigation.

Groundwater in the vicinity of the site is likely to flow towards Black Creek.

Groundwater receptors

A search of the WaterNSW Water Information Hub (WaterNSW, 2026) identified groundwater bores within 1 km of the site, as detailed in **Table 6.9-2**.

In the absence of groundwater elevation information, the approximate groundwater elevations presented in **Table 6.9-2** were calculated based on digital elevation model (NSW SS 2014) elevations and standing groundwater water levels.

Table 6.9-2: Groundwater monitoring bores

ID	Bore depth (m)	Lithology (m)	Date of log	Groundwater standing water level (m)	Approx. groundwater elevation (m AHD)	Approx. distance to site (m)
GW050646	38	0 - 1, Soil 1 - 4, Clay 4 - 38, Shale	1/8/1980	19	36.67	541
GW080956	76	0 - 0.05, Topsoil 0.05 - 0.07, Ironstone 0.07 - 12, Shale (weathered) 12 - 76, Shale (grey)	1/10/2005	1	51.37	659
			21/3/2011	11.45	40.92	
			17/8/2012	10.68	41.69	

Table 6.9-2 indicates variable groundwater levels at the monitored bore locations. As the nearest monitored location is over 500 m from the site, groundwater conditions at these locations may not be representative of onsite conditions.

Groundwater dependent ecosystems

Review of the HEVAE dataset (DCCEE, 2018) identified areas of vegetation within the site with a medium likelihood of groundwater dependence, mainly where mature trees occur. Additional medium-probability Groundwater Dependent Ecosystems (GDEs) were mapped about 200 m south-west and west of the Project Area along the Black Creek riparian corridor.

The BoM GDE Atlas (2025) shows no terrestrial GDEs on the site; however low-potential GDEs were identified east of Wine Country Drive and high-potential GDEs along Black Creek.

6.9.3.6 Water quality

Water quality in Black Creek is disturbed by its existing surrounding agriculture, urban runoff upstream of the site, and treated flows (under an EPL) from the Cessnock Wastewater Treatment Works (WWTW), resulting in elevated nutrient levels. WaterNSW monitoring at Black Creek (Station 210089), located approximately 570 m upstream of the site was undertaken between 1996 and 2009 and indicated slightly brackish conditions, with high variability (WaterNSW, 2025). Since monitoring ceased, upgrade works at the Cessnock WWTW between 2021 and 2024 have improved the quality of treated outflows (Abergeldie, 2025).

6.9.3.7 Existing flood conditions

Two flood models were developed to assess existing and future flood behaviour at the site. A local overland flow model, prepared in accordance with ARR 2019, was used to assess flooding caused by rainfall across the site. A regional flood model was also used to represent riverine flooding from Black

Creek, based on the *Black Creek Flood Study Stage 2 (Nulkaba to Branxton)* (WMAwater, 2015) and updated to align with ARR 2019. Further details on the flood modelling are provided in **Appendix L**.

Both models were run for a range of design flood events, including the 5% AEP, 1% AEP under current (2030) and future (2080) climate scenarios and Probable Maximum Flood (PMF) under the future (2080) climate scenario.

The modelling indicates that under the current 2030 scenarios, flooding at the site is influenced by a combination of local overland flow from the local catchment and regional flooding from Black Creek.

In both the current 5% and 1% AEP events, regional (riverine) flooding from Black Creek inundates the western portion of the site and Old North Road but does not directly inundate the Project Area. Flood extent and depths from regional flooding in the 1% AEP event are presented in **Figure 6.9-3**.

Shallow localised flooding, generally up to approximately 0.3 m, occurs within the Project Area during both the 5% and 1% AEP events due to overland flow along these drainage pathways, resulting in shallow localised ponding within the depression. Floodwaters are slow-moving, resulting in low to moderate hazard levels.

In the future 2080 PMF event, the site is fully inundated as part of widespread flooding of the Black Creek floodplain, which extends up to approximately 1 km in width, as shown in **Figure 6.9-4**. Flood depths within the Project Area may reach up to 8 m, with Wine Country Drive and Old North Road also inundated. These conditions result in high hazard levels and severe impacts to road serviceability and are consistent with regional flood behaviour under extreme flood scenarios.

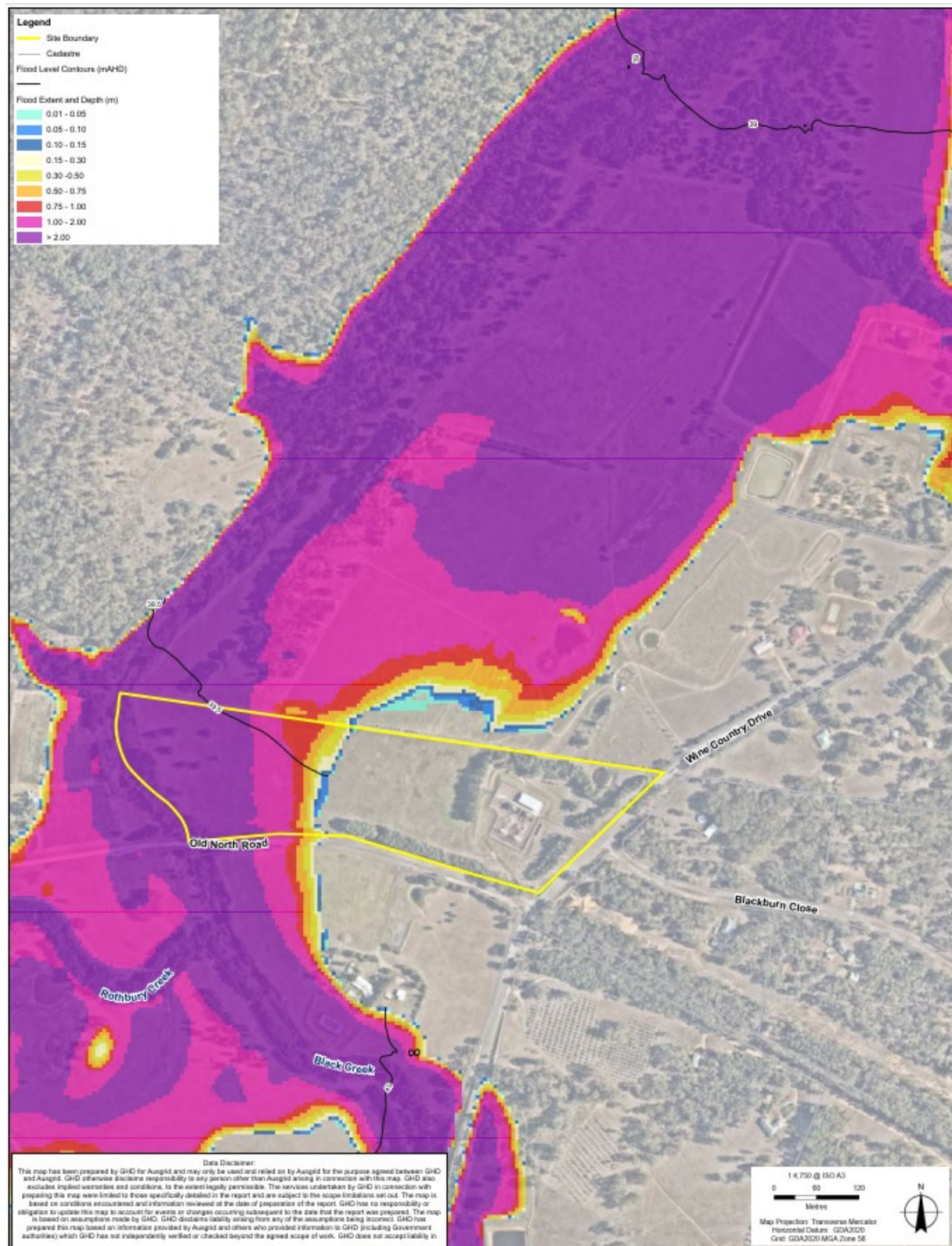


Figure 6.9-3: Regional flood extent and depths for a 1% AEP event (1 in 100 year flood event) in 2030 (GHD, 2026)

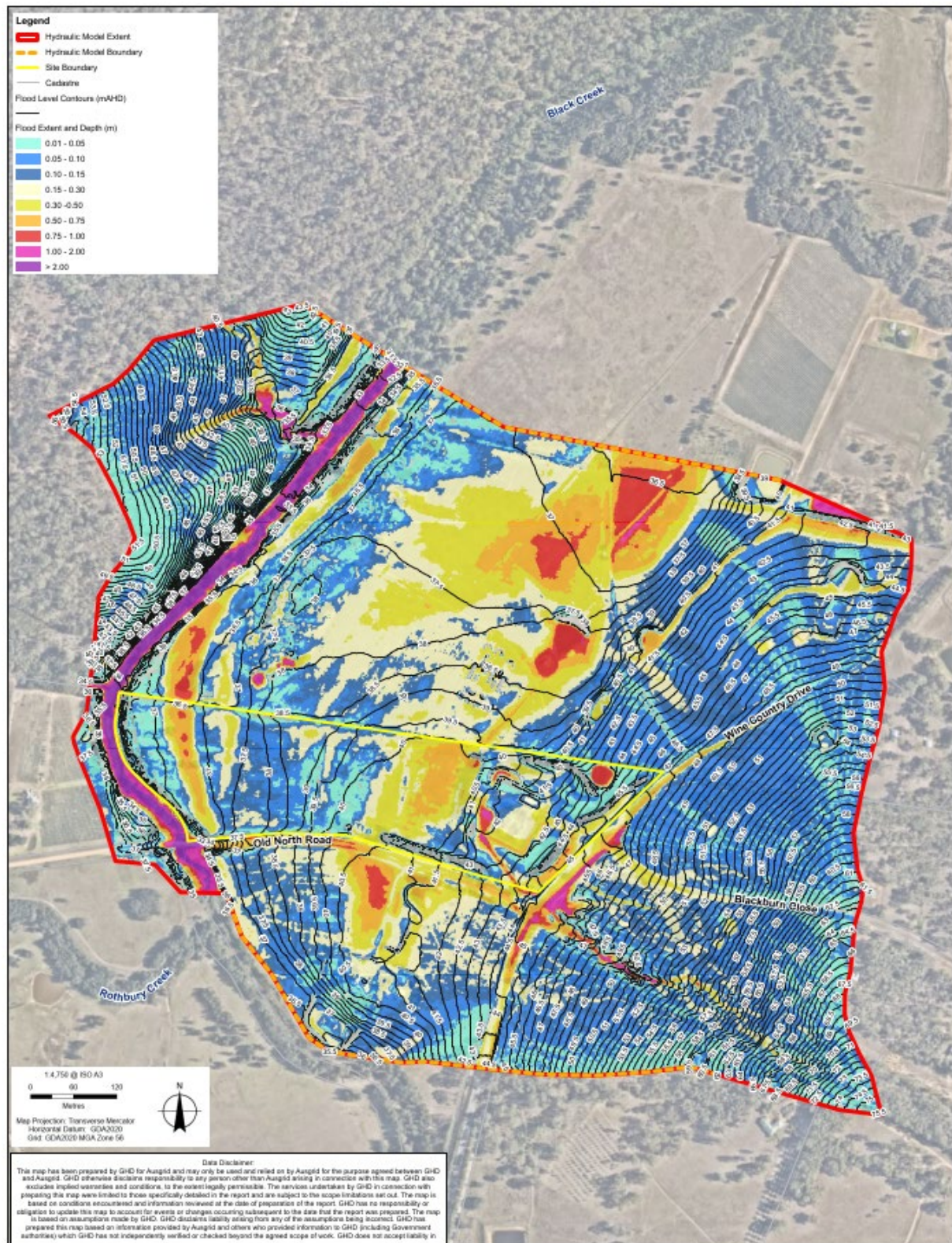


Figure 6.9-4: Flood mapping of the future 2080 Probable Maximum Flood event without the Project (GHD, 2026)

6.9.4 Impact assessment

6.9.4.1 Construction

Hydrology and flooding

Due to the relatively short duration of the proposed construction period (approximately 22 months), a standalone quantitative assessment of construction-phase flooding has not been undertaken. Instead, the outcomes of the operational flood modelling have been used to estimate the potential magnitude and changes in flood extent during the construction stage.

Without the implementation of appropriate flood management measures, inundation of the site by floodwater has the potential to:

- Transport sediments or construction materials downstream, affecting water quality
- Obstruct natural flow paths where temporary works, stockpiles or compounds impede overland flow
- Limit access to work areas due to ponding or soft, saturated ground conditions.

Direct flood impacts during construction would be temporary in nature and are anticipated to be negligible, however minor impacts to local runoff pattern may occur, and indirect impact associated with construction phase water quality may also occur.

Impacts associated with flooding and hydrology during construction are not expected to be significant, provided the mitigation measures outlined in **Section 6.9.5** are adhered to.

Surface water quality

Construction activities have the potential to temporarily affect surface water quality through soil disturbance and the handling of hazardous materials.

Earthworks, excavation and vegetation clearing may disturb soils, creating a risk of surface sediment being washed into downstream waterways, primarily as suspended solids. The overall disturbed area for the Project is relatively small, and a soil loss hazard assessment found the risk of soil loss to be very low. As a result, potential impacts are expected to be minor and can be effectively managed using standard erosion and sediment controls, as outlined in **Section 6.9.5**.

Construction will involve the use and handling of materials such as fuels, oils, concrete, and battery components. Spills or improper handling could contaminate stormwater and impact nearby waterways, including Black Creek. These risks may arise from activities such as plant maintenance, refuelling, concrete works, storage of materials, or installation of electrical equipment. Similar materials are already present at the existing Rothbury Zone Substation, and established management practices are in place.

Hazardous materials associated with the battery units will require specific procedures, which will be addressed through the SWMP, as outlined in **Section 6.9.5**.

Overall, surface water impacts are generally considered minor and are proposed to be managed with standard site controls and the mitigation measures outlined in **Section 6.9.5**.

Waterfront land

The Project does not involve construction work within 40 m of waterfront land and therefore there would be no impacts to any waterfront land or the associated riparian zone.

Groundwater

Excavation during construction, such as for drainage works, culvert realignment, cabling and the bioretention basin, may temporarily expose or intercept shallow groundwater.

This could result in short-term changes to groundwater levels, elevated turbidity, or mobilisation of contaminants if construction materials enter the excavation. Disruption of natural groundwater flow paths could also occur at a local scale.

Minor dewatering may be required, particularly after rainfall, though any groundwater extracted would be managed in accordance with surface water, erosion and sediment controls, as outlined in **Section 6.9.5**.

Water supply

Water would be required for certain construction activities, including dust suppression, earthworks and landscaping. A conservative estimate of water demand for these activities is 4.1 megalitres (ML) over the 22-month construction period.

An additional 0.2 ML of potable water would be required to service the construction workforce (peak of 100 personnel). This would be supplied externally via mains water or bottled water.

Construction water would be imported to site by tanker. With a typical tanker capacity of 15 kilolitres, this would equate to less than one tanker delivery per day on average over the construction period. No extraction from surface or groundwater sources is proposed.

Construction water requirements will be refined during detailed design and construction planning in line with the staging plan for the site. No impacts to surface or groundwater resources are anticipated, as the volume required are relatively minor and would be sourced from external suppliers rather than local water resources.

Water balance

A conceptual site water balance identifying the demands, water uses and outflows of the different water types is presented in **Figure 6.9-5**.

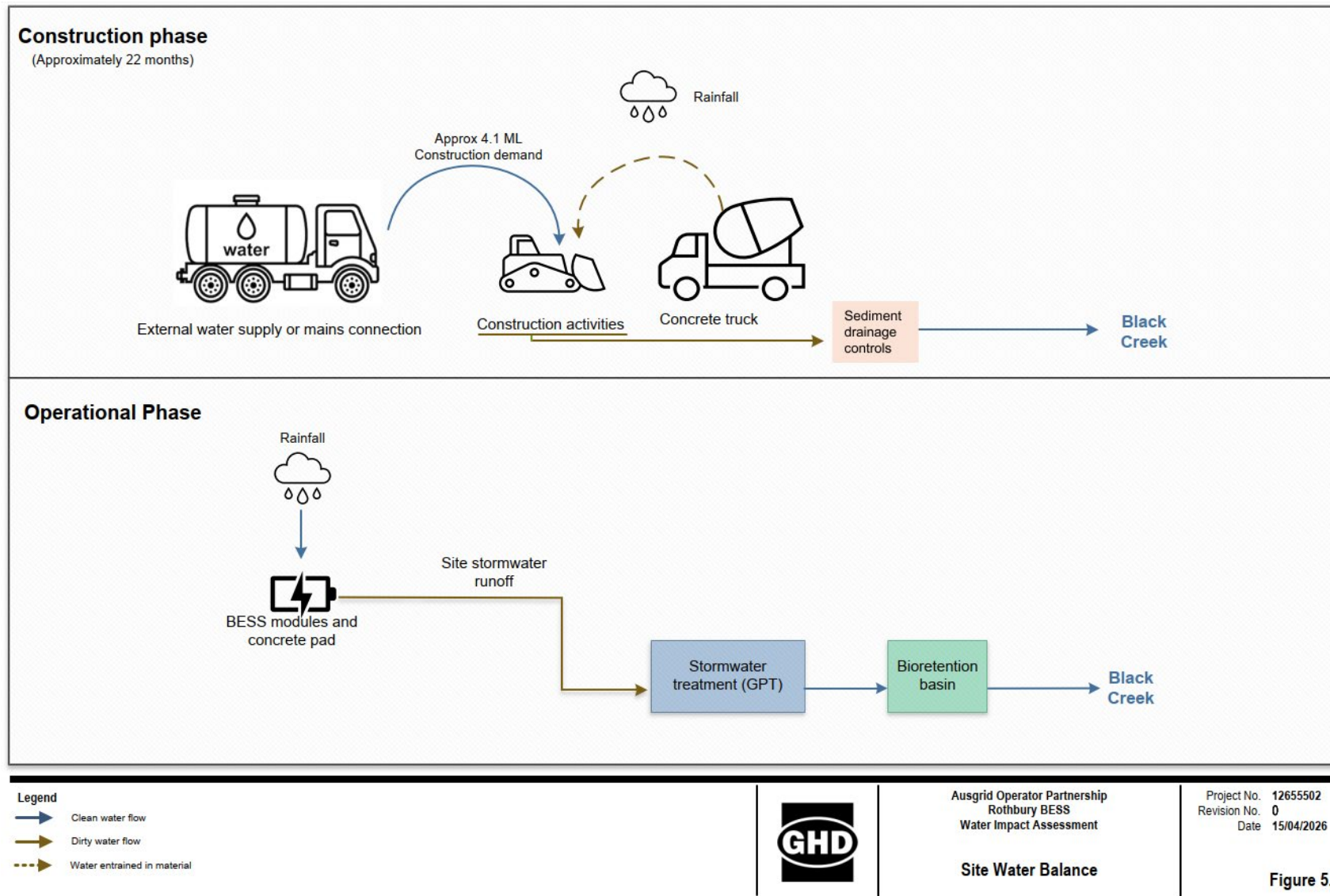


Figure 6.9-5: Conceptual site water balance (GHD, 2026)

6.9.4.2 Operation

Hydrology and flooding

Based on the existing local flood conditions (described in **Section 6.9.3.7**), and recognising that the introduction of a small hardstand area has the potential to slightly change local surface water flow patterns, drainage measures have been incorporated into the Project design to manage runoff effectively and maintain existing flood behaviour.

Surface water management measures would be implemented within the Operational Footprint to collect and convey runoff away from operational and hardstand areas while maintaining existing drainage patterns. These measures would include the construction of grass-lined open drainage channels, designed to integrate with the surrounding drainage network.

Runoff collected within the Project Area would discharge to existing grassed areas that drain naturally toward Black Creek, maintaining established downstream flow paths. Final configurations and design details would be confirmed during detailed design.

Flood modelling was undertaken using local and regional models and incorporated the proposed site levels, drainage infrastructure and land use changes. The hardstand area has been designed with a freeboard above the critical future 2080 1% AEP peak flood level and a surface slope of approximately 1% ensuring effective drainage and flood resilience.

For the 5% AEP and all modelled 1% AEP events, the results generally indicate that:

- Localised shallow ponding may occur south of the hardstand area and near the existing Rothbury Zone Substation, reflecting changes to minor flow paths and interactions with upstream flood runoff from Black Creek
- Floodwaters across the site are generally shallow, slow-moving and low hazard, except within defined drainage lines
- Minor offsite changes include reduced flows to the northern farm dam and small increases in flood levels (up to approximately 100 mm) where the proposed drainage channel discharges onto the uninhabited Black Creek floodplain, with no substantial hazard change
- No change in flood levels is predicted along Old North Road or Wine Country Drive for any modelled event
- Regional flooding only reaches the Project Area in the future worst-case climate scenario, with the hardstand area remaining flood-free due to its elevated design.

Under the future 2080 PMF scenario, the Project Area, the existing Rothbury Zone Substation and the surrounding floodplain would be fully inundated, consistent with existing flood behaviour. Minor increases in upstream flood levels are predicted along Black Creek and Rothbury Creek but do not expand the extent of flooding or substantially increase flood hazards. Wine Country Drive would remain inundated under future 2080 PMF conditions based upon existing infrastructure and conditions.

Overall, offsite impacts are limited to very minor increases in flood levels within the uninhabited Black Creek floodplain and are not expected to be significant. Some areas of the site remain susceptible to localised ponding during extreme events. The final drainage configuration will be confirmed during detailed design.

Surface water quality

The Project introduces approximately 1.38 ha of new impervious hardstand area, which could increase stormwater runoff and pollutant loads. A conceptual stormwater quality treatment train, including a gross pollutant trap and a bioretention basin, is proposed to meet typical Council target reductions. MUSIC modelling shows the system would achieve or exceed common load-reduction objectives for suspended solids, nutrients and gross pollutants. As a result, no significant water quality impacts are expected.

Handling of hazardous materials is not expected to occur regularly, however small quantities of materials such as hydrocarbons may be handled during maintenance, posing a moderate localised risk if accidentally released. In contrast, the battery units and transformers are fully enclosed, generating no

leachate or process wastewater, and present a negligible water quality risk during normal operation or failure (including fire).

Overall, any operational water quality impacts are expected to be minor and manageable through standard mitigation measures (refer to **Section 6.9.5**), with limited potential for localised effects on downstream environments such as Black Creek.

Waterfront land

The vegetated riparian zone extends 40 m from the top of bank of Black Creek. The Project is located more than 200 m from the eastern extent of the vegetated riparian zone and is therefore situated outside waterfront land. Accordingly, no operational impacts to waterfront land or the riparian zone are expected.

Groundwater

No impacts to groundwater are anticipated during the operational phase as no ongoing interaction with the subsurface is proposed.

Water supply

During operation, water would be stored onsite and utilised for fire suppression and emergency management purposes. Limited potable water use for onsite amenities would be supplied via a proposed mains connection.

As no groundwater or surface water take is proposed, no additional impacts to water resources are expected during operation.

Water balance

A conceptual site water balance during operation summarising the demands, water uses and outflows of the different water types is presented in **Figure 6.9-5**.

6.9.5 Mitigation and management measures

Implementing mitigation measures would aim to reduce the potential impacts on surface water, groundwater and flooding from the Project to the greatest extent practicable. The management measures that would be implemented during detailed design, construction and operation of the Project are detailed in **Table 6.9-3**.

Table 6.9-3: Mitigation and management measures – surface water, groundwater and flooding

ID	Mitigation/management measure	Timing
SWGF-1	Detailed design must ensure the water quality requirements in the Cessnock Council Development Control Plan are met. The requirements will be achieved via a water quality treatment train which will be installed to address the changes in pollutant loads generated by the increased impervious area within the Project Area. The stormwater treatment train will be appropriately sized to manage the four exceedances per year design storm.	Detailed design Operation
SWGF-2	Emergency response procedures in the event of flooding will be undertaken in accordance with the Emergency Response Plan outlined in mitigation measure SC-4.	Pre-construction Construction
SWGF-3	The CEMP will include a detailed Soil and Water Management Plan (SWMP), incorporating an Erosion and Sediment Control Plan (ESCP) and contain environment control measures to manage risks to the water environment and its quality. Details of the SWMP requirements are outlined in mitigation measure SC-1.	Construction
SWGF-4	Operational controls relevant to surface water, groundwater and flooding will be included in a site-specific Operational Environmental Management Plan (OEMP). Details of the OEMP requirements are outlined in mitigation measure SC-12.	Construction

6.10 Hazards and risk

6.10.1 Secretary's Environmental Assessment Requirements

Table 6.10-1 sets out the SEARs relevant to hazards and risk and where the requirements have been addressed in this EIS.

Table 6.10-1: Relevant SEARs – hazards and risk

Relevant SEARs	
Hazards	Where addressed
This EIS must address the following specific matters:	
<i>Health</i> – an assessment of potential hazards and risks including but not limited to fires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure against the <i>International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields</i>;	Potential hazards and risks (including health risks) are assessed in Section 6.10.4 .
<i>Bushfire</i> – identify potential hazards and risks associated with bushfires including the risks that a BESS would cause a bush fire and demonstrate compliance with <i>Planning for Bush Fire Protection 2019</i>;	Potential hazards and risks associated with bushfires is summarised in Section 6.11 and detailed in the Bushfire Risk Assessment in Appendix N .
<i>Dangerous Goods</i> - a preliminary risk screening completed in accordance with the State Environmental Planning Policy (Resilience and Hazards) 2021;	A preliminary risk screening of dangerous goods is outlined in Section 6.10.3.1 and detailed in the PHA in Appendix M .
<i>Battery Energy Storage System</i> – a Preliminary Hazard Analysis (PHA) prepared in accordance with <i>Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis</i> (DoP, 2011) and <i>Multi-Level Risk Assessment</i>. The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation and compliance with <i>Hazardous Industry Advisory Paper No. 4, Risk Criteria for Land Use Safety Planning</i>.	The PHA for the Project (Appendix M) has been prepared in accordance with the relevant guidelines and considers all recent standards and codes.

6.10.2 Methodology

A PHA was prepared by Sherpa Consulting (2026) to identify and assess potential hazards and risks associated with the construction and operation of the Project to people, property and the environment. The PHA is provided in **Appendix M** and is summarised in this section.

The PHA has been prepared in accordance with the following government policy and guideline documents:

- Chapter 3 (Hazardous and offensive development) of *State Environmental Planning Policy (Resilience and Hazards) 2021* (DPIE, 2021) (*Resilience and Hazards SEPP*)
- Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (NSW Department of Planning (DoP), 2011) (*Applying SEPP 33*)
- Hazardous Industry Planning Advisory Paper No 6 – Guidelines for Hazard Analysis* (NSW DoP, 2011b) (HIPAP No 6)
- Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning* (NSW DoP, 2011a) (HIPAP No 4)
- Hazardous Industry Planning Advisory Paper No 10 - HIPAP 10: Land Use Safety Planning* (NSW DoP, 2011c) (HIPAP No 10)

- *Assessment Guideline: Multi-level Risk Assessment* (NSW Department of Planning and Infrastructure, 2011) (MLRA)
- *Planning for Bushfire Protection: A guide for councils, planners, fire authorities and developers* (NSW Rural Fire Service, 2019a) (PBP 2019)
- Australian Standard AS 2067:2016 *Substations and high voltage installations exceeding 1kV* (AS 2067).

The methodology of the hazards and risk assessment addresses the elements required by the SEARs:

- Undertake a preliminary risk screening
- Complete an assessment of Electric and Magnetic Field (EMF) hazards against the ICNIRP guidelines
- Consider separation distances between equipment to prevent fire propagation
- Consider hazards including fires, including spontaneous combustion in a hazard identification
- Undertake a PHA.

6.10.2.1 Preliminary risk screening methodology

A preliminary risk screening was completed in accordance with the Resilience and Hazards SEPP, following the approach outlined in the Applying SEPP 33 guideline, to determine whether the Project is considered as 'potentially hazardous', considering the following factors:

- Storage of hazardous materials
- Transport of hazardous materials to and from the Project Area
- Other types of hazards.

Risk screening is undertaken by comparing the storage quantity and the number of road movements of the hazardous materials with the screening threshold specified in the guideline. The screening threshold presents the quantities which it can be assumed that significant offsite risk is unlikely

6.10.2.2 PHA methodology

The following steps were undertaken to prepare the PHA:

- Establish the study context, including the Project scope, objectives, exclusions and limitations, and a summary of the existing environment and surrounding land uses
- Hazard Identification (HAZID) – identification of hazards resulting from the Project and events with the potential for offsite impact. The assessment considered risks from all sources, including EMF and the potential for spontaneous combustion and fires
- Consequence Analysis - analysis of the severity of the consequences for the identified events with potential offsite impact, e.g. fires and explosion
- Determination of the level of risk analysis required, and the risk assessment criteria following the guidance provided in HIPAP 4
- Risk Analysis - analysis of the risk of the identified events with offsite impact
- Risk Assessment - assessment of the estimated risks from identified events against risk criteria to determine acceptability.

The PHA assessed the risks associated with proposed operation of the Project only.

6.10.3 Existing environment

The Project's exposure to existing environmental hazards is summarised in **Table 6.10-2**.

Table 6.10-2: Environmental baseline

Hazard	Potential outcome	Site specific risk
Bushfire	Encroachment of offsite bushfire or on-site ignition could result in damage to Project infrastructure	A Bushfire Risk Assessment has been prepared for the Project and is included in Appendix N and summarised in Section 6.11. The assessment identified that bushfire risk for the Project Area is considered overall to be low.
Flooding	Overland flow and pluvial events could result in water ingress to Project infrastructure	A WIA was prepared for the Project and is included in Appendix L and summarised in Section 6.9. The assessment identified that the site is subject to flooding due to overland flow drainage from the local catchment and from regional (riverine) flooding of Black Creek. The existing flood environment at the site is characterised by shallow localised flooding during more frequent events and deep, high-hazard inundation during rare extreme floods, reflecting the site's location within a low-lying area of the Black Creek floodplain. The risk of water ingress to Project infrastructure from a flood event is considered in the PHA.
Earthquake	Seismic activity could compromise structural integrity of Project infrastructure	A search of the National Seismic Hazard Assessment map (Geoscience Australia, 2018) on 15 January 2026 indicated a moderate hazard from earthquakes in the vicinity of the Project Area.
Lightning strike	Direct lightning strike could cause equipment damage and potential ignition	According to the Bureau of Meteorology (BoM) average annual thunder-day and lightning-ground flash density maps (BoM, 2026), there are approximately 20 to 25 thunder-days annually with lightning-ground flash density ranges from 1 to 3 flashes per square kilometre per year, which is considered a moderate lightning activity level.

6.10.3.1 Electric and magnetic fields

EMFs are naturally present in the environment. They are present in the earth's atmosphere as electric fields, while static magnetic fields are created by the earth's core. EMFs are also produced wherever electricity or electrical equipment is in use (e.g. household appliances, powerlines etc.) (Energy Networks Association Limited, 2016). Use of electricity means that people are exposed to EMF as part of daily life.

Electric fields arise from voltage differences and are proportional to voltage, measured in volts per metre (V/m). Magnetic fields occur when current flows and are proportional to current, measured in Tesla or Gauss. Both fields are strongest near the source and weaken with distance; electric fields can be shielded by materials, while magnetic fields cannot.

Existing sources of EMF within the site include the Rothbury Zone Substation and associated transmission lines. EMF associated with the generation, distribution and use of electricity power systems in Australia which have a frequency of 50 hertz are classified by Energy Networks Australia as Extremely Low Frequency (ELF) EMF.

6.10.4 Impact assessment

6.10.4.1 Preliminary risk screening

In accordance with the Applying SEPP 33 guideline, the following risks were considered in the preliminary risk screening:

- Storage of hazardous materials:
 - Containerised lithium iron phosphate (LFP) battery units (classified as Dangerous Goods (DG) Class 9 – Miscellaneous)
 - Coolant (50% ethylene glycol aqueous solution) within battery units (not classified as DG)
 - Transformer oil (FR3 dielectric fluid) in MV and auxiliary transformers (classified as DG Class C1 - Combustible liquid)
 - Diesel for use in the backup generator (classified as DG Class C1 - Combustible liquid)
 - Herbicides and pesticides in small quantities for vegetation management (not classified as DG)
- Transport of hazardous materials:
 - LFP batteries in the battery units
 - Coolant in each battery unit
 - Transformer oil and diesel products.

Appendix 2 of the Applying SEPP 33 guideline outlines other risk factors for consideration to identify hazards outside the scope of the risk screening method. A review of these risk factors concluded that the Project would not involve:

- Storage or transport of incompatible materials (i.e. hazardous and non-hazardous). Hazardous materials will be stored in dedicated areas and storage protocols in accordance with standard and guidelines will be followed
- Generation of hazardous waste
- Possible generation of dusts within confined areas
- Storage or processing operations involving high (or extremely low) temperature and/or pressures
- Activities involving hazardous materials with potential to cause significant offsite impacts
- Incompatible, reactive or unstable materials and process conditions that could lead to uncontrolled reaction or decomposition.

The preliminary risk screening found that the storage and transport of hazardous materials associated with the Project would not exceed the relevant risk screening threshold. No other risk factors were identified that could result in significant offsite impacts. The Project is not considered 'potentially hazardous' in the context of the Resilience and Hazards SEPP and does not require a PHA.

Regardless of the findings of the preliminary risk screening, the SEARs require a PHA covering hazards and risks associated with operation of the Project, which is included in **Appendix M** and summarised in the following sections.

6.10.4.2 Preliminary hazard and risk analysis

In accordance with the findings of the preliminary risk screening and the SEARs, a PHA was undertaken for the Project in accordance with HIPAP No. 6 and the MLRA guideline.

A HAZID was undertaken to identify all reasonably foreseeable hazards and associated events that may arise due to the operation of the Project. The HAZID identified 17 potential hazardous events.

Based on screening, the following scenarios were carried forward for more detailed consequence analysis and risk assessment to determine the potential impacts on offsite receptors arising from their associated effects:

- A battery unit on fire
- An MV or auxiliary transformer fire.

6.10.4.3 Consequence analysis

Consequence analysis of a battery unit or transformer fire was undertaken in the PHA for the following scenarios:

- Single battery unit – thermal runaway (pre-ignition)
- Single battery unit – fully developed fire
- Single transformer on fire

Analysis of these scenarios is presented in **Table 6.10-6**. Consequences identified include:

- Battery unit fire consequences:
 - Accumulation and ignition of flammable vapours inside a battery unit
 - Heat radiation
 - Toxic products of combustion such as Hydrogen fluoride (HF) generated from decomposition of battery electrolyte
- Transformer fire consequences:
 - Heat radiation.

Impact distances associated with heat radiation and toxic gas dispersion due to fire were estimated to determine potential for offsite impacts to sensitive receptors:

- **Heat radiation** - the potential for offsite impact from a fully developed fire considers the distance to the 'injury' level heat radiation criteria. The distance was estimated to be approximately 15 m from the side of the battery unit, or 7 m from the end of the battery unit
- **Toxic gas dispersion** – the analysis considered potential hydrogen fluoride release levels against toxic exposure criteria that inform harm levels following exposure (irritation, injury or fatality). As a conservative approach, the distance to the 'irritation' level was used to determine offsite impacts. The distance was calculated as 23 m.

A detailed evaluation of potentially hazardous incident scenarios, including consequence modelling, is provided in the PHA in **Appendix M**.

6.10.4.4 Risk assessment

The PHA has identified hazardous events associated with the operation of the Project. An assessment against HIPAP No. 4 criteria and AS/NZS 5139 risk criteria has been undertaken, including a review of separation distances and health effects.

The Project proposes to use a lithium iron phosphate chemistry which is considered less flammable than other lithium-ion battery chemistries. It is conservatively assumed in the PHA that a transformer fire could escalate to an adjacent battery unit and vice-versa.

Modelling of battery units on fire was undertaken to determine the heat radiation impact and toxic dispersion impact on receptors. The results of the modelling are presented in **Table 6.10-3** and **Table 6.10-4**.

The heat radiation impact modelling found that heat radiation impacts for both the side and end of the battery unit would be contained within the site, as such no fatality or injury impacts would reach offsite receptors (**Table 6.10-3**).

Table 6.10-3: Battery unit on fire – heat radiation impact

Battery unit aspect	Surface (L x H, m)	Distance (m) at receptor height (1.5 m) to heat radiation levels		
		4.7 kW/m ² (irritation)	12.6 kW/m ² (injury)	23.0 kW/m ² (fatality)
Side	8.81 x 2.79	15	9	6
End	1.65 x 2.79	7	4	3

Dispersion modelling of HF was undertaken as part of the risk assessment to determine the impact to receptors.

The dispersion model was used to determine the distances to the acute exposure guideline level (AEGL). The results of the HF dispersion modelling are presented in **Table 6.10-4**.

Table 6.10-4: Battery unit on fire – toxic dispersion impact (HF)

Project element	Capacity per unit (MWh)	HF generation rate (kg/s)	Typical Pasquill weather stability and wind speed	Distance (m) at receptor height (1.5 m) to AEGL levels		
				AEGL 1 (irritation)	AEGL 2 (injury)	AEGL 3 (fatality)
Battery unit	3.9	0.22	Daytime - Neutral (Class D) and 5 m/s (D5)	23	10	8
			Night – Very stable (Class F) and 2 m/s (F2)	3	2	2

The dispersion model found that fatal (AEGL-3) and injury (AEGL-2) toxic exposure effects are contained onsite for all battery units. Irritation toxic exposure effects are contained onsite for most battery units; the irritation distance of 23 m does however extend 8 m beyond the northern boundary of the site. The area north of site is zoned as 'RU2 Rural Landscape' and irritation effects do not extend to any residential or sensitive receptors within this area, hence HIPAP 4 risk criteria are met.

The Project has been designed with separation distances from sensitive receptors, such as residential areas, to minimise the potential for offsite risk. The separation distances are detailed in **Table 6.10-5**.

Table 6.10-5: Project design separation distances

Separation distance	Comment
Fatality distance (9 m)	The distance between a battery unit and the nearest site boundary is approximately 15 m for all battery units at the north of the site. This is more than the estimated fatality distance from a battery unit fire (9 m) and is equal to the estimated injury distance (15 m).
Injury distance (15 m)	
Risk or irritation (23 m)	The offsite impact due to toxic combustion products dispersion is mostly contained onsite, with the risk of irritation (23 m) extending approximately 8 m beyond the northern boundary. The land north of the boundary is zoned as 'RU2 Rural Landscape' and irritation effects do not extend to residential or sensitive uses within this area.

Based on the separation distance to the site boundary and sensitive receptors, consequences from the identified hazardous events are not expected to result in significant offsite impacts.

Using the risk matrix from AS/NZS 5139, the identified hazardous events were qualitatively risk profiled, and all found to be 'Very Low' or 'Low' risk.

6.10.4.5 Risk acceptability and compliance

The preliminary risk screening confirms that the Project does not meet the definition of a potentially hazardous industry under Applying SEPP 33.

Hazards and risk associated with battery unit and transformer fire have been assessed against HIPAP No. 4 and AS/NZS 5139 criteria. No scenarios with significant offsite consequences were identified, and societal risk is assessed to be negligible. All residual risks are considered acceptable following application of standard design and operational controls. It has been demonstrated in the PHA that a battery fire meets the HIPAP No. 4 land use planning consequence criteria.

The Project will be managed in accordance with the HIPAP criteria and relevant codes and standards to maintain compliance and ensure safe operation. Mitigation and management measures are provided in **Section 6.10.5**.

Table 6.10-6: Hazard analysis and risk assessment

Hazard/Event	Cause	Consequence	Potential impact	Severity	Likelihood	Risk
Fire - Battery unit	- Faulty equipment - Electrical fault - Mechanical damage or failure of battery case (e.g. overload, insulation breakdown, connection failures) - Battery thermal runaway (e.g. short circuit, overheating, overcharge) - External fire (e.g. substation fire, fire at existing facility, neighbouring sites) - Bushfire (e.g. encroachment of off-site bushfire, escalated event due to fire from other Project infrastructure)	- Fire radiation impact to onsite personnel or possibly off-site - Release of toxic or/and explosive combustible products - Escalation to other Project infrastructure	Onsite Offsite	Moderate (medical treatment for burn)	Rare (area not occupied and escape possible)	Low
Fire - MV or auxiliary transformer	- Faulty equipment - Transformer oil leak - Arc flash - Vandalism - External fire (e.g. battery unit on fire, switch room and control room building fire) - Bushfire (e.g. encroachment of off-site bushfire, escalated event due to fire from other Project infrastructure)	- Fire radiation impact to onsite personnel or possibly off-site - Release of toxic or/and explosive combustible products - Escalation to the battery units	Onsite Offsite	Moderate (medical treatment for burn)	Rare (area not occupied and escape possible, Factory Mutual approved transformer with low combustible oil)	Low

6.10.4.6 Electric and magnetic fields

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) are assigned with the responsibility for protecting the health and safety of people and the environment from EMF.

ARPANSA advises that there is no established scientific evidence that exposure to EMF causes adverse health effects or that exposure to ELF EMF is associated with long-term health effects (ARPANSA, 2026).

As part of a precautionary approach, an assessment of the typical exposure levels to EMF for the Project infrastructure has been undertaken.

The ICNIRP has produced guidelines for limiting EMF exposure, that define general public and occupational exposures, as set out in **Table 6.10-7**.

Table 6.10-7: Reference levels for EMF levels at 50 Hz

Exposure	ICNIRP reference levels	
	Electric field (V/m)	Magnetic field (μT)
General public	5,000	200
Occupational	10,000	1,000

High level exposure (i.e. exceeding the reference limits) may affect function of the nervous system causing muscle and nerve stimulation or visual disturbances, which may lead to injury for onsite personnel.

EMF created from the Project will not exceed the ICNIRP reference level for exposure to the public. Additionally, the strengths of electric and magnetic fields attenuate rapidly away from the source. As the Project is situated in a rural area and there is a large separation distance to the nearest residential receptor, off-site impacts are not expected.

The assessment concluded that the EMF created from the Project will not exceed the ICNIRP occupational exposure reference level.

Exposure to EMF would therefore result in no or minor injury (insignificant). Appropriate controls to limit exposure to EMF are outlined in **Section 6.10.5**.

The cumulative exposure to EMF from the Project and the existing Rothbury Zone Substation and transmission lines in the vicinity of the Project has not been assessed in the PHA. However, as the strength of EMF attenuates rapidly with distance, cumulative impacts at the closest sensitive receptors are considered negligible. Consequently, no off-site impact and no cumulative exceedance of EMF exposure limits is expected from the Project.

6.10.5 Mitigation and management measures

Mitigation and management measures that will be implemented for the Project to address hazards and risks are listed in **Table 6.10-8**. Most hazards identified in the assessment can be avoided or mitigated by employing a combination of standard measures.

Table 6.10-8: Mitigation and management measures – hazards and risk

ID	Mitigation/management measure	Timing
HR-1	Review and update the BESS OEM clearances and installation requirements, and transformer type and approval for separation distances once the OEM, make, and model are selected.	Detailed design

ID	Mitigation/management measure	Timing
HR-2	The final layout of the site will be confirmed during detailed design, following selection of the OEM. The final layout will be compliant with the clearance specifications and requirements of <i>AS 2067:2016 – Substations and high voltage installations exceeding 1 kV</i> . This will include the provision of appropriate risk controls, such as bunding, fire walls and/or minimum clearances to adjacent transformers, equipment and buildings, as required to manage fire propagation, safety and environmental risks.	Detailed design
HR-3	Project equipment and systems will be designed, installed tested, operated and maintained to comply with all relevant Australia and/or international standards and recognised codes of practice, including <i>AS/NZS 5139:2019 – Electrical installations – Safety of battery systems for use with power conversion equipment</i> .	Detailed design Construction Operation
HR-4	The Project will be certified under internationally recognised test methods such as the <i>Underwriters Limited (UL) 9540A Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage System</i> to demonstrate acceptable system-level fire and thermal runaway performance.	Detailed design
HR-5	Electrical systems will be independently endorsed by the Owner's Engineer and will be installed, operated and maintained by certified electrical contractors and trained personnel in accordance with approved procedures. All personnel undertaking electrical works will complete a site induction and competency verification prior to commencing work, to ensure familiarity with applicable procedures, hazards and safety controls.	Construction Operation
HR-6	A Fire Safety Study (FSS) will be prepared in accordance with <i>HIPAP No. 2 Fire Safety Study Guidelines</i> (DoP, 2011), in consultation with FRNSW and DPHI. The FSS will demonstrate compliance with the requirements of <i>FRNSW Fire Safety Guideline Technical Information: Large-scale external lithium-ion battery energy storage systems - Fire safety study considerations</i> (D22/107002). The FSS will specify the Project's fire safety design requirements, including minimum battery unit separation distances and provisions for the containment and management of fire-fighting water on site, where required.	Pre-construction
HR-7	The Preliminary Hazard Analysis prepared for the Project (Appendix M) will be reviewed against the detailed design to confirm consistency with assessed assumptions. The PHA will be re-evaluated where minimum separation distances cannot be achieved or where material changes to battery technology, layout or hazard characteristics are proposed.	Detailed design
HR-8	Controls will be included in the Project's CEMP/OEMP and implemented to manage any potentially hazardous liquids and/or other dangerous goods in accordance with Australian Standards requirements, including AS 1940 for flammable liquids control.	Construction Operation
HR-9	Warning signs will be installed and maintained as per code and standards requirements, and will include signage for dangerous goods, electrical hazards, arc flash and entry procedures.	Detailed design Construction
HR-10	Preventative maintenance practices will be put in place, including an asset protection zone, and vegetation management within the Project's Operational Footprint.	Operation

6.11 Bushfire

6.11.1 Secretary's Environmental Assessment Requirements

Table 6.11-1 sets out the SEARs relevant to bushfire and where these requirements have been addressed in this EIS.

Table 6.11-1: Relevant SEARs – Bushfire

Relevant SEARs	
Hazards	Where addressed
The EIS must address the following specific matters:	
Bushfire - a bush fire hazard assessment completed by a suitably qualified consultant and identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a BESS would cause a bush fire and demonstrate compliance with Planning for Bush Fire Protection 2019.	A Bushfire Risk Assessment has been prepared and is provided in Appendix N and summarised in this section (Section 6.11).

6.11.2 Methodology

A Bushfire Risk Assessment (BRA) was prepared by Blackash Bushfire Consulting Pty Ltd (Blackash) for the Project. The BRA was prepared taking into consideration the following legislative policies, Acts, and guidelines:

- Australian Standard *AS 3959:2018 Construction of buildings in bushfire-prone areas*
- EP&A Act
- Guideline for Bush Fire Prone Land Mapping* (NSW Rural Fire Service (NSW RFS), 2015)
- Planning for Bushfire Protection 2019* (NSW Rural Fire Service, 2019a)
- Rural Fires Act 1997*.

A full description of how these policies, Acts, and guidelines were applied is provided in the BRA provided in **Appendix N**.

The BRA includes an analysis of the hazard, threat, and subsequent bushfire risk to the Project and addresses the aims, objectives, and the provisions detailed in Section 8.3.5 (wind and solar farms) of PBP 2019.

The BRA includes a bushfire landscape assessment and bushfire attack assessment for the Project.

The bushfire landscape assessment evaluates the likelihood, severity, and potential impact of bushfires on life and property within the broader landscape. It draws on the *Lower Hunter Bush Fire Risk Management Plan* (NSW RFS, 2023) for climate, bushfire season, population, and fire history data. The assessment also uses Blackash's Landscape Scale Assessment Tool (LSAT), which combines quantitative and qualitative analysis with expert judgment to determine overall landscape-scale risk. Key factors considered in the assessment include:

- Extent and continuity of vegetation
- Topography
- Prevailing winds
- Potential fire run and areas likely to be impacted by a fire
- Impact on evacuation routes to safer places considering road networks, distances, and landscape factors
- Location and exposure of the Project to bushfire
- Ability to seek bushfire shelter onsite or at alternative locations
- Extent of neighbourhood-scale damage that a bushfire may produce.

Bushfire Attack Levels (BAL) were determined in accordance with PBP 2019. The methodology for determining BAL comprised the following steps:

- Step 1: Determine vegetation formation in all directions around the building to a distance of 140 m
- Step 2: Determine the effective slope of the land from the building for a distance of 100 m
- Step 3: Determine the relevant Forest Fire Danger Index (FFDI) for the council area in which the development is to be undertaken
- Step 4: Determine the separation distance by measuring from the edge of the unmanaged vegetation to the closest external wall of an asset
- Step 5: Match the relevant FFDI, appropriate vegetation, distance and effective slope to determine the appropriate BAL using the relevant tables in PBP 2019.

The vegetation formations (bushfire fuels) and the topography (effective slope) combine to create the bushfire threat that may affect bushfire behaviour at the site, and which determine the planning and building response of PBP 2019. A detailed assessment was undertaken to determine the bushfire hazard and likely radiant heat at the site (refer to **Appendix N**).

6.11.3 Existing environment

6.11.3.1 Bushfire prone land

The NSW RFS bush fire prone land online mapping tool (NSW RFS, 2025) identifies that the Project Area is designated as bushfire prone land (BFPL), as shown in **Figure 6.11-1**.

The NSW Bush Fire Prone Lands mapping (NSW DPE, 2025) identifies that the Project Area is located within an area that is mapped as Vegetation Category 3, which is considered to be medium bush fire risk vegetation.

Vegetation in proximity to Black Creek, located within the site to the west of the Project Area, is mapped as Vegetation Category 1, which is considered to be the highest risk for bushfire. This vegetation category has the highest combustibility and likelihood of forming fully developed fires including heavy ember production.

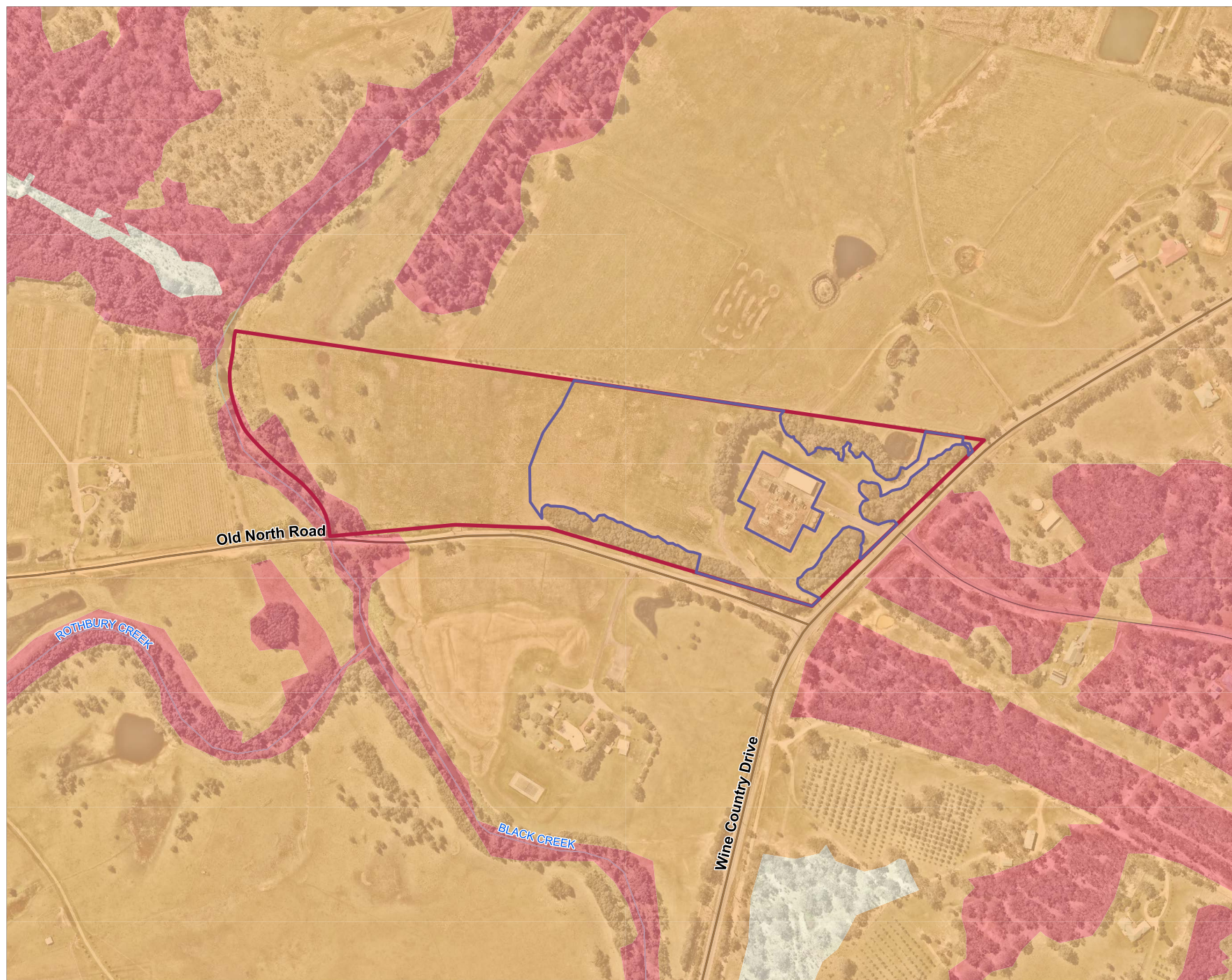
The landscape surrounding the site is predominantly grassland categorised as Vegetation Category 3. Smaller patches of Category 1 vegetation are present in the surrounding area, typically comprising woodland and forested areas.

6.11.3.2 Vegetation formation

Vegetation is classified by structure or formation using the system adopted by David Keith (2004) and by the general description using PBP 2019. Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation has been determined for the site over a distance of at least 140 m in all directions from the site. Where a mix of vegetation types exist, the type providing the greater hazard to the site is said to predominate.

The vegetation formation within the site has been categorised as 'Grassland'. The planted screening trees and vegetation along sections of the site perimeter and surrounding the Rothbury Zone Substation are low threat vegetation exclusions, in accordance with Appendix 1 of PBP 2019.

**FIGURE 6.11-1:
BUSHFIRE PRONE LAND**



Legend

-  The site
-  Project Area

NSW Bush Fire Prone Land

-  Category 1
-  Category 2
-  Category 3

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6.11.3.3 Topography and slope

The slope under classified vegetation influences the rate of fire spread and the intensity of radiant heat, with fires typically moving faster uphill due to pre-heating of vegetation above the flame front. Steeper slopes can significantly increase the rate of spread of fires.

The effective slope is the slope of the ground under the hazard (vegetation). Effective slope is the slope that most significantly affects potential fire behaviour between the hazard and the Project. The effective slope influencing fire behaviour approaching the site was assessed in the BRA in accordance with the methodology specified within PBP 2019.

The site and surrounding area are characterised by relatively flat country with gentle topography. The Project Area is typically characterised by downslopes averaging 0.3 degrees. An upslope with an average of 1.1 degrees extends to the south of the Project Area. Moderate upslopes are present in the vicinity of Black Creek to the west of the site, which have typical slope angles of between 3.6 and 8.1 degrees.

6.11.3.4 Fire weather and history

The fire weather is dictated by PBP 2019 and RFS NSW Local Government Areas FDI (RFS NSW, 2017) and assumes a credible worst-case scenario and an absence of other mitigating factors relating to aspect or prevailing winds.

The Forest Fire Danger Index (FFDI), calculated by the McArthur M 5 Forest Fire Danger Meter (McArthur, 1967), measures the degree of danger of fire in Australian vegetation. The higher the rating the more dangerous the fire weather conditions. The FFDI required to be used for development assessment purposes is based on local government boundaries. The Cessnock City Council LGA is within the Greater Hunter Weather District and has an FFDI of 100.

Data from the NSW National Parks and Wildlife Service (NPWS) and the Australian and New Zealand National Council for Fire and Emergency Services (AFAC), which generally spans the past 40 years, indicates that no bushfire events have been recorded within the site and limited bushfire history within an indicative 10 km radius. The largest bushfire within 5 km of the site was experienced in 2002 located to the east of the site. Smaller fires occurred within 2 km of the site in 2005, 2019 and 2023.

The fire history mapping indicates the site is at low risk of bushfire

6.11.3.5 Landscape-scale fire risk

Landscape-scale fires are those that can span many kilometres or tens of kilometres, and that burn for days or weeks at a time. Typically, these fires can be many thousands of hectares in size with fire fronts many kilometres in length.

The BRA identified that there is no potential for a landscape-scale fire to affect the site. With consideration given to various parameters, as well as the landscape context and the design of the Project complying with PBP 2019, the overall Landscape Scale Threat for the site is assessed as low risk.

6.11.3.6 Bushfire Attack Level

Bushfire Attack Level (BAL) is a means of measuring the severity of a building's potential exposure to ember attack, radiant heat, and direct flame contact. BAL ratings form the basis for construction requirements under AS 3959:2018, ensuring building elements are designed to reduce bushfire risk.

The BRA for the Project identified BAL-29 as an appropriate risk management standard. BAL-29 indicates potential exposure to radiant heat flux between 19 kilowatts per square metre (kW/m²) and 29 kW/m², with a high risk of ember attack and possible flame contact during a bushfire.

BAL-29 aligns with industry standards for components analogous to BESS and associated infrastructure and is intended to minimise ignition risk and structural failure, thereby protecting life and property. The Project has been designed to comply with the construction requirements for BAL-29 as prescribed in AS 3959:2018.

6.11.3.7 Asset Protection Zone

In accordance with Section 8.3.5 of PBP 2019, a minimum Asset Protection Zone (APZ) of 10 m is required for structures, buildings and infrastructure associated with the Project.

An APZ has been applied across the Project Area as illustrated in **Figure 6.11-2**. The minimum APZ proposed is 10m, which is a requirement under PBP 2019. The APZ distances in the current Project layout meet or exceed the minimum setback required to limit radiant heat exposure to less than 29 kW/m², consistent with a BAL-29 outcome.

The APZ established to protect the Project from bushfire also provides a secondary benefit by reducing the likelihood of vegetation ignition from any potential battery unit fire.

FIGURE 6.11-2:
ASSET PROTECTION ZONE



Legend

-  The site
-  Project Area
-  Containerised battery units
-  Operational Footprint
-  Noise barrier
-  Main road
-  Asset Protection Zone (APZ) (minimum of 10 m)

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6.11.4 Potential impacts

6.11.4.1 Construction and decommissioning

Bushfire risk during construction and decommissioning depends on fuel loads, weather conditions, and potential fire size.

Construction activities may generate ignition sources through the use of plant and equipment, exhaust emissions, hot works, electrical faults, improper chemical storage, or deliberate acts such as arson. If not effectively managed, these could lead to a fire escaping the Project Area and spreading to surrounding land, causing potential damage to the Project and adjacent properties.

An uncontrolled bushfire occurring within or near the Project Area during construction of the Project could result in workers being exposed to fire, leading to potential injury, emergency evacuation, and disruption to construction activities.

While the threat to construction personnel from fast-moving bushfires is generally limited, mitigation and management measures including the provision of firefighting water supplies and availability of first-attack firefighting equipment are proposed. Firefighting water quantity, locations and access will be determined as part of the Fire Safety Study (FSS) to be developed in consultation with NSW Fire & Rescue during the detailed design of the Project.

Mitigation and management measures to reduce bushfire impacts during construction and decommissioning are outlined in **Section 6.11.4.2** and further detailed in the BRA in **Appendix N**.

6.11.4.2 Operation

Bushfire impacts during the operational phase of the Project are primarily associated with ignition and fire propagation, which could lead to significant consequences for the Project and surrounding areas.

Potential ignition sources include the use of onsite equipment, exhaust emissions from vehicles and machinery, hot works such as welding or grinding, electrical equipment faults, inappropriate chemical storage, and deliberate acts such as arson. If not effectively managed, these ignition sources could result in a fire escaping the Operational Footprint and spreading uncontrollably, causing damage to the Project's infrastructure and adjacent properties.

The BRA determined that it is unlikely a battery unit fire will ignite a bushfire through radiant heat flux. In the event of a battery unit self-igniting due to damage or malfunction, the radiant heat generated by a would be insufficient to ignite surrounding vegetation.

However, provision of an APZ designed to reduce radiant heat exposure from a bushfire to less than 29 kW/m² (BAL-29 standard) will also provide a setback that limits radiant heat from a battery unit fire reaching nearby vegetation, thereby reducing the likelihood of bushfire ignition.

Additional operational impacts include the potential for workers to be exposed to an out-of-control bushfire affecting the site. A bushfire event could also disrupt power supply if critical infrastructure is damaged, resulting in service interruptions and potential loss of essential assets.

The APZ provides a baseline separation distance but does not fully account for the vulnerability of the Project's infrastructure to bushfire attack, including embers, radiant heat, flame contact and smoke, nor the consequence of disruption to critical infrastructure.

Mitigation and management measures will be implemented during the operational phase to safeguard life, protect the Project's infrastructure and adjacent properties, and ensure continuity of energy supply. These measures are outlined in **Section 6.11.4.2** and further detailed in the BRA in **Appendix N**.

6.11.5 Mitigation and management measures

Mitigation and management measures that would be implemented for the Project to address potential bushfire impacts are outlined in **Table 6.10-8**.

Table 6.11-2: Mitigation and management measures – bushfire risk

ID	Mitigation/management measure	Timing
BF-1	Essential Project equipment will be designed and housed to minimise bushfire impacts on operational capability and to avoid increasing bushfire risk to surrounding vegetation. Compliance with this measure will be demonstrated through detailed design documentation and certification, confirmation during construction that approved bushfire protection measures have been implemented, and ongoing inspection and maintenance under the Project's OEMP.	Detailed design Construction Operation
BF-2	The Asset Protection Zone (APZ) will comprise a permanent service trail encircling the Project and maintained grassed areas. The APZ will be maintained to the standard of an Inner Protection Area (IPA) for the life of the Project in accordance with Appendix 4 of NSW Rural Fire Service's <i>Planning for Bushfire Protection 2019</i> and <i>Standards for asset protection zones</i> .	Operation
BF-3	Hot work (activities involving high temperatures) and fire risk work (activities involving heat or with the potential to generate sparks) will be managed under a Hot Work and Fire Risk Work Procedure, which will be incorporated into and implemented as part of the Project's CEMP and OEMP. Measures will include, but not be limited to, controls for elevated fire danger conditions, including suspension of activities on days of elevated or extreme fire risk.	Construction Operation Decommissioning
BF-4	Non-essential works with the potential to ignite a fire or exacerbate fire spread will be postponed on days with a Fire Danger Rating of Extreme and Catastrophic and on days of Total Fire Ban (TOBAN). All personnel will receive a site induction that includes clear instruction on activities permitted and prohibited on days of TOBAN, including any exemptions notified by the Commissioner of the NSW RFS under section 99 of the <i>Rural Fires Act 1997</i>. Where essential operational works are required on a TOBAN day, such works will only proceed where permitted under the Project's Hot Work and Fire Risk Work Procedure and in accordance with any applicable NSW RFS exemptions and required controls.	Construction Operation Decommissioning
BF-5	Project access and internal site roads will be designed in accordance with property access requirements in <i>Planning for Bushfire Protection 2019</i> to ensure medium rigid firefighting vehicles can enter and exit the site safely.	Detailed design
BF-6	Provision for firefighting water has been incorporated into the Project design and assessed in the EIS. The final requirement for firefighting water infrastructure, including confirmation of capacity, location and access arrangements, will be determined through preparation of a Fire Safety Study (FSS) developed in consultation with Fire and Rescue NSW (FRNSW) and informed by the Bushfire Risk Assessment (Appendix N). The Bushfire Risk Assessment will continue to inform the FSS where its assumptions remain valid. Reassessment of the Bushfire Risk Assessment will only be required where detailed design outcomes or site conditions change materially from those previously assessed. Firefighting water infrastructure will be implemented during construction where required by the outcomes of the FSS.	Detailed design Construction

ID	Mitigation/management measure	Timing
BF-7	Vegetation management will be undertaken in accordance with the outcomes of the FSS.	Construction Operation Decommissioning
BF-8	A Bushfire Emergency Management & Operations Plan (BEMOP) will be prepared and implemented in accordance with the FSS and Bushfire Risk Assessment. The BEMOP will incorporate a Bushfire Emergency Response Plan (BERP) that outlines emergency response procedures for fires occurring within, or in the vicinity of, the Project. The BERP component will include defined triggers and circumstances for modifying or ceasing Project operations (such as the approach of a bushfire or grassfire to Project infrastructure), emergency communication arrangements, and response and evacuation procedures. The BEMOP (including the BERP) will include, but not be limited to: • Measures to prevent or mitigate ignition of bushfires associated with Project activities • Identification of works that must not be undertaken during periods of elevated bushfire risk, including TOBAN days • Availability, location and access to fire-suppression equipment, including firefighting water where provided • storage, handling and maintenance protocols for fuels and other flammable materials • Procedures for notifying the local NSW RFS Fire Control Centre of proposed works with potential to ignite surrounding vegetation during bushfire danger periods, to confirm suitability of weather conditions; and • Bushfire emergency management and response procedures, including evacuation, communication and operational shutdown protocols. The BEMOP (including the BERP) will be prepared in accordance with the NSW RFS <i>Guide to Developing a Bushfire Emergency Management Plan, AS 3745-2010: Planning for Emergencies in Facilities</i>, and the NSW Hazardous Industry Planning Advisory Papers, and will be developed in consultation with the local Bush Fire Management Committee.	Construction Operation Decommissioning
BF-9	All staff will be trained during the site induction in emergency procedures applicable to the Project and the correct use of firefighting equipment.	Construction Operation Decommissioning

6.12 Social and economic

6.12.1 Secretary's Environmental Assessment Requirements

Table 6.12-1 sets out the SEARs relevant to Social and Economic impacts and where these requirements have been addressed in this EIS.

Table 6.12-1: Relevant SEARs – social and economic

Relevant SEARs	Where addressed
Social	
This EIS must address the following:	
An assessment of the social impacts or benefits of the project for the region and the State as a whole in accordance with the <i>Social Impact Assessment Guideline</i> (DPE, 2023), including consideration of any increase in demand for community infrastructure services, and consideration of construction workforce accommodation.	An assessment of the social impacts of the Project is provided in Section 6.12.4 and Appendix O .
Economic and Benefit Sharing	
This EIS must address the following:	
an assessment of the economic impacts or benefits of the project for the region and the State as a whole and provide details of any proposed voluntary benefit sharing, having regard to the <i>Benefit-Sharing Guideline 2024</i> and <i>Private Agreement Guideline 2024</i>.	An assessment of the economic impacts of the Project is provided in Section 6.12.5 and Appendix O .

6.12.2 Methodology

A Social and Economic Impact Assessment (SEIA) has been prepared by AECOM (2026) to assess the impacts of the Project in accordance with the *Social Impact Assessment Guideline* (DPE, 2023) (the SIA Guideline) and *Technical Supplement: Social Impact Assessment Guideline for State Significant Projects* (DPE, 2023) (SIA Supplement). The SEIA is included in **Appendix O** and summarised in this section.

6.12.2.1 Social impact assessment methodology

Social impact study areas

The study area for the social impact assessment (SIA), referred to as the 'social locality' in accordance with the SIA Guideline, was defined to capture the likely direct and indirect areas of influence associated with the construction and operation of the Project.

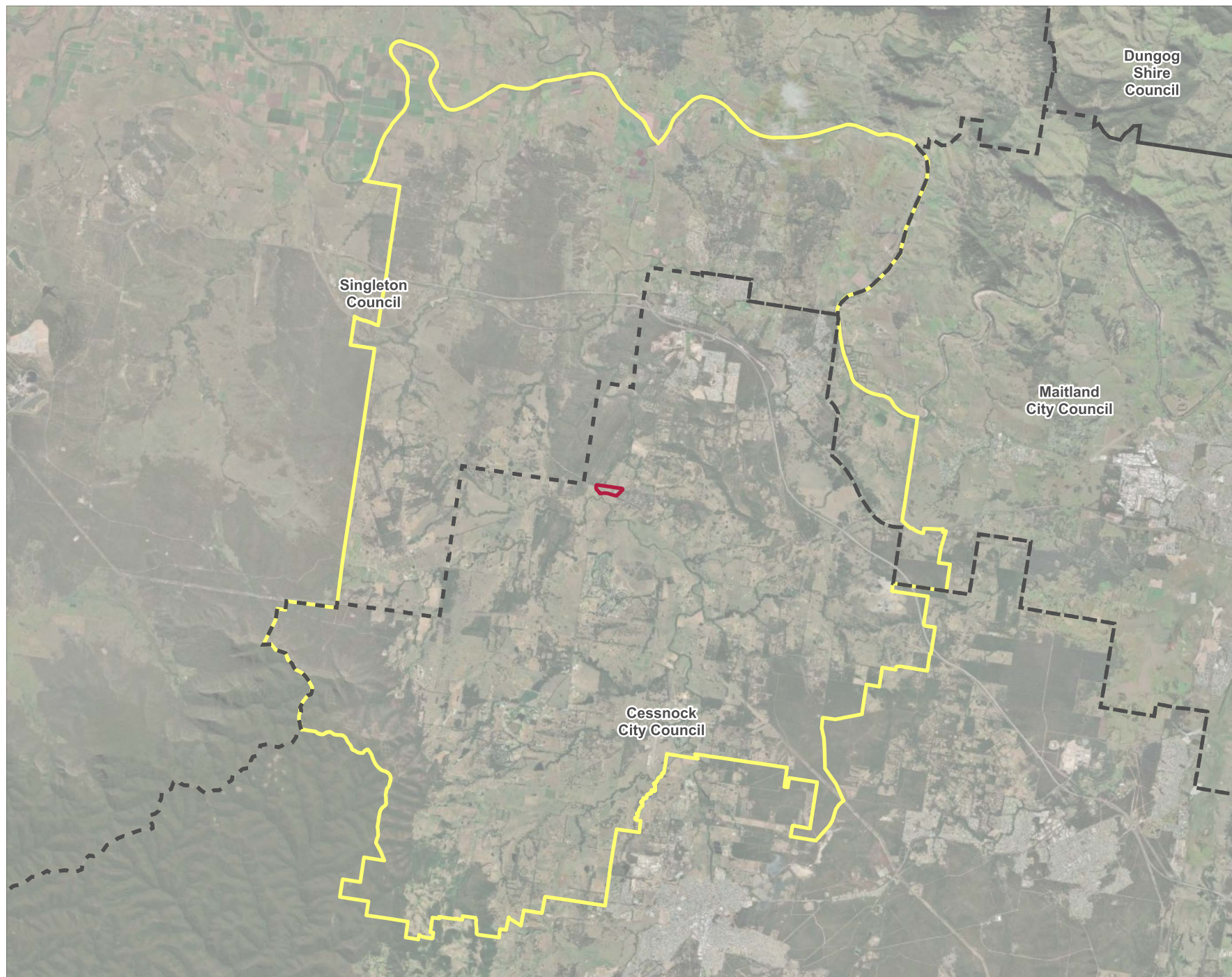
To ensure the assessment considered surrounding communities at an appropriate scale, the social locality was delineated at the Australian Bureau of Statistics (ABS) Statistical Area Level 2 (SA2), consistent with the SIA Guideline. The selected SA2 for the assessment is 'Branxton – Greta – Pokolbin', as shown in **Figure 6.12-1**.

For context and comparison, demographic and socio-economic data for this SA2 were benchmarked against the neighbouring Cessnock SA2, Singleton SA2, and the broader NSW population.

Recognising the potential for multiple and overlapping impacts, the assessment also defined two sub-areas, as shown in **Figure 6.12-2**:

- Primary impact area:** The immediate vicinity of the Project Area, where residents and businesses are most likely to experience minor to moderate impacts
- Secondary impact area:** The remainder of the social locality, where people living or working are expected to experience minor to moderate social impacts.

**FIGURE 6.12-1:
SOCIAL LOCALITY**



Legend

-  The site
-  LGA boundary

Statistical Area 2 boundary

-  Branxton - Greta - Pokolbin SA2

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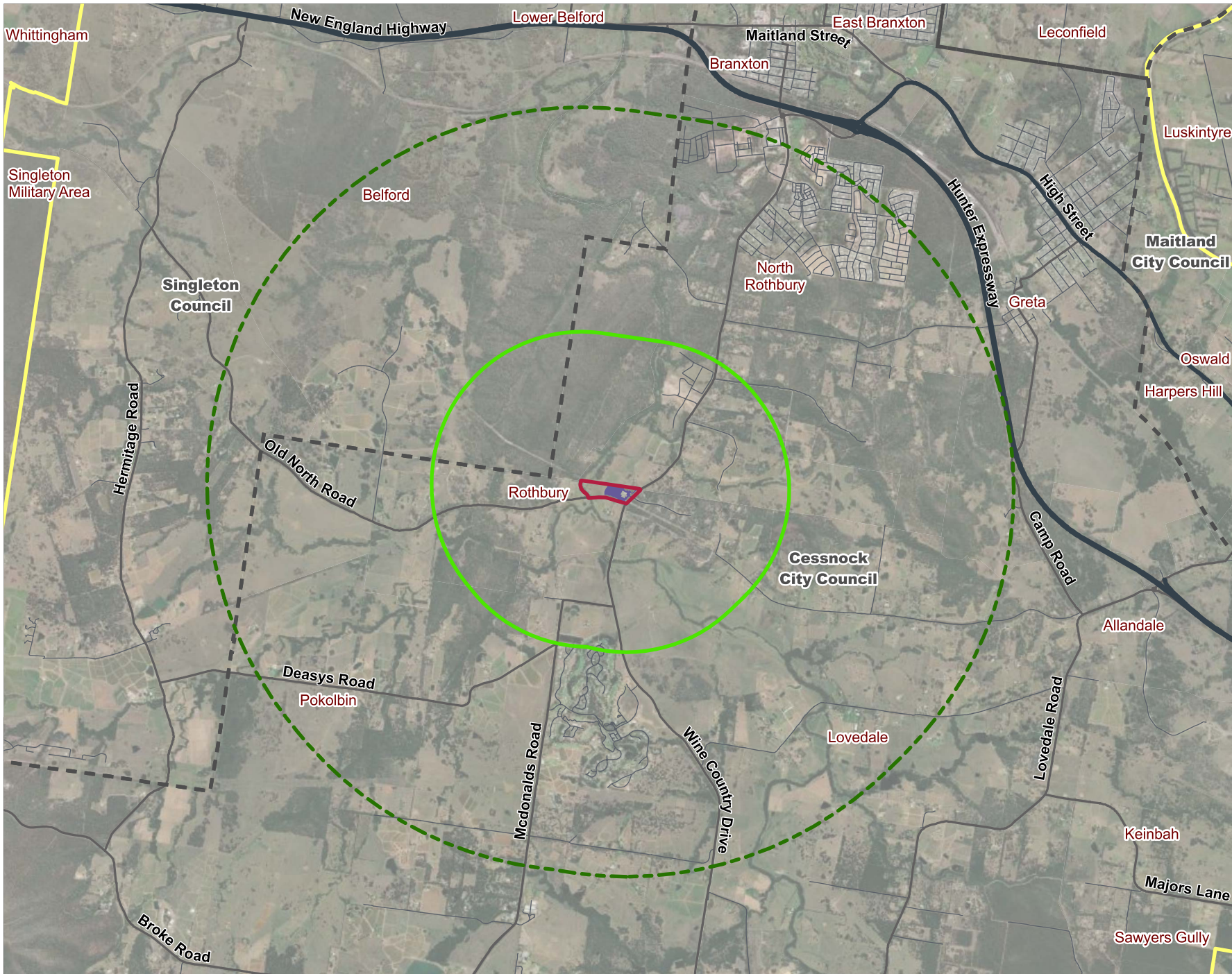


FIGURE 6.12-2:
SOCIAL LOCALITY - IMPACT AREAS

Legend

- The site
- Project Area
- Primary Impact Area
- Secondary Impact Area
- LGA boundary
- Motorway
- Main road
- Local road

Statistical Area 2 boundary

- Branxton - Greta - Pokolbin SA2

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Social impact assessment approach

This SEIA has been prepared to understand the social environment and context within and around the Project's social locality and consider its impacts in a broad, inclusive and culturally sensitive manner.

The SEIA was informed by the SIA Guideline and SIA Supplement which provided a structured framework to understand and evaluate the Project's impacts on the following social factors:

- **Way of life** – how people live, get around, work, play and interact with one another on a day-to-day basis
- **Community** – its composition, cohesion, character, how it functions, and sense of place
- **Accessibility** – how people access and use infrastructure, services, and facilities
- **Culture** – people's shared beliefs, customs, values and stories, and connections to Country, land, water, places, and buildings
- **Health and wellbeing** – people's physical, mental, social, and spiritual wellbeing
- **Surroundings** – access to and use of natural and built environment, including ecosystem services, public safety, and security, as well as aesthetic value and amenity
- **Livelihoods** – including impacts on employment or business, experience of personal breach or disadvantage, and the distributive equity of impacts and benefits
- **Decision-making systems** – the extent to which people are able to participate in decisions that affect their lives, procedural fairness, and the resources provided for this purpose.

Impacts relating to each of the above factors were evaluated for their likelihood and magnitude. A Social Significance Rating was derived from this analysis, using the social impact significance matrix in **Table 6.12-2**, in accordance with the SIA Supplement.

Table 6.12-2: Social impact significance matrix

		Magnitude level				
Likelihood level		1	2	3	4	5
		Minimal	Minor	Moderate	Major	Transformational
A	Almost certain	Low	Medium	High	Very high	Very high
B	Likely	Low	Medium	High	High	Very high
D	Possible	Low	Medium	Medium	High	High
E	Unlikely	Low	Low	Medium	Medium	High
F	Very unlikely	Low	Low	Low	Medium	Medium

Source: *Technical Supplement - Social Impact Assessment Guideline for State Significant Projects* (NSW DPE, 2023)

6.12.2.2 Economic impact assessment methodology

Economic impact study area

The economic impact of the Project was assessed for NSW and the Hunter Region.

Economic impact assessment approach

The Economic Impact Assessment (EIA) was undertaken using a qualitative framework to identify and assess the Project's direct, indirect and broader system-level economic impacts. The assessment drew on Project-specific inputs, including capital and operational expenditure, workforce requirements and procurement assumptions, alongside publicly available information on battery storage technology, energy market trends and NSW policy.

Regional economic conditions were also reviewed to understand local workforce capacity, industry structure and the ability of nearby centres to participate in and benefit from the Project.

Economic impacts were evaluated across both construction and operational phases of the Project by examining expected Project expenditure, opportunities for local procurement and employment, potential import leakage and the scale of likely regional benefits.

The assessment also considered wider NEM benefits, including enhanced grid reliability and renewable energy integration. This approach provided a proportionate and evidence-based understanding of the Project's overall economic contribution.

6.12.2.3 Consultation

The SEIA was informed by consultation with relevant stakeholder and community members undertaken by Ausgrid. Further details of consultation and engagement activities are provided in **Chapter 5.0**.

Due to the relatively isolated nature of the Project, no SEIA-specific consultation was carried out.

6.12.3 Existing environment

6.12.3.1 Demographic profile

The SEIA examined the demographic characteristics of the social locality using ABS 2021 Census data and projected resident population trends. A detailed profile is provided in **Appendix O**, with key findings summarised below:

- **Population and age:** The social locality has a population of 12,770 and a median age of 36, which is lower than the NSW median of 39, indicating a comparatively younger community.
- **Aboriginal and Torres Strait Islander population:** Aboriginal and Torres Strait Islander peoples comprise 7.3% of the population, more than double the NSW average (3.0%)
- **Cultural diversity:** A higher proportion of residents speak English only at home (92.6%) compared with NSW (73.0%), suggesting lower cultural and linguistic diversity in the area
- **Housing characteristics:** Separate houses dominate (94.4% of dwellings), significantly higher than the NSW rate (65.6%). Home ownership with a mortgage is also higher (48.1% compared with 32.5% in NSW), while the proportion of renters (21.3%) is lower than the NSW average (32.6%). The share of homes owned outright is slightly lower than the NSW average
- **Household structure:** Family households are more prevalent (80.0%) compared with NSW (71.2%), while single-person households are less common (18.0% compared with 25.0% in NSW).

6.12.3.2 Vulnerable communities

The SEIA considered population groups within the social locality that may be vulnerable or marginalised, recognising that these groups can experience social and economic impacts differently. The following groups were identified and assessed in the SEIA:

- **Aboriginal communities:** The social locality has a higher proportion of its population identify as indigenous compared to NSW. This may increase the potential for disproportionate impacts, particularly in relation to cultural values, connections to Country and sensitivity to changes in the local landscape
- **Older people:** While older and elderly residents are generally considered a potentially vulnerable group, the social locality has a significantly lower proportion of people aged 65 years and over compared with NSW. As such, the likelihood or scale of age-related vulnerability is reduced relative to other communities
- **People with a need for assistance:** Individuals who self-identify as requiring assistance with daily activities represent another potentially vulnerable group. In 2021, 4.4% of the social locality identified as needing assistance, slightly below the NSW average of 5.8%. This group was considered in relation to potential changes to accessibility, mobility and amenity.

6.12.3.3 Local social infrastructure

The nearest social infrastructure to the Project is the Vintage Golf Club, located approximately 3 km south of the site. Huntlee Medical Centre and Huntlee Shopping Centre are both around 5 km to the north, while Branxton Public School and Branton Community Hall are located approximately 7 km to the north.

Economic context

The nearest local centre to the site is Branxton, located approximately 6 km to the north. The closest major urban centres are Singleton, around 20 km to the north-west, and Cessnock, approximately 13 km to the south-east.

The site is located within the Hunter Region of NSW, an economy historically underpinned by the mining, energy and manufacturing sectors. As NSW transitions toward a net-zero future, the region is experiencing economic diversification. Tourism and agriculture, particularly viticulture and wine-related tourism, have become increasingly important contributors to the Hunter's economic profile.

Employment profile and income

The three largest employment industries within the social locality are Mining (14.8%), Health Care and Social Assistance (11.0%) and Accommodation and Food Services (8.6%). Each of these sectors has a higher share of workers compared with the NSW average, reflecting the region's strong mining presence and its established tourism and service economy.

Unemployment in the social locality is significantly lower than the NSW rate, with 3.5% of residents unemployed at the 2021 Census compared to 5.0% across NSW. Median weekly household income is also higher at \$2,128, compared with \$1,829 for NSW and lower incomes recorded in nearby urban centres such as Cessnock (\$1,493) and Singleton (\$1,935).

Housing affordability appears comparatively favourable, with 12.6% of households paying more than 30% of their income on mortgage payments, lower than the NSW average of 17.3%.

Construction workforce and industry

The SEIA assessed the construction workforce across LGAs within a reasonable commuting distance of the Project. Across these LGAs, a combined 32,143 people are employed in the construction industry, indicating a strong regional skill base capable of supporting the Project and reducing the likelihood of significant workforce relocation.

6.12.4 Social impact assessment

6.12.4.1 Construction

An assessment of the potential social impacts associated with the construction of the Project, the proposed mitigation and management measures and an assessment of the residual impacts following the application of the proposed measures is provided in **Table 6.12-3**.

Table 6.12-3: Assessment of social impacts during construction of the Project

Social factor	Potential impact	Unmitigated impact ratings			Mitigation and management measures	Mitigated impact ratings		
		Likelihood	Magnitude	Social significance rating		Residual likelihood	Residual magnitude	Residual significance rating
Way of life	People's ability to move around their community is important for accessing work, services and social activities. The Project is located away from major residential areas, which would minimise disruption to local travel patterns. Construction activities would temporarily increase traffic on Wine Country Drive and Old North Road but the TIA (Appendix K) found the impacts to be acceptable with negligible effects on road operation, noting only minor short-term delays during any required intersection or local road upgrades.	Possible	Minor	Medium (negative)	Section 6.8.8	Unlikely	Minor	Low (negative)
	Temporary utility interruptions may occur during construction tie-ins (e.g. electricity, telecommunications, water, sewage), but any outages are expected to be short-term and localised to the immediate works area with advance notification provided.	Unlikely	Minor	Low (negative)	No specific measures proposed	Unlikely	Minor	Low (negative)
	Access to accommodation for tourists and visitors is important in this winery and events-focused area. While the construction workforce will be sourced locally where practicable, a small number of relocating workers could increase short-stay demand; however, nearby centres such as Singleton, Maitland and Cessnock have sufficient capacity, so any accommodation impacts are expected to be temporary and localised given the reliance of local businesses on visitor stays.	Unlikely	Moderate	Medium (unlikely)	Section 6.12.7	Unlikely	Minor	Low (negative)
Community	Construction of the Project may temporarily influence the local demographic profile by increasing the daytime population, with up to 100 workers onsite at peak. Most construction personnel are expected to be sourced from within a reasonable commuting distance, meaning little to no change in the night-time population and limited potential for workforce-related in-migration. The surrounding area hosts a small community with few nearby businesses or residences, so the temporary increase in daytime activity may create some perceived pressure or dissatisfaction among a small number of residents.	Possible	Minor	Medium (negative)	Section 6.12.7	Unlikely	Minor	Low (negative)
	Social cohesion refers to the relationships, trust and sense of connection shared amongst community members. Temporary disruption to local amenity can influence how people experience their neighbourhood and interact with one another, particularly in small or close-knit rural areas. Construction of the Project would introduce short-term changes such as increased noise, dust, construction traffic and reduced visual quality, as identified in the NVIA (Appendix J), TIA (Appendix K) and LCVIA (Appendix I). While these impacts will be managed through appropriate mitigation measures, temporary changes to the landscape and acoustic environment may affect how nearby residents and businesses perceive the area and its rural character. For some community members, this may create minor but temporary frustration or reduce the enjoyment of shared spaces, which can influence the day-to-day sense of place and cohesion. However, given the short construction period, limited number of sensitive receivers and the implementation of mitigation and communication mechanisms, any effects on social cohesion are expected to be low and reversible.	Possible	Minor	Medium (negative)	Section 6.6.6 Section 6.7.6 Section 6.8.8 Section 6.12.7	Unlikely	Minor	Low (negative)
Accessibility	Access to infrastructure, services and facilities (whether provided by public, private or not-for-profit organisations) can be affected by the construction of large-scale infrastructure projects. Overall, it was determined that the Project would result in minimal impacts to infrastructure, services and facilities in the social locality as parking will be provided onsite and access to roads will be maintained.	Unlikely	Minor	Low (negative)	No specific measures proposed	Unlikely	Minor	Low (negative)

Social factor	Potential impact	Unmitigated impact ratings			Mitigation and management measures	Mitigated impact ratings		
		Likelihood	Magnitude	Social significance rating		Residual likelihood	Residual magnitude	Residual significance rating
Culture	An ACHAR (Appendix F) confirmed that the Project Area forms part of a culturally significant landscape for local Aboriginal people. Surveys and archaeological test excavation identified Aboriginal cultural material in the western portion of the site, assessed as having moderate to high archaeological significance. Although the Project Area is located in the more disturbed central area, where archaeological sensitivity is lower, complete avoidance of cultural material is unlikely due to its presence across the wider site. Construction activities involving ground disturbance therefore have the potential to impact Aboriginal archaeological deposits, noting that works will not occur in the western area where intact deposits are concentrated.	Likely	Moderate	High (negative)	Section 6.3.6	Likely	Minor	Medium (negative)
	The cultural identity of the local community is strongly influenced by the area's historic landscape, including its early transport routes and European settlement history. The Old North Road remnant (LEP #I177), located approximately 30 m south-east of the Project Area, is a recognised statutory heritage item that contributes to this sense of place. Although direct impacts on the item are not expected, the Project's proximity to this culturally significant route, means there remains a low likelihood that unrecorded archaeological features associated with the Old North Road or early European occupation are present within the Project Area. The accidental disturbance of unexpected archaeological features could create short-term concern for community members who place value on the protection of local heritage. These risks are low and would be managed through established archaeological procedures, reducing the potential for adverse cultural or social impacts during construction.	Possible	Moderate	Medium (negative)	Section 6.13.1.5	Possible	Minor	Low (negative)
Health and wellbeing	Health and wellbeing refers to the physical and mental health of community members who may be affected by a project. Construction activities can influence health and wellbeing, particularly for people who are vulnerable to social exclusion or substantial change. For this Project, impacts on community health and wellbeing are unlikely. Predicted dust, noise and air emissions remain consistent with existing conditions, and no health-related facilities are affected. In addition, construction workers requiring routine medical care are expected to access services outside the local area, meaning no increased demand on local doctors or medical centres is anticipated.	Unlikely	Minor	Low (negative)	No specific measures proposed	Unlikely	Minor	Low (negative)
Surroundings	Amenity refers to the overall quality of a place, its appearance, feel and sound, and the way it is experienced by the community. It contributes to a community's identity and its sense of place. While aesthetic qualities are, amenity is also shaped by the physical design of an area and the human activity that occurs within it. A place with high amenity is perceived as pleasant, attractive, convenient and comfortable. Construction of the Project is expected to result in a noticeable reduction in amenity within the social locality. This is primarily due to changes to the existing rural visual character of the Project Area during construction, along with increases in noise levels compared with current baseline conditions.	Likely	Moderate	High (negative)	Section 6.6.6 Section 6.7.6 Section 6.13.3.5	Possible	Minor	Low (negative)
	The presence of construction sites, a temporary workforce and increased construction traffic can influence community perceptions of safety. However, the Project Area is located away from major townships and urban centres and is not considered a likely target for crime. As a result, no substantial change to local security conditions or passive surveillance levels is expected.	Unlikely	Minimal	Low (negative)	No specific measures proposed	Unlikely	Minimal	Low (negative)

Social factor	Potential impact	Unmitigated impact ratings			Mitigation and management measures	Mitigated impact ratings		
		Likelihood	Magnitude	Social significance rating		Residual likelihood	Residual magnitude	Residual significance rating
Livelihoods	Businesses within the social locality may experience temporary impacts during construction due to changes in passing trade, access and travel times for employees, customers and deliveries, as well as reduced local amenity. These impacts on business operations and viability can, in turn, affect people's livelihoods by influencing their ability to maintain employment or continue local business activities.	Likely	Moderate	High (negative)	Section 6.6.6 Section 6.7.6 Section 6.8.8 Section 6.12.7	Unlikely	Minor	Low (negative)
	Businesses in the area are likely to be affected by reduced amenity during construction. This is particularly relevant for local enterprises that rely on the area's picturesque rural landscape, tranquillity and scenic qualities, such as Black Creek Farm (Thélème Wines) to the west and Scarborough Cottage to the north. Some local businesses, including Black Creek Farm (Thélème Wines) to the west of the Project and Lucy's Run Wines to the east may also experience a decline in passing trade if patrons choose to travel elsewhere. Conversely, businesses in the surrounding area, such as Branxton, Greta and Cessnock, may benefit from construction-related demand for services such as vegetation management, fencing, earthworks and other ancillary activities required to support the Project.	Possible	Moderate	Medium (positive)	Section 6.12.7	Likely	Moderate	Medium (positive)
Decision-making systems	The Project will be located on privately owned Ausgrid land that is not accessible to the public, and construction activities will not limit the community's ability to participate in decisions that affect them. Ausgrid has undertaken community engagement during Project development. Public exhibition of the EIS, including this SEIA, will provide further opportunity for community members to express support or concerns. All submissions will be addressed in a Submissions Report and considered by DPHI during assessment. The Project also aligns with major strategic policies, including Australia's Long-Term Emissions Reduction Plan (2021), the NSW Renewable Energy Action Plan (2021), the NSW Climate Change Policy Framework (2016), and the Cessnock CSP 'Together Cessnock 2040' (2025). These plans were informed by community consultation and reflect regional values and aspirations. The Project will contribute to the local economy and support the region's growing renewable energy sector. Further detail on Project need and strategic context is provided in Chapter 2.0 .	Very unlikely	Minimal	Low (negative)	No specific measures proposed	Very unlikely	Minimal	Low (negative)

6.12.4.2 Operation

A number of social factors were scoped out of the operational impact assessment, including Community, Accessibility, Culture, Health and wellbeing, and Decision-making systems. These factors were excluded due to the small Operational Footprint of the Project, the limited number of staff required during operation, and the absence of any expected changes to community access, amenity, heritage values or opportunities for public participation in decision-making. Operational impacts on these factors are negligible, as the Project will not alter local movement, affect heritage sites, or increase exposure to health or safety risks.

An assessment of the remaining relevant social factors is provided in **Table 6.12-4**. The assessment considers the potential social impacts associated with the operation of the Project, the proposed mitigation and management measures and an assessment of the residual impacts following the application of the proposed measures.

Table 6.12-4: Assessment of social impacts associated with the operation of the Project

Social factor	Potential impact	Unmitigated impact ratings			Mitigation and management measures	Mitigated impact ratings		
		Likelihood	Magnitude	Social significance rating		Residual likelihood	Residual magnitude	Residual significance rating
Way of life	The Project would strengthen essential utilities by improving the stability and reliability of the NEM, helping to maintain consistent electricity supply for day-to-day living, work, and community activities. Enhanced power reliability also supports telecommunications and internet services, indirectly improving digital access. Overall, the Project would provide indirect benefits to the community's way of life and aligns with national and state policies aimed at improving network resilience and long-term access to reliable essential services.	Almost certain	Major	Very high (positive)	No specific measures proposed	Almost certain	Major	Very high (positive)
Surroundings	Operational impacts of the Project on the community's surroundings, including the way people experience the natural and built environment, local amenity, and aesthetic values, are expected to be minimal. While the Project would introduce new built infrastructure and generate low levels of operational noise, these effects would be largely screened by existing vegetation and further mitigated through landscape planting, as well as the installation of noise barriers. As a result, the Project is not anticipated to noticeably change views, reduce the area's aesthetic quality, or create noise levels that influence how nearby residents or visitors use or enjoy the locality. Overall, operation of the Project is unlikely to significantly affect the community's experience of their surroundings or reduce the amenity of the local environment.	Likely	Minor	Medium (negative)	Section 6.6.6 Section 6.7.6	Possible	Minor	Medium (negative)
Livelihoods	Businesses that rely on scenic rural views may experience minor changes to visual amenity from the permanent infrastructure; however, the LCVIA (Appendix I) confirms that existing vegetation will substantially screen the site, meaning any visual impacts on local businesses are expected to be limited, localised and not prominent.	Unlikely	Minor	Low (negative)	Section 6.6.6	Unlikely	Minimal	Low (negative)
	Operation of the Project will generate modest ongoing employment, with up to five part-time roles (equivalent to two FTE positions) expected to be sourced locally where possible. The Project will also support regional economic diversification by strengthening the NEM through increased renewable energy storage, improving grid reliability and flexibility. Ausgrid's ongoing operational expenditure (approximately \$7.1 million per year) will contribute to local economic activity, and benefit-sharing measures will provide additional economic opportunities for the community.	Likely	Minor	Medium (positive)	No specific measures proposed	Likely	Minor	Medium (positive)

6.12.5 Economic impact assessment

A qualitative economic impact assessment was undertaken to evaluate the potential economic impacts associated with construction and operation of the Project, informed by the Estimated Development Cost Report (Investstructure, 2026) for the Project, included in **Appendix P**.

The EDC estimates a total capital investment of approximately \$231 million (excluding GST), representing a substantial contribution to economic activity at the local, regional and state levels.

The assessment identifies, describes and qualitatively assesses the Project's direct, indirect and broader system-level economic impacts across the construction and operational phases.

The following economic impact pathways were considered, reflecting the scale, duration and nature of the Project:

- **Capital expenditure:** Investment by the proponent during the construction phase of the Project
- **Operational expenditure:** Ongoing expenditure from the proponent during the operation of the Project
- **Employment generation:** Direct and indirect employment opportunities created through construction and operation
- **Supply chain linkages:** Engagement of suppliers and service providers across the Project's construction and operational supply chain
- **Electricity market impacts:** Benefits to the wider electricity market resulting from the Project's operation, including improved grid stability and reduced price volatility
- **Avoided infrastructure costs:** Potential to defer or reduce the need for other new electricity infrastructure through the Project's operational capabilities
- **Renewable energy integration:** The Project's ability to store excess renewable energy that may otherwise be curtailed, supporting improved utilisation of renewable generation.

6.12.5.1 Construction

Construction of the Project is expected to occur over 22 months and represents the phase of greatest economic activity. At peak, construction would support up to 100 FTE positions, including civil, electrical, construction management and specialist technical roles.

The scale of capital investment would generate positive direct and indirect economic effects through contractor engagement, demand for materials and services, and increased expenditure in the regional economy associated with the construction workforce.

An assessment of the potential economic impacts associated with the construction of the Project is provided in **Table 6.12-5**.

Table 6.12-5: Assessment of economic impacts during construction

Impact category	Impact description	Overall impact
Direct impacts		
Contractor engagement	Engagement of a Principal Contractor and specialist subcontractor would retain a portion of the Project's capital expenditure within the domestic economy and support short-term employment during the construction period.	Positive
Civil works and local procurement	Site establishment and civil works would generate demand for construction materials, transport and logistics services, providing short-term support for regional suppliers where capacity is available.	Positive
Professional and technical services	Planning, design, project management and environmental assessment activities would support demand for professional services, primarily within NSW metropolitan centres.	Positive

Impact category	Impact description	Overall impact
Direct impacts		
Regional business activity	The temporary construction workforce is expected to increase demand for food and beverage services, fuel and equipment hire, resulting in a short-term uplift in local and regional business turnover.	Positive
Capital import leakage	A significant proportion of capital expenditure relates to specialised components and electrical equipment that are manufactured overseas, reducing the proportion of capital retained within Australia.	Negative
Indirect impacts		
Induced economic benefits	Increased expenditure by workers and contractors would generate minor induced benefits across the regional economy, particularly in retail, fuel and service sectors.	Positive
Skills benefit	The Project would contribute to ongoing demand for skills and capabilities in the energy storage and renewable energy sector, supporting workforce development in emerging clean energy industries.	Positive

6.12.5.2 Operation

During operation, the Project would require a small permanent workforce, with up to five part-time roles equating to two FTE positions, supported by periodic specialist contractors for maintenance and inspections. While operational employment is limited, the Project's broader economic benefits are realised through its contribution to electricity market efficiency and system resilience.

An assessment of the potential economic impacts associated with operation of the Project is provided in

Table 6.12-6: Assessment of economic impacts during operation

Impact category	Impact description	Overall impact
Direct impacts		
Operations and monitoring	Ongoing operation and monitoring of the Project would support up to five part-time roles, equating to up to two FTE positions, contributing to local employment opportunities.	Positive
Routine maintenance (periodic)	Periodic maintenance activities would provide ongoing opportunities for specialist contractors and service providers.	Positive
Indirect impacts		
NEM and system level impacts	The Project would support improved grid stability, reduced curtailment of renewable energy, avoided or deferred network augmentation and lower overall system costs within the NEM.	Positive

6.12.6 Cumulative impact assessment

6.12.6.1 Construction

Cumulative socio-economic impacts during construction may occur if other projects are underway within the same social locality. Information about other projects is provided in **Section 6.14**.

While nearby construction activities could contribute to combined noise, vibration, dust and visual changes, separation distances between projects mean any cumulative amenity or air quality impacts would be limited. Construction traffic from other developments may also add to temporary congestion on the local road network, particularly along Wine Country Drive, although concurrent peaks are unlikely.

Multiple projects may generate positive effects through additional employment and increased demand for local goods and services, but overlapping works could also contribute to construction fatigue due to prolonged or combined disruptions.

Overall, cumulative socio-economic impacts during construction are considered unlikely and, if they occur, would be localised, minor in magnitude, and of low (negative) social significance.

6.12.6.2 Operation

Cumulative socio-economic impacts during operation may occur if the Project operates concurrently with other developments in the social locality. However, as identified in **Section 6.14**, nearby developments are not located close to the Project and differ in scale and operational intensity, meaning cumulative effects on amenity, including noise and visual setting are expected to be negligible. While nearby projects may contribute to positive cumulative outcomes such as modest ongoing employment and local service demand, adverse cumulative socio-economic impacts during operation are considered unlikely. Any cumulative effects would be minor in magnitude, with overall social significance assessed as low (negative for adverse impacts and low (positive) for potential economic benefits).

6.12.7 Mitigation and management measures

Construction and operational mitigation measures to manage potential social and economic impacts of the Project are outlined in **Table 6.12-7**.

Mitigation measures identified in other chapters of this EIS, including in **Chapter 5.0** and **Section 6.3** (Aboriginal heritage), **Section 6.6** (Visual amenity), **Section 6.7** (Noise and vibration), **Section 6.8** (Traffic and transport), are also relevant to the management of potential social impacts.

Cumulative social and economic impacts would be managed through the application of the mitigation measures outlined in **Section 6.14**.

Table 6.12-7: Mitigation and management measures - social and economic

ID	Mitigation/management measure	Timing
SE-1	Consultation will be undertaken with Cessnock City Council, local residents, businesses and other relevant stakeholders prior to and during construction to coordinate Project works, minimise amenity and cumulative impacts, address stakeholder concerns and enhance potential community benefits. A Construction Communications and Engagement Plan (CCEP) will be prepared prior to commencement of construction and implemented for the duration of construction. The CCEP will provide a framework for ongoing consultation and communication and will: - Identify key stakeholders and appropriate engagement methods to ensure engagement activities are accessible to a broad range of community groups, including the use of digital communications and physical (hard copy) materials where required - Provide advance notification to affected residents and businesses of construction activities that may affect amenity, including traffic disruptions, noise or changes to access, to enable affected parties to plan accordingly - Ensure sufficient prior notice is provided for any works required to occur outside standard construction hours to minimise disruption - Include mechanisms for ongoing engagement and feedback, including regular updates to community information channels, which will be regularly monitored to identify and respond to stakeholder enquiries and concerns - Provide a dedicated phone number and email address for stakeholder, business and community enquiries, issues and complaints. Consultation activities and communication measures will be regularly reviewed and updated, where necessary, to respond to community feedback and evolving Project requirements.	Pre-construction Construction Operation
SE-2	The Proponent and its contractors will promote local employment through a merit-based, legally compliant local employment preference by advertising roles locally, incorporating local participation initiatives into contractor workforce plans, encouraging use of local suppliers and trainees where feasible. These measures are to be reported.	Construction Operation
SE-3	Project infrastructure will be procured in line with <i>Ausgrid's Modern Slavery Statement</i> (Ausgrid, 2024), which has been developed in accordance with the <i>Modern Slavery Act 2018</i> .	Construction
SE-4	Relevant construction worker behaviour codes, such as the <i>Workplace behaviour: Code of practice</i> (Commission for Occupational Safety and Health, 2022) will be implemented to help promote respectful and appropriate behaviours in the community.	Construction

6.13 Other issues

This section provides an overview of other environmental matters that, based on existing information and conditions onsite, require limited assessment. These matters include:

- Non-Aboriginal heritage
- Waste
- Air quality.

6.13.1 Non-Aboriginal heritage

6.13.1.1 Secretary's Environmental Assessment Requirements

Table 6.13-1 sets out the SEARs relevant to non-Aboriginal heritage and where the requirements have been addressed in this EIS.

Table 6.13-1: Relevant SEARS – non-Aboriginal heritage

Relevant SEARS	
Heritage	Where addressed
The EIS must address the following specific matter:	
• An assessment of historic heritage (including archaeological impacts) in accordance with the Guidelines for preparing a Statement of Heritage Impact and Guidelines for Archaeological Sites and Relics including consideration of potential visual impacts on any heritage item(s)	The impact that the Project will have on historic heritage is discussed in this section (Section 6.13.1).

6.13.1.2 Methodology

A desktop assessment was undertaken to identify registered or known non-Aboriginal heritage items with the potential to be impacted by the Project.

Desktop searches were undertaken in October 2025 of the following statutory and non-statutory historic registers:

- The Australian Heritage Database, which includes:
 - The Commonwealth Heritage List (Australian Government Department of Agriculture, Water and the Environment, 2025a)
 - The Register of the National Estate (Australian Heritage Council, 2025)
 - The National Heritage List (Australian Government Department of Agriculture, Water and the Environment, 2025b)
- NSW State Heritage Register (SHR) (Heritage NSW, 2025)
- NSW State Heritage Inventory (SHI) (NSW DPE, 2025)
- Cessnock LEP
- The National Trust of Australia (NSW)
- Section 170 Heritage and Conservation Register.

6.13.1.3 Existing environment

Historical context

European settlement in the Rothbury area began in 1826 when Scottish settler John Campbell received a 2,560-acre land grant in the valley of Black Creek. The construction of the convict-built Great North Road between 1826 and 1836 was crucial in opening the Hunter Valley to further settlement, including the Rothbury area, by linking Sydney with the interior.

From the 1820s onwards, settlers began establishing cattle and sheep farms across the valley. The sandy river flats supported crops, while the surrounding land provided excellent grazing. From the 1860s, vineyards began to appear, with the Bouffier family among the first to cultivate grapes in the area.

The discovery of coal in the late 19th century marked a turning point in Rothbury's development. In 1892, George Brown struck coal on the former Campbell estate. The seam's high-quality coal attracted investment, and by 1910, the Rothbury Colliery had opened under the direction of Edward and Henry Merewether. A village of 116 allotments was established in 1912 to house mine workers, and a public school followed in 1916.

By the 1920s, the population had grown significantly, supported by an expanding rail network that transported coal from numerous local collieries. Rothbury's post-contact history reflects the broader trajectory of colonial Australia shifting from agricultural settlement to industrial development driven by natural resource extraction.

Aerial imagery from 1977 to 2010 shows progressive changes in land use within the site. In 1977, the site was used for viticulture and by 1991, the vineyard had been cleared, and the land repurposed for grazing or pasture. In 2006, the Rothbury Zone Substation was constructed in the eastern portion of the site and since 2007, the site has not undergone any major changes, the only noted change is the vegetation growth around the substation for screening.

Heritage items

A search of the national, state, and local heritage databases, including relevant LEPs, identified no heritage items listed on the Commonwealth Heritage List or National Heritage List within 1 km of the Project.

Within 1 km of the Project Area, one item of heritage significance was identified as being listed under Schedule 5 of the Cessnock LEP. The Old North Road Remnant (LEP #1177) is located approximately 30 m south-east of the Project Area on the eastern side of Wine Country Drive and is not publicly accessible. The Old North Road Remnant comprises a section of the early road route associated with European settlement and development in the Hunter Valley. Historically, the Old North Road formed a major transport corridor running north from just west of Lochinvar through Allandale and Rothbury, potentially extending as far as Singleton. The road reservation of the Old North Road and remnant works has not been in use for many decades and has resultantly changed through erosion and bush regeneration. The item is assessed as having an associative value of significance at a local level. The location of this heritage item is shown in **Figure 2-2**.

The Project Area lies within the extent of the Pokolbin Valley Landscape Conservation Area (Place ID #14236), which was listed on the Register of the National Estate (RNE) in the 1990s for its historic landscape values, particularly its association with early viticulture and its scenic rural character. The listing recognises the cultural landscape rather than specific built heritage. The RNE is now a non-statutory archive, meaning the listing is recognised for its historical and cultural value but does not carry legal protection under state or federal heritage legislation and therefore trigger formal heritage assessment or approval processes.

The Conservation Area covers approximately 258 km², extending from the ridgelines of the Broken Back Range in the south-east to Thistle Hill, Terrace Ridge, and Molly Morgan Range in the north, and includes the townships of Bellbird and Nulkaba to the south. The Project is located near the eastern boundary of this landscape, as shown in **Figure 2-2**.

6.13.1.4 Impact assessment

Construction

The desktop assessment confirmed that the Project Area lies within the eastern extent of the non-statutory listed Pokolbin Valley Landscape Conservation Area. While changes to land use patterns or the introduction of industrial elements could potentially diminish the perceived historic character of this broader landscape, the anticipated impacts during construction are considered low. This is because the Project Area represents a very small portion of the entire conservation area, the listing is non-statutory and does not impose legal protection, and the Project is located on previously disturbed land, minimising any alteration to the historic setting.

There are no historic heritage sites with statutory listing within the Project Area. The Old North Road remnant (LEP #177) lies outside the Project Area and is unlikely to be directly affected by Project construction activities. However, due to the proximity of the Project to the Old North Road remnant and its potential connection to the historic transport route, there is a low possibility that unrecorded archaeological remnants associated with the Old North Road or early European occupation could occur within the Project Area. These could include subsurface features such as road alignments, drainage structures, or artifact scatters.

Overall, the Project is expected to have negligible impact on historic heritage values, with no direct effects on statutory-listed items and only a low risk of encountering unrecorded archaeological material, which can be managed through the standard mitigation measures identified in **Section 6.13.1.5**.

Operation

No impacts to historic heritage items are likely during operation of the Project.

6.13.1.5 Mitigation and management measures

The mitigation and management measures that would be implemented for the Project to address potential non-Aboriginal heritage impacts are provided in **Table 6.13-2**.

Table 6.13-2: Mitigation and management measures - non-Aboriginal heritage

ID	Mitigation/management measure	Timing
NAH-1	A procedure will be included in the CEMP to guide the response to the discovery of any previously unknown items of heritage significance (being items of State heritage significance and/or local heritage significance) during construction. This will include guidelines on regulatory consultation, and physical management, include collection and salvage, as relevant.	Construction

6.13.2 Waste

6.13.2.1 Secretary's Environmental Assessment Requirements

Table 6.13-3 sets out the SEARs relevant to waste and where the requirements have been addressed in this EIS.

Table 6.13-3: Relevant SEARs – waste

Relevant SEARs	
Waste	Where addressed
The EIS must address the following specific matters:	
identify, quantify and classify the likely waste stream to be generated during construction, operation, and decommissioning, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste (in consultation with waste facilities, including Council).	This section (Section 6.13.2) identifies likely waste streams during construction, operation and decommissioning of the Project and outlines management measures to manage these.

6.13.2.2 Methodology

A qualitative desktop assessment has been carried out to estimate waste types and approximate quantities, identify potential impacts and identify appropriate management measures. This involved:

- Identifying potential waste generating activities during construction, operation and decommissioning
- Estimating the likely waste streams and associated quantities
- Identifying the likely classification of waste streams in accordance with the *NSW EPA Waste Classification Guidelines* (NSW EPA 2014a)

- Describing proposed management and handling techniques for key waste streams, including storage and collection, minimisation and reuse.

Consultation has been undertaken with waste facility operators and Cessnock City Council in relation to the likely waste streams and safe disposal of this waste. Further details of this consultation are provided in **Chapter 5.0**.

6.13.2.3 Existing environment

The closest waste facility to the Project is the Cessnock Waste Management Centre, located in the Cessnock City LGA approximately 13.3 km south-east of the site. The waste types accepted at this facility that are relevant to the Project include concrete and bricks, metal, green waste, paper, cardboard, and uncontaminated and debris-free soil.

6.13.2.4 Impact assessment

Construction

Construction of the Project has the potential to produce, but is not limited to, the following key waste streams:

- Excess spoil through site clearance activities and earthworks
- Green waste from the removal of vegetation
- Packaging materials associated with pallets, crates, cartons, plastics and wrapping materials etc.
- Waste produced from the maintenance of construction equipment and machinery, including liquid wastes from cleaning, repair and maintenance
- Waste produced from construction works, including metal offcuts, excess concrete, excess cabling, broken panels and other materials
- Sewage waste generated through the workers' use of toilets, showers and kitchen facilities
- General office and domestic waste, such as paper and food.

A summary of the potential key construction waste streams, waste classification, estimated waste volumes, and a description of the methodology likely to be adopted for the management of each waste type is provided in **Table 6.13-4**.

Table 6.13-4: Potential construction waste types, classifications, approximate volumes and management methods

Waste type / stream	Waste classification	Proposed handling, treatment, and/or disposal method	Estimated volume
Green waste (vegetation)	General solid waste – putrescible	Separated from other excavation waste and chipped. Stored and used later for landscaping where feasible. Excess chipped material would be sent to landscape suppliers or for offsite recycling.	Vegetation clearing of approximately 0.48 ha required
Wastewater	Liquid waste	Collected in tanks onsite and periodically pumped out into trucks. Transported to and deposited at an existing sewage treatment plant.	Up to 500 litres per week at peak construction
Construction waste	General solid waste – putrescible	Reuse of materials would be prioritised where possible. Otherwise, waste will be sorted and separated onsite prior to being transported to an offsite recycling or disposal facility.	Minimal

Waste type / stream	Waste classification	Proposed handling, treatment, and/or disposal method	Estimated volume
Construction and office personnel waste	General solid waste – putrescible	Reuse of materials would be prioritised where possible. Otherwise, waste will be sorted and separated on site prior to being transported to an offsite recycling or disposal facility.	Minimal
Excess spoil	General solid waste – putrescible	Spoil would be distributed to another project as fill or sent to a repurposing facility or landfill.	Confirmation of excess spoil will be determined following the preparation of a bulk earthworks plan as part of the detailed design.
Contaminated fill or soils	To be classified subject to results of testing	Procedure for handling and disposal of contaminated fill or soils would be in line with the management measures presented in Section 6.4 . An unexpected finds protocol would be implemented.	Negligible/Minimal – low risk based on the soils classification in Appendix G

Adverse waste outcomes that have the potential to occur during construction include:

- Clean spoil directed to landfill due to inadequate re-use and recycling
- Waste being unnecessarily directed to landfill due to inadequate handling and/or classification
- Excess waste being generated from mismanagement of ordering quantities (i.e. over-estimating)
- Contamination of soil, surface and/or groundwater from the inappropriate excavation, storage, transport and/or disposal of liquid or solid waste
- Risks to human health from the handling, storage, transport and/or disposal of contaminated waste
- Increased presence of pests due to incorrect storage, handling and/or transport of waste.

As shown in **Table 6.13-4**, all waste generated during construction would be appropriately managed.

In order to avoid potential issues associated with odour generation, decreased visual amenity and creating environments that attract animals/pest species (e.g. rats and mice), waste removal would occur at regular intervals, or more frequently, if required.

With the implementation of the proposed waste management and mitigation measures provided in **Section 6.13.2.5**.

Operation

During operation, the most common waste streams generated by the Project would be:

- Maintenance and operations waste consisting of replaced equipment, packaging materials, scrap and excess materials and liquids such as transformer oils
- Domestic waste, such as office and food waste.

The Project would operate primarily as an unmanned facility. The Project would provide up to five part-time roles, equating to up to two FTE positions, during operation. Due to the low staffing requirements, it is expected that only small quantities of general waste and recycling will be generated onsite by these workers during operation.

Operational equipment waste, such as replaced battery components, would be included in chemical waste collection. Any material from within the battery units that can be repurposed will be returned to the supplier. If this is not feasible or available, then these materials would be sent for recycling.

Replacement of transformer oils would be carried out in accordance with the Project's OEMP which would detail appropriate handling, collection, storage, transportation and disposal measures in compliance with regulatory requirements.

Overall, the waste generated by the Project during operation would be minimal and is expected to be adequately managed using conventional waste collection, handling and disposal procedures in compliance with regulatory requirements

Decommissioning

All waste and operating chemicals generated during decommissioning of the Project would be disposed of at a licenced facility in accordance with the *Protection of the Environment Operations (Waste) Regulation 2014* (POEO Waste Regulation) and the *NSW EPA Waste Classification Guidelines*.

Decommissioning waste would be largely associated with the removal of the primary Project infrastructure from the Project Area. Prior to demolition, existing infrastructure, plant and equipment would be assessed and categorised based on whether the materials can be reused, repurposed, or recycled. Materials able to be reused, repurposed, or recycled will be distributed offsite to other projects, suppliers, or recycling facilities willing to accept the materials. Batteries will be recycled at an approved recycling facility or returned to the manufacturer for refurbishment. Other materials that cannot be recycled, will be disposed of at a licenced waste facility.

6.13.2.5 Mitigation and management measures

Mitigation and management measures that would be implemented for the Project to address potential waste impacts during construction, operation and decommissioning are provided in **Table 6.13-5**.

Table 6.13-5: Mitigation and management measures - waste

ID	Mitigation/management measure	Timing
W-1	A Waste Management Plan will be developed and implemented as part of the CEMP and would: - Identify requirements consistent with the waste hierarchy and circular economy initiatives - Include relevant measures from the <i>National Waste Policy: Less Waste, More Resources</i> (Department of Agriculture, Water and the Environment, 2018) - Provide a framework to target resource efficiency through the design and construction phases - Provide consistent clear direction on waste and resource handling, storage, stockpiling, use and reuse management measures - Set out processes for disposal, including onsite transfer, management, and the necessary associated approvals/permits - Describe the process for regularly removing waste from the Project Area to avoid issues associated with odour, visual amenity, and the attraction of animal/pest species - Outline procedures for waste generated to be segregated at source and suitably stored in designated waste management areas within the Project Area - Include material tracking measures to track waste and recyclables generated from the Project and removed from the Project Area - Include a protocol for reporting on the above elements of the WMP.	Construction Operation

ID	Mitigation/management measure	Timing
W-2	Onsite waste management will require the assessment, classification, separation, storage and handling of all waste streams to maximise reuse and recycling. Waste will only be disposed of to landfill where it is demonstrated that materials cannot be reasonably reused or recycled. All waste will be classified, managed, and disposed of in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014) and other applicable legislation, with hazardous wastes (e.g. waste oils, paints, septic wastewater and asbestos) collected and disposed of by a licensed waste contractor at an appropriately licensed facility.	Construction Operation Decommissioning
W-3	All generated and regulated waste records will be retained for waste tracking purposes.	Construction

6.13.3 Air quality

6.13.3.1 Secretary's Environmental Assessment Requirements

No specific requirements were provided for air quality in the SEARs, however an assessment for this environmental matter is provided in this section.

6.13.3.2 Methodology

A qualitative desktop assessment has been carried out to estimate the potential air quality impacts associated with the construction and operation of the Project. This involved:

- Reviewing the legislation for air pollution and air quality in NSW
- Identifying potential air pollution generating activities during construction and operation
- Describing the proposed mitigation and management measures for key air pollutants during construction and operation.

6.13.3.3 Existing environment

Air Quality Index

The background air pollution at the site has been characterised through ambient monitoring undertaken by NSW DPHI (NSW Government, 2026).

The NSW air quality monitoring network is designed to track and report on air quality across the state. This network consists of numerous monitoring stations strategically placed to provide comprehensive coverage.

Singleton monitoring station is the closest representative monitoring station that monitors a relevant range of pollutants. This facility is located approximately 22 km to the north-west of the site. The landscape at this monitoring station comprises more heavy mining and industrial land uses compared to Rothbury, which is typically more agricultural; however, this is considered an appropriate source of data and is the closest monitoring site to Rothbury.

The following relevant air pollutants are monitored at the Singleton monitoring station:

- Fine particles less than 2.5 micrometres in diameter (PM_{2.5}) measured in micrograms per cubic metre (µg/m³)
- Fine particles less than 10 micrometres in diameter (PM₁₀) in µg/m³
- Ozone (O₃) in parts per hundred million (pphm)
- Nitrogen dioxide (NO₂) in pphm
- Sulfur dioxide (SO₂) in pphm.

Data obtained from the Air Quality NSW website (NSW Government, 2025) for the Singleton monitoring station is summarised in **Table 6.13-6**.

Table 6.13-6: Singleton monitoring station air quality data

Date	Time	Averaging period	Pollutant concentration				
			PM _{2.5} (ug/m ³)	PM ₁₀ (ug/m ³)	O ₃ (pphm)	NO ₂ (pphm)	SO ₂ (pphm)
5 August 2025	10-11 am	1-hour average	3.1	14.0	1.5	N/A	0.3
5 September 2025	10-11 am	1-hour average	20.6	27.2	0.1	1.4	0.2
6 September 2025	10-11 am	1-hour average	0.0	12.7	3.3	0.1	0.0
8 October 2025	10-11 am	1-hour average	12.3	26.8	1.9	1.5	0.0

In NSW, air quality measurements are summarised and classified into five air quality categories ranging from 'Good' to 'Extremely Poor' (NSW Government, 2026).

The pollutant concentration levels of fine particles (O₃, NO₂ and SO₂) at the Singleton monitoring station are all categorised as 'Good'. This means that the existing air pollution levels are low and pose little or no risk to health.

National Pollutant Inventory

Based on the results from the Singleton monitoring station presented in **Table 6.13-6**, the air quality within the region surrounding the site is generally considered to be good.

Considering land uses, the majority of air pollution surrounding the site is likely to be generated by agricultural activities, bushfire and hazard reduction burns, and vehicle emissions along local roads.

The National Pollutant Inventory (NPI) has a list of registered facilities, which are those that meet the following Commonwealth criteria:

- That exceed certain emission thresholds
- Those that participate in manufacturing, mining, waste treatment and energy production
- Those exceeding 20,000 hours of work per year (i.e. 10 full time employees).

Based on these criteria, there are no NPI registered facilities within 5 km of the site. The closest NPI registered facilities are Pacific National Greta (rail freight transport) (facility ID: 640976) located around 5.9 km to the northeast, and the Hunter Bottling Company (beverage manufacturing) (facility ID: 492166) located around 6.3 km to the south-west.

Sensitive receivers

The Project is located within a rural area with some sensitive receivers located nearby, primarily consisting of residential dwellings. The closest residential receivers are located approximately 188 m south of the Project Area on Old North Road and 200 m east of the Project Area on Blackburn Close.

A list of sensitive receivers within proximity to the Project is provided in **Section 6.7.3.2**.

6.13.3.4 Impact assessment

Construction

Potential air quality impacts associated with the Project during construction include airborne dust generated during construction activities and emissions to air from vehicles, construction plant and equipment.

During the construction phase, airborne dust would potentially be generated by earthworks such as site levelling, excavation and trenching for the underground cable connection, as well as from vehicle movements on unsealed areas during dry weather. Due to the generally flat terrain of the Project Area, bulk earthworks would be restricted to levelling and grading for hardstand for the battery units. Fill work would be required to raise the Project above the flood plain which may require stockpiling of earth.

Exhaust emissions would be generated by vehicles transporting workers to and from the Project, trucks delivering construction materials and construction machinery such as piling rigs, excavators, graders and diesel generators. The emissions would be highest during peak construction but would be temporary in nature. These emissions would be expected to be dispersed by prevailing winds and are unlikely to significantly affect local air quality.

Overall, construction-related air quality impacts would be minor, localised and short-term. Standard air quality mitigation and management measures to address construction impacts are provided in **Section 6.13.3.5**.

Operation

During operation, localised dust would be generated from vehicles travelling on the internal site roads during routine inspection works and maintenance activities. The airborne dust impacts on local and regional air quality throughout the operational phase is expected to be negligible.

Exhaust emissions would be generated by workers' vehicles when travelling to and from the Project during operation, as well as during periodic maintenance activities and occasional unscheduled repair works. A maximum of four vehicle movements per week are anticipated by workers during operation. Due to this low number, air quality (exhaust emissions) impacts throughout the operational phase are considered to be negligible.

The Project will help support NSW to transition towards greater network storage capacity for renewable energy. This transition is expected to improve air quality in the long-term due to reductions in the operation of fossil fuel powered electricity generators elsewhere in the state.

6.13.3.5 Mitigation and management measures

Mitigation and management measures that would be implemented to address potential air quality impacts are set out in **Table 6.13-7**.

Table 6.13-7: Mitigation and management measures – air quality

ID	Mitigation/management measure	Timing
AQ-1	The CEMP will include air quality management measures to minimise visible dust moving offsite including: • During dry or adverse weather conditions (including hot, dry or windy conditions), dust from uncovered stockpiles and unsealed or exposed areas will be managed through targeted dust suppression measures that minimise additional handling of materials, such as controlled water application or surface stabilisation, and by modifying the location, timing or scale of dust-generating activities where necessary to reduce dust emissions and avoid unnecessary disturbance or rehandling of materials. • Minimising exposed surfaces, such as stockpiles and cleared areas. Dust-generating stockpiles will be covered when exposed to wind, comprised of fine or dry material, inactive for extended periods, or where other dust controls are ineffective, or dust complaints are received. • Burning of material onsite will be prohibited • Visual monitoring of air quality to verify the effectiveness of controls and to enable and encourage early intervention • Covering all vehicle loads during transport • Using wheel washes/shaker grids to minimise tracking of dirt onto surrounding roads • Maintaining plant and equipment in good condition and in accordance with manufacturers' specifications • Minimising idling by turning off vehicles, plant and machinery when not in use • Reporting on actions taken to manage air quality, including its	Construction

ID	Mitigation/management measure	Timing
	effectiveness A complaints handling process, including a protocol for recording all complaints.	

6.14 Cumulative impacts

6.14.1 Secretary's Environmental Assessment Requirements

Table 6.14-1 sets out the SEARs relevant to cumulative impacts and where the requirements have been addressed in this EIS.

Table 6.14-1: Relevant SEARs – cumulative impacts

Relevant SEARs	Where addressed
Cumulative impact	
The EIS must include:	
- An assessment of the likely impacts of the development on the environment, and any other significant issues identified in the above risk assessment, focusing on the specific issues identified below, including: - an assessment of the likely impacts of all stages of the development (which is commensurate with the level of impact), including any cumulative impacts of the site and existing, approved or proposed developments in the region and impacts on the site and any road upgrades, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the <i>Cumulative Impact Assessment Guideline</i> (DPE, 2022);	An assessment of cumulative impacts has been undertaken in Section 6.14.6 .
Biodiversity including:	
A cumulative impact assessment of biodiversity values in the region from nearby developments	An assessment of potential cumulative biodiversity impacts is provided in Section 6.14.6 .
Land including:	
- an assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: - a cumulative impact assessment of nearby developments	A cumulative impact assessment was not conducted for land, as the land use assessment in Section 6.5 identified no residual impacts related to land use arising from the Project.
Noise including:	
an assessment of the construction noise impacts (including impacts from proposed road upgrades) of the development in accordance with the <i>Interim Construction Noise Guideline</i> (ICNG), operational noise impacts in accordance with the <i>NSW Noise Policy for Industry (2017)</i>, traffic noise in accordance with the <i>NSW Road Noise Policy</i> (DECCW, 2011) and cumulative noise impacts (considering other developments in the area)	A cumulative impact assessment for noise is provided in Section 6.14.6 .
Transport including:	
A cumulative impact assessment of traffic from nearby developments (including mining operations)	A cumulative impact assessment of traffic from nearby developments is provided in Section 6.14.6 .

6.14.2 Methodology

This chapter has been prepared to assess the potential cumulative impacts of the Project during construction and operation.

When multiple projects are undertaken at the same time, their residual impacts can overlap which may worsen any social or environmental impacts of the projects alone resulting in a cumulative impact. The extent of these cumulative impacts can be affected by the location of the projects and the phase of the projects (i.e. design, construction, operation, decommissioning etc.).

The identification and assessment of cumulative impacts for the Project involved the following:

- Identification of projects in the nearby area that may generate cumulative impacts alongside the Project
- Identification of the residual impacts of the Project (identified within each of the previous sections in **Chapter 6.0**)
- A screening process for nearby projects so that only those that have a timeframe, scale or status that overlap with the Project are considered (see **Section 6.14.5**)
- Assessment of potential cumulative impacts (if any).

This process has been developed to provide a proportionate cumulative impact assessment (CIA) in accordance with *Cumulative Impact Assessment Guidelines for State Significant Projects* (CIA Guideline) (DPE, 2022).

6.14.3 Residual impacts

The SEARs require cumulative impacts be considered for biodiversity, land use, noise and traffic and transport. As no residual land use impacts are anticipated, this has not been carried forward for cumulative assessment.

The key residual impacts from the Project, after the implementation of mitigation measures, are summarised as follows:

- **Biodiversity** – minor residual construction impacts associated with the removal of native vegetation and associated biodiversity values within the Project Area (refer to **Section 6.2**)
- **Visual** – minor to moderate residual visual impacts during construction associated with temporary construction elements and vegetation removal; and minor, localised residual operational visual impacts from the visibility of Project infrastructure (refer to **Section 6.6**)
- **Noise** – residual construction noise exceedances above the relevant NMLs for nearby sensitive receivers during standard construction hours (refer to **Section 6.7**)
- **Traffic and transport** – residual construction-related traffic impacts on roads proposed to be used for construction access due to increased heavy vehicles movements (refer to **Section 6.8**)
- **Surface water quality** – minor residual construction impacts associated with erosion, sediment mobilisation and the handling of hazardous materials, with potential short-term effects on downstream receiving environments (refer to **Section 6.9**).

6.14.4 Identification of potentially cumulative projects

A search of publicly available information was undertaken to identify existing and potential future projects in the vicinity of the Project. A search of the DPHI Major Projects website was undertaken on 7 January 2026 to identify State Significant projects within the area surrounding the Project that may be relevant for the EIS cumulative impact assessment. A search of the Cessnock City Council Application Tracker for relevant Development Applications (DAs) was also conducted on 7 January 2026. The projects returned by these searches are included in **Table 6.14-2**.

6.14.5 Screening process

The screening process considered the following:

- **Location:** projects where there is the potential for spatial overlap (e.g. use the same roads for construction access). A search of the DPHI Major Projects website was undertaken for projects in the area surrounding the Project, and a 1 km radius was applied to a search of the Cessnock City Council Application Tracker for DAs
- **Timeframe:** with construction of the Project proposed to begin in late-2027 and last for approximately 22 months, only projects that are being developed simultaneously, immediately before, or immediately after the Project have been considered
- **Scale:** large-scale projects that have been identified on the DPHI Major Projects website or the Cessnock City Council Application Tracker have been considered for this assessment. Smaller scale local developments have not been considered as they are not expected to incur any substantial cumulative impacts alongside the Project
- **Status:** Projects that have been considered for this assessment are those that are under construction, in the determination phase or currently preparing an EIS.

Projects that met the above criteria are outlined in **Table 6.14-2**.

Table 6.14-2: Cumulative impact screening assessment for relevant future projects

Project	Description	Approx. distance to Project Area	Current status	Indicative timing	Potential for overlap of impacts	Screening assessment
Sunshine Estate BESS (SSD-92914712)	Construction, operation and decommissioning of a BESS with a capacity of 120 MW/480 MWh and ancillary infrastructure at Wine Country Drive, Rothbury.	Within Project Area and adjacent to the north	Prepare EIS	Construction commencement: Feb 2027 Duration: 12 months	Biodiversity	Screened in
					The Sunshine Estate BESS and the Project are located within the same local landscape, with part of the Sunshine Estate BESS site overlapping the Project Area, and construction phases expected to overlap. Concurrent vegetation removal and ground disturbance within or adjacent to the overlapping areas could result in incremental local habitat loss and increased fragmentation, providing a potential pathway for cumulative biodiversity impacts.	
					Visual	Screened in
					Should construction periods overlap, cumulative visual impacts may occur due to temporary construction elements from both projects being visible to nearby sensitive receivers, with intensified effects where construction activities coincide at local viewpoints.	
					Noise	Screened in
					Overlapping construction timeframes could result in construction activities occurring in close proximity, increasing the potential for cumulative construction noise impacts. Concurrent operation of plant, equipment and vehicles may increase the frequency and/or duration of elevated noise levels at	

Project	Description	Approx. distance to Project Area	Current status	Indicative timing	Potential for overlap of impacts	Screening assessment
					nearby shared sensitive receivers, despite mitigation under project-specific CNVMPs.	
					Traffic and transport	
					Overlapping construction periods may result in concurrent construction traffic on shared routes, increasing heavy vehicle movements along Wine Country Drive and at key intersections. This could lead to short-term cumulative impacts on traffic flow and road safety during peak construction and delivery periods.	Screened in
					Surface water quality	
					This proposed development is also located in the Black Creek catchment. Minor cumulative surface water quality impacts may occur if construction periods overlap, due to increased erosion, sedimentation or accidental spills potentially affecting the same downstream receiving environments.	Screened in
Huntlee New Town – Stage 2 (SSD-707484466)	A concept masterplan for Villages 2, 3 and 4 (1,750 new lots over includes) and a large lot residential area comprising 40 dwellings located on Old North Road.	600 m west (Old North Road) and 3.1 km north (Villages 2, 3 and 4)	Assessment	Construction commencement: Unknown due to masterplan approach Duration: Staged over 15 years	Biodiversity	
					Both projects would remove areas mapped as Swift Parrot Important Habitat, reducing habitat within the same landscape. As this species relies on dispersed patches of suitable winter foraging habitat, the combined loss of mapped habitat across both projects creates a potential pathway for cumulative impacts on Swift Parrot habitat availability.	Screened in

Project	Description	Approx. distance to Project Area	Current status	Indicative timing	Potential for overlap of impacts	Screening assessment
					Visual	
					Should construction periods overlap, cumulative visual impacts may occur due to temporary construction elements from both projects being visible to nearby sensitive receivers, with intensified effects where construction activities coincide at local viewpoints.	Screened in
					Noise	
					Given the proximity of the large lot residential development off Old North Road, located approximately 600 m west of the Project, there is potential for noise sensitive receivers to experience construction noise impacts from both projects if their construction periods occur simultaneously.	Screened in
					Traffic and transport	
					Access to the proposed large lot residential area is via Wine Country Drive and Old North Road with associated intersection and pavement upgrades. Construction timeframes are unknown, creating potential overlap with the Project.	Screened in
					Surface water quality	
					Black Creek is located between the proposed development and the Project. There may be a cumulative impact on surface water quality due to potential overlap in construction periods.	Screened in

Project	Description	Approx. distance to Project Area	Current status	Indicative timing	Potential for overlap of impacts	Screening assessment
Huntlee New Town – Stage 1 (MP10_0137-Mod-25)	The proposed development consists of 2,272 residential land lots, 123 large residential lots, 12 infrastructure community and education lots and 84 commercial lots.	950 m north (large lot residential)	Under construction	Construction commencement: February 2014 Duration: 12 years+	Biodiversity	
					Cumulative biodiversity impacts could occur at a broader landscape-scale where highly mobile fauna traverse both project areas or where vegetation with limited local occurrence is removed by both projects, resulting in incremental habitat loss.	Screened in
					Visual	
					Due to the separation distance between the two projects, it is unlikely that construction activities for both projects would be simultaneously perceived by common sensitive receivers. As a result, there is limited potential for cumulative impacts to occur.	Screened out
					Noise	
					Due to the substantial separation between the two projects, there is no reasonable potential for cumulative construction noise impacts at any sensitive receivers, even if construction periods overlap.	Screened out
					Traffic and transport	
					Upgrades to the Wine Country Drive/Old North Road intersection would be required to support access to the proposed development. As staging and timing of these upgrades has yet to be confirmed, there is potential for construction overlap	Screened in

Project	Description	Approx. distance to Project Area	Current status	Indicative timing	Potential for overlap of impacts	Screening assessment
					with the Project's proposed intersection and local road improvement works.	
					Surface water quality	
					Potential cumulative surface water quality impacts may arise if construction periods overlap, due to the combined effects of concurrent earthworks and construction activities.	Screened in
Huntlee Arcare Seniors Housing (SSD-49283708)	Residential care facility comprising 96 beds with ancillary access, parking and servicing infrastructure at 1864 Wine Country Drive, Branxton.	5.2 km north	Approved 26 September 2025	Construction commencement: Mid-2026 Duration: 18 months	Biodiversity All vegetation within the subject site has been previously cleared under the approval for Huntlee New Town – Stage 1 (MP10_0137-Mod-25). No additional vegetation clearing is required for the proposed development. As the site does not contain vegetation or habitat of biodiversity value, cumulative biodiversity impacts are not anticipated.	Screened out
					Visual	
					Due to the separation distance between the two projects, construction activities would not be simultaneously experienced by the same sensitive receivers. Accordingly, cumulative impacts are not expected to occur.	Screened out
					Noise	
					Due to the distance between this proposed development and the Project, there is no	Screened out

Project	Description	Approx. distance to Project Area	Current status	Indicative timing	Potential for overlap of impacts	Screening assessment
					potential overlap in noise impacts on sensitive receivers.	
					Traffic and transport	
					There is potential for construction phases of both projects to overlap. For this proposed development, all construction vehicles are proposed to/from the north only via Kesterton Rise to Wine Country Drive, then to either Hunter Expressway or Wine Country Drive north and south of Hunter Expressway. If construction vehicles route to/from the south along Wine Country Drive, there is potential for traffic impacts to overlap.	Screened in
					Surface water quality	
					Due to the projects being situated within the same catchment, cumulative impacts on surface water quality may occur if construction periods temporally coincide.	Screened in
Cedar Mill Hunter Valley (SSD-39121472)	The proposal comprises a cultural, tourism and Convention Centre at 482-542 McDonalds Road, Pokolbin, comprising a museum, restaurants and cafes, a brewery	5.9 km south-west	Prepare EIS	Construction commencement: Unknown Duration: Unknown	Biodiversity	
					Due to the substantial separation between this proposed development and the Project, there is no reasonable potential for cumulative biodiversity impacts during construction, even if construction periods overlap.	Screened out
					Visual	
					Given the distance between the two projects, construction activities would not	Screened out

	distillery and supporting retail outlets.				be experienced by the same sensitive receivers at the same time, and cumulative impacts are therefore not anticipated.	
					Noise	
					Due to this distance between the proposed development and the Project, there is no potential for overlapping noise impacts at identified noise sensitive receivers, even if construction activities are undertaken concurrently.	Screened out
					Traffic and transport	
					Construction timeframes for this project are not publicly available. There is potential for construction for both projects to overlap. Construction routes for the proposed development are unknown, however construction traffic for both projects could utilise Hunter Expressway and Wine Country Drive.	Screened in
					Surface water quality	
					Due to the separation distance between the proposed development and the Project, and the lack of direct hydrological connectivity, it is unlikely that construction activities would result in water quality effects at the same downstream receiving environments. Accordingly, cumulative water quality impacts are not anticipated.	Screened out

6.14.6 Cumulative impact assessment

6.14.7 Construction

An assessment of the potential cumulative impacts associated with the Project's construction and the 'screened in' projects identified in **Table 6.14-2** is provided as follows.

Biodiversity

Potential cumulative biodiversity impacts resulting from the construction of the Project alongside other nearby major projects are detailed in **Table 6.14-3**.

Table 6.14-3: Summary of potential cumulative biodiversity impacts during construction

Project	Potential cumulative traffic and transport impacts
Sunshine Estate BESS (SSD-92914712)	A portion of the Sunshine Estate BESS site overlaps with the Project Area. In addition, construction timeframes for the two projects are also anticipated to overlap. Based on the detail contained within the Sunshine Estate BESS Scoping Report (NGH, 2025), the proposed development is expected to involve clearing of native vegetation, including areas associated with TECs, and would result in impacts to native fauna, including threatened and migratory species. Anticipated direct impacts include habitat removal, increased fragmentation, potential injury or mortality of fauna associated with vegetation clearing and vehicle movements, and localised changes to riparian hydrology and ecological function. The BDAR for the Project (Appendix E) identifies that the main biodiversity impacts would occur during construction and relate primarily to the clearing of a small area of native vegetation, including 0.48 ha of PCT 3315 Central Hunter Ironbark–Spotted Gum Forest, together with removal of non-native vegetation and a small farm dam. The Project would also affect a limited area of mapped Swift Parrot Important Habitat, although impacts are expected to be minor given the small area affected and the availability of higher-quality habitat nearby. Indirect effects, such as those associated with noise, erosion, weed spread and increased human activity, are expected to be localised, minor and manageable through the implementation of standard mitigation measures. Vegetation clearing or ground disturbance within or adjacent to the shared boundary interface could result in incremental local habitat loss, increased edge effects and minor additional fragmentation, particularly where PCTs associated with TECs occur in fragmented or scattered condition. Several mobile threatened fauna species recorded within the Sunshine Estate BESS study area are likely to utilise habitat across both project footprints, creating a potential localised pathway for cumulative biodiversity impacts during overlapping construction periods. Notwithstanding this, the broader locality retains extensive areas of similar vegetation and habitat, key listed flora recorded within the Sunshine Estate BESS study area are located outside the proposed impact area, and both projects would implement standard avoidance, minimisation and offsetting measures consistent with legislative requirements. On this basis, any cumulative biodiversity impacts arising from the interaction of the two projects are expected to be low in magnitude, with no significant or regionally adverse biodiversity outcomes anticipated.

Project	Potential cumulative traffic and transport impacts
Huntlee New Town – Stage 2 (SSD-707484466)	Both projects would involve the removal of areas mapped as Swift Parrot Important Habitat. The Project would remove 0.71 ha of Important Habitat, noting that no Swift Parrots have been recorded within the Project Area. In comparison, the Additional Ecological Information Report (MJD Environmental, 2026) for the proposed development documented Swift Parrot records in winter 2005 and May 2008, with surveys indicating that the species uses the Huntlee locality sporadically in both location and abundance, returning intermittently during winter due to the availability of extensive suitable habitat in the broader area. Given the Swift Parrot's highly mobile, winter-migrant behaviour and the sporadic pattern of habitat use recorded across the landscape, the small area of habitat loss (0.71 ha) associated with the Project is unlikely to reduce habitat availability at a regional scale or materially interact with impacts from the proposed development. The proposed development also includes the protection and conservation of habitat areas where the species has previously been recorded, maintaining important foraging resources within the locality. Overall, while both projects contribute to incremental loss of mapped Important Habitat, the limited extent of removal, the absence of Swift Parrot records within the Project Area, the species' transient and irregular use of the locality, and the retention of extensive nearby habitat mean that cumulative impacts on Swift Parrot habitat values are expected to be low.
Huntlee New Town – Stage 1 (MP10_0137-Mod-25)	Cumulative biodiversity impacts at a landscape scale could potentially occur where highly mobile fauna species are present that are able to move across both project areas, resulting in combined disturbance or displacement during construction. In addition, where vegetation communities or habitat features with limited local occurrence are affected by both projects, the cumulative loss of such vegetation could contribute to incremental reductions in habitat extent and connectivity. While these effects may be limited in magnitude, they represent a potential pathway for cumulative biodiversity impacts at the broader landscape scale.

Based on **Table 6.14-3**, overall, with the implementation of standard and additional mitigation measures, cumulative biodiversity impacts on sensitive receivers are not anticipated to be significant.

Visual

Potential cumulative visual impacts resulting from the construction of the Project alongside other nearby major projects are detailed in **Table 6.14-4**.

Table 6.14-4: Summary of potential cumulative visual impacts during construction

Project	Potential cumulative traffic and transport impacts
Sunshine Estate BESS (SSD-92914712)	During construction, the overlapping project areas could result in a shared and intensified construction footprint, increasing temporary visual change in the local landscape. Concurrent construction activities within and adjacent to the overlapping areas including earthworks, cranes, construction plant, materials storage, lighting and workforce movements would heighten the visibility and apparent scale of industrial elements, particularly from nearby viewpoints. These combined effects are likely to increase the magnitude and duration of construction-phase visual impacts compared to either project occurring in isolation; however, the impacts would remain temporary and are expected to diminish progressively as construction is completed, temporary infrastructure is removed, and rehabilitation and landscaping are implemented.

Project	Potential cumulative traffic and transport impacts
Huntlee New Town – Stage 2 (SSD-707484466)	If construction activities for both projects were to occur at the same time, the combined extent of construction works could result in a broader and more visually prominent temporary disturbance within the local landscape. The simultaneous presence of construction activities, plant and equipment and increased workforce activity could collectively increase the visibility and perceived scale of built form from nearby viewpoints. As a result, visual effects during construction would be more noticeable and could persist for a longer period than if either project were undertaken in isolation. Nevertheless, these impacts would be temporary in nature and would progressively reduce as works are completed, temporary facilities are removed, and site rehabilitation and landscaping are established.

Noise

Cumulative noise impacts can occur during construction when multiple construction activities or projects take place simultaneously or sequentially within the same area, leading to an overall increase in noise levels. If construction work overlaps, the combined noise from construction activities could significantly affect noise sensitive receivers and also potentially prolonged exposure to elevated noise levels.

Potential cumulative noise and vibration impacts resulting from the construction of the Project alongside other nearby major projects are detailed in **Table 6.14-5**.

Table 6.14-5: Summary of potential cumulative noise impacts during construction

Project	Potential cumulative noise impacts
Sunshine Estate BESS (SSD-92914712)	A portion of the Sunshine Estate BESS site overlaps with the Project Area. The closest non-associated residential receiver to the Sunshine Estate BESS is 2 Blackburn Close, Lovedale, located 89 m south-east of the site. The NVIA for the Project (Appendix J) predicts that construction noise levels at 2 Blackburn Close, Lovedale may exceed the applicable noise management levels during certain high-noise construction activities. If construction periods for the two projects were to overlap, construction vehicles and machinery would be the primary contributors to potential cumulative noise impacts. Concurrent use of plant, equipment and construction traffic across adjacent work fronts could increase the frequency and duration of construction noise events experienced at nearby sensitive receivers, including 2 Blackburn Close, Lovedale. Each project will implement appropriate noise management controls through project-specific Construction Noise and Vibration Management Plans. Where any overlap in construction occurs, coordinated staging, avoidance of concurrent high-noise tasks near shared receivers, and targeted additional mitigation measures, such as temporary acoustic shielding, delivery sequencing and respite protocols will be applied, where appropriate. With these measures in place, residual cumulative construction noise impacts are expected to be low and manageable.
Huntlee New Town – Stage 2 (SSD-707484466)	The Construction Noise and Vibration Assessment prepared for the proposed development identifies that the residence at 803 Old North Road may experience construction noise levels above the relevant management thresholds, with a worst-case predicted level of 77 dB(A), classified as an <i>extreme impact</i>. These levels are only expected when rock breaking occurs in close proximity to the receiver; at all other times, predicted noise levels would be substantially lower. A Preliminary Construction Management Plan has been prepared for the proposed development which outlines measures to manage amenity

Project	Potential cumulative noise impacts
	impacts on surrounding properties. The Construction Noise and Vibration Management Plan prepared requires the application of all feasible and reasonable noise controls, and where residual exceedances remain, the Additional Mitigation Measures Matrix in the <i>Interim Construction Noise and Vibration Guideline</i> will be implemented. This includes Specific Notification for any receiver predicted to experience levels above 75 dB(A). The NVIA for the Project (Appendix J) similarly predicts that construction noise levels at 803 Old North Road (Black Creek Farm/Winery) would exceed the applicable noise management levels during certain construction activities. The proposed large residential lot on Old North Road will be subject to a separate detailed DA and is part of a 15-year staged development program. Based on its indicative timing, construction of the Old North Road Concept Area is unlikely to overlap with the Project's construction period. Therefore, cumulative construction noise impacts are unlikely.

Based on **Table 6.14-5**, overall, cumulative noise and vibration impacts on sensitive receivers are not anticipated to be significant.

Traffic and transport

Potential cumulative traffic and transport impacts resulting from the construction of the Project and other major projects are detailed in **Table 6.14-6**.

Table 6.14-6: Summary of potential cumulative traffic and transport impacts during construction

Project	Potential cumulative traffic and transport impacts
Sunshine Estate BESS (SSD-92914712)	Given that a portion of the proposed development overlaps with the Project Area, there is potential for construction phases of both projects to interact directly if construction periods overlap. Combined heavy vehicle movements on Wine Country Drive and local approaches could temporarily increase traffic volumes, intersection turning movements and short-duration queuing, particularly near closely spaced, adjoining or shared site access points. Concurrent peak activities, such as major deliveries, concrete pours or any OSOM movements, may compound short-term congestion and elevate local road safety interface risks at or near shared access points. In the context of the overlapping boundaries and the unconfirmed construction timing for the proposed development, cumulative construction traffic impacts are therefore possible. Should construction overlap occur, cumulative traffic impacts will be managed through coordination of Construction Traffic Management Plans between the two projects, including alignment of haul routes and delivery windows (with peak hour avoidance), sequencing of any OSOM permits and movements into non-overlapping time slots, staggering high-intensity construction activities across the projects, and implementing integrated temporary traffic controls at shared or adjacent interfaces. With these measures in place, residual cumulative traffic impacts are expected to remain low and manageable.

Project	Potential cumulative traffic and transport impacts
Huntlee New Town – Stage 2 (SSD-707484466)	Access to the proposed large lot residential area would be via Old North Road. The development proposes upgrades of the Wine Country Drive/Old North Road intersection and an extension of the sealed pavement along Old North Road (west of Black Creek) to the proposed development. Construction timeframes are unknown and therefore there is potential for these works to overlap with the Project's construction period. However, given the long, staged nature of the construction period of the proposed development (up to 15 years) and the absence of confirmed delivery timeframes for these specific road upgrades, the likelihood of simultaneous construction activity is low. Traffic management measures outlined in Section 8 of the TIA (Appendix K) will be incorporated into a CTMP and implemented throughout the Project's construction phase. If required, any OSOM movements will be scheduled to avoid coinciding with OSOM trips associated with the development of the residential large lot off Old North Road, minimising cumulative impacts on the local road network. This coordination will be addressed through the relevant permit application process.
Huntlee New Town – Stage 1 (MP10_0137-Mod-25)	The Huntlee New Town Traffic Modelling Report (Hyder, 2012) identifies an upgrade of the existing priority-controlled Wine Country Drive/Old North Road intersection to a seagull-type treatment (Works I-7). As construction timeframes for this upgrade are not confirmed, there is some potential for overlap with the Project's construction activities. However, given the extended, staged delivery of the broader development (up to 15 years), the likelihood of these intersection works occurring at the same time as the Project is low. Traffic management measures outlined in Section 8 of the TIA (Appendix K) will be incorporated into the CEMP and implemented during construction. If required, any OSOM vehicle movements will be coordinated to avoid coinciding with OSOM trips associated with the development, minimising cumulative impacts on the road network. These arrangements will be managed through the relevant permit process.
Huntlee Arcare Seniors Housing (SSD-49283708)	This proposed development would generate only low levels of construction traffic, with heavy vehicles accessing the site via Kesterton Rise and Wine Country Drive. Peak construction activity is expected to involve up to 80 truck trips per day (a maximum of 10 per hour) for a short, two-week excavation phase, decreasing to no more than 10 truck trips per day for the remainder of the construction program. These volumes are low relative to the capacity of the surrounding road network. The Project would also utilise Wine Country Drive for construction access; however, its construction traffic generation is low and short-term, and any overlap with the construction period of the proposed development would result in only minor additions to traffic volumes on Wine Country Drive. Given the scale of both developments and the capacity of the network, no significant cumulative construction traffic impacts are expected during construction.

Project	Potential cumulative traffic and transport impacts
Cedar Mill Hunter Valley (SSD-39121472)	The Scoping Report for Cedar Mill Hunter Valley project indicates that the development has the potential to generate significant traffic volumes, with potential impacts on the surrounding local, regional and state road network. Primary access to the site is proposed off McDonalds Road, with a secondary access point off Broke Road, both of which are local roads. Construction access routes for the proposed development have not yet been confirmed; however, due to the development's location, it is likely that construction vehicles would utilise Wine Country Road. Construction timeframes for Cedar Mill Hunter Valley are currently unknown, and as such there is potential for construction traffic to overlap with traffic generated during the Project's construction phase along Wine Country Drive. Traffic management measures outlined in Section 8 of the TIA (Appendix K) will be incorporated into a CTMP and implemented throughout the Project's construction phase. If required, any OSOM movements will be scheduled to avoid coinciding with OSOM movements associated with the proposed development, reducing cumulative impacts on Wine Country Drive should construction routes overlap. Coordination of these movements will be managed through the relevant permit application process.

Based on **Table 6.14-6**, cumulative impacts on traffic, transport and the surrounding road network are not anticipated to be significant.

Surface water quality

Potential cumulative surface water quality impacts resulting from the construction of the Project alongside other nearby major projects are detailed in **Table 6.14-7**.

Table 6.14-7: Summary of potential cumulative surface water quality impacts during construction

Project	Potential cumulative surface water quality impacts
Sunshine Estate BESS (SSD-92914712)	This proposed development is situated in the Black Creek catchment, within and adjacent to the Project Area. Where construction activities are undertaken concurrently, there is potential for cumulative impacts on surface water quality. Such impacts may result from the combined contribution of earthworks-related disturbance, increased sediment generation, and inadvertent contaminant releases, with potential effects on shared downstream receiving environments. If construction works for both projects are undertaken concurrently within proximate areas of the catchment, short-duration cumulative impacts on Black Creek may occur. The Project's SWMP will consider other proposed developments nearby. Where overlapping construction programs are confirmed, enhanced or supplementary water quality management measures may be implemented to mitigate potential cumulative impacts.

Project	Potential cumulative surface water quality impacts
Huntlee New Town – Stage 2 (SSD-707484466)	Black Creek is located between the proposed development and the Project and, where construction programs coincide, there is potential for cumulative impacts on surface water quality to occur. Concurrent construction activities within the shared Black Creek catchment may increase the likelihood of surface water quality degradation within this watercourse. Where overlapping construction works are undertaken, short-term cumulative surface water quality impacts may occur as a result of simultaneous earthworks and construction activities generating runoff containing sediment and other potential contaminants discharging to Black Creek. The Project's SWMP will take into account other proposed developments being constructed within the catchment at the same time, and additional mitigation measures will be implemented, where required, where concurrent construction is confirmed. With the application of these measures, cumulative surface water quality impacts are expected to be minor, localised, and temporary.
Huntlee New Town – Stage 1 (MP10_0137-Mod-25)	Construction activities associated with the staged large-lot residential land development off Wine Country Drive are currently underway. Depending on the timing of future development stages, there is potential for construction activities to occur concurrently with the Project. Both developments are located within the Black Creek catchment and in proximity to Black Creek itself, resulting in a potential pathway for surface water quality impacts during construction. Should water quality impacts on Black Creek or associated receiving watercourses occur at the same time, cumulative effects may arise. However, with the implementation of appropriate mitigation measures for both projects, including Soil and Water Management Plans and Erosion and Sediment Control plans, cumulative surface water quality impacts on receiving waters are anticipated to be minimal.

Based on **Table 6.14-7**, cumulative surface water quality impacts are not expected to be significant.

6.14.8 Operation

An assessment of the potential cumulative impacts associated with the operation of the Project is provided as follows.

Biodiversity

Biodiversity impacts are not expected during the operational phase of the Project, as ongoing activities would not involve additional vegetation clearing, ground disturbance or modification of habitat.

Operational activities are not expected to introduce new disturbance pathways that could affect native vegetation, threatened species or ecological communities. As no residual operational biodiversity impacts are anticipated for the Project, there is no potential for cumulative operational biodiversity impacts to arise from interaction with other proposed developments.

Visual

During operation, the Project would result in low to moderate adverse visual impacts at a limited number of nearby private viewpoints, with low to negligible impacts for most public viewpoints, including motorists. While the presence of other proposed developments may contribute to minor cumulative visual effects, these would be consistent with the established and evolving visual character of the area and are not expected to give rise to significant cumulative impacts.

Noise

Residual operational noise impacts associated with the Project are predicted to result in minor noise exceedances at three noise-sensitive residential receivers. When considered in combination with other surrounding developments, cumulative operational noise impacts are not expected to significantly increase noise exposure at any receiver. This is because operational noise sources would not spatially or temporally interact in a manner likely to result in additive impacts, and each development would be required to demonstrate compliance with the relevant NSW noise criteria through its own assessment, design and mitigation measures. It is anticipated that nearby developments would similarly incorporate site-specific operational noise controls (for example, acoustic enclosures, barriers or noise walls) as part of their approval conditions. Accordingly, with each development independently managing its operational noise emissions, cumulative operational noise impacts at surrounding receivers are expected to be minimal and not significant.

Traffic and transport

Operation of the Project would generate up to four vehicle movements per week, resulting in a negligible change to existing traffic conditions and no discernible effects on road capacity, intersection performance or road safety. When considered cumulatively with other developments in the local area, operational traffic volumes associated with the Project would remain negligible. While traffic impacts from other developments would be assessed individually, any required upgrades to intersections or the surrounding road network would be implemented through those approval processes and may result in improved traffic efficiency and capacity in the local network. Accordingly, given the very low operational traffic demand generated by the Project and the potential for network upgrades associated with other developments, no cumulative operational traffic impacts are expected to occur.

Noise and vibration

With the implementation of noise walls and a noise control strategy to manage fan speeds, operational noise levels will be below the acceptable noise criteria levels and residual operational noise impacts are not anticipated.

Due to the separation distance from other noise-generating projects, and the lack of residual noise impacts during the Project's operation, cumulative noise impacts would not occur.

Surface water quality

Residual operational impacts on surface water quality are anticipated to be negligible for the Project. Cumulative operational impacts on Black Creek, its wider catchment and downstream receiving environments are not anticipated.

6.14.9 Conclusion

Assessment of the Project's residual impacts associated with biodiversity, noise and traffic during construction and operation in combination with impacts identified for other major projects in the vicinity of the Project concluded that there are no significant cumulative impacts expected as a result of the Project.

7.0 Justification and conclusion

7.1 Justification of the Project

7.1.1 Recognised need

The NEM is transitioning away from fossil fuel-based generation toward a renewable-dominated electricity system, driven by the planned closure of coal-fired power stations and the need to decarbonise the economy. Maintaining a reliable, affordable and resilient electricity network during this transition is a key national and state priority.

Grid-scale BESS play a critical role in supporting this transition by storing surplus renewable energy and dispatching electricity during periods of peak demand or low renewable generation, thereby improving system reliability and network stability.

The Project directly responds to this need by providing dispatchable energy storage capacity that supports renewable energy integration, enhances network resilience and contributes to a lower-emissions electricity system. The Project is consistent with Australia's commitments under the Paris Agreement and relevant Commonwealth and NSW climate change and energy policies, as outlined in **Chapter 4.0**.

7.1.2 Project benefits

As described in **Chapter 2.0**, the Project delivers benefits at the local, regional and State levels through its contribution to the energy transitions, improved electricity system reliability and economic investment. The key benefits of the Project are:

- Supporting the energy transition to a low-emissions electricity system
- Improving grid stability and energy security for NSW
- Job creation and investment in the Hunter region.

The Project's primary benefit is the provision of grid-scale battery energy storage to support the NEM's transition to a renewable-dominated generation mix. The four-hour duration BESS would store surplus renewable electricity during periods of high generation and low demand and dispatch energy during periods of peak demand or reduced renewable output, particularly in the late afternoon and evening, thereby supporting system reliability.

In addition to energy storage, the Project would provide essential system services, including frequency control and other firming services, which support grid stability as coal-fired generation retires and renewable penetration increases. By balancing supply and demand, moderating peak-period price volatility and reducing reliance on fossil fuel generation, the Project would contribute to a more resilient, reliable and lower-emissions electricity system.

The Project would also deliver economic benefits through capital investment and employment, with an estimated capital investment of approximately \$231 million and up to 100 FTE construction roles at peak, generating flow-on benefits for local businesses in the Hunter region. Ongoing operations would support a small number of permanent roles, providing a modest but sustained contribution to the local economy.

7.1.3 Suitability of the site

The suitability of the site for the Project is outlined in detail in **Section 2.3**. The site was selected through a structured assessment of environmental, social, technical and network integration criteria and is considered highly suitable for grid scale battery energy storage.

The site is strategically located adjacent to the existing Rothbury Zone Substation on Ausgrid owned land, enabling efficient connection to the electricity network without the need for substantial new infrastructure or major upgrades. This location supports timely and cost-effective delivery while minimising transmission losses.

The site has been previously disturbed by agricultural activities and existing electricity infrastructure and is characterised by an established utility use. This allows the Project to be consolidated within an

existing infrastructure corridor, avoids development of greenfield land and minimises land use conflict and visual intrusion into the surrounding rural landscape.

The site benefits from suitable access via the existing road network and proximity to a skilled regional workforce. Alternative sites were considered but discounted due to greater environmental and community impacts, higher costs and more extensive network upgrade requirements.

Overall, the site is well suited to the Project as it leverages existing land ownership and infrastructure, minimises environmental and social impacts, and supports the orderly transition of the NSW electricity system.

7.1.4 Consideration of community views

An overview of community and stakeholder consultation for the Project, including key issues raised and responses, is provided in **Chapter 5.0** and **Appendix C**.

The main issues identified through consultation related to safety and hazards (including fire risk), visual impact, operational noise, traffic safety on Wine Country Drive, Aboriginal cultural heritage associated with Black Creek, flood risk, and potential impacts on tourism and local businesses, primarily raised by nearby residents and businesses.

These matters have been assessed through the technical studies presented in this EIS and, where required, addressed through Project design refinements and mitigation and management measures outlined in **Appendix D**.

Community and stakeholder engagement will continue during the public exhibition of the EIS, with submissions and responses informing DPHI's assessment, the final Project design and any conditions of consent, should development consent be granted.

7.1.5 Future monitoring and communication

Environmental management, monitoring and communication for the Project will be guided by a CEMP, to be prepared prior to construction and implemented for the duration of construction. The CEMP will be supported by topic-specific management plans, as outlined in **Appendix D**.

These plans will be prepared in accordance with relevant legislation, guidelines and conditions of consent and will implement the mitigation and management measures identified in this EIS, including monitoring, inspection and reporting requirements.

An OEMP will be implemented during operation to manage ongoing compliance, with a focus on operational noise, hazard and risk management, emergency preparedness and routine maintenance activities, including maintaining stormwater infrastructure.

Community and stakeholder communication will continue throughout construction via the Project website and other appropriate notification methods. During operation, established communication channels will remain available, with stakeholders informed of any matters of significance.

At the end of the Project's operational life, decommissioning would be supported by appropriate environmental management and stakeholder consultation in accordance with regulatory requirements and best practice.

7.1.6 Key uncertainties

Due to the extent of the technical studies undertaken for each of the key matters and the proposed mitigation measures that will be in place to address any potential impacts, there are no notable uncertainties related to the Project.

7.2 Consistency with the objects of the EP&A Act

Table 7-1 outlines how the Project aligns with the objects of the EP&A Act.

Table 7-1: Consistency with the objects of the EP&A Act

Object	Response
a. to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,	The Project would promote the social and economic welfare of the community through the delivery of critical electricity infrastructure that supports grid stability, increased energy storage capacity and the transition of the National Electricity Market toward greater reliance on renewable energy. With an estimated capital investment of \$231 million, the Project would deliver economic benefits during construction, including up to 100 FTE jobs at peak and opportunities for local and regional suppliers, and would support a small ongoing operational workforce of up to five part-time roles, equating to up to two FTE positions. Once operational, the Project would provide essential system services that enhance network reliability and resilience, support efficient renewable energy integration and contribute to long-term market efficiency. Potential environmental impacts have been assessed by technical specialists and, with the mitigation and management measures identified in Chapter 6.0 and Appendix D, residual impacts are expected to be low and manageable, consistent with the objectives of the EP&A Act.
b. to promote the supply, delivery and maintenance of housing, including affordable housing,	This objective is not applicable to the Project.
c. to promote productivity through the development and management of the State and its resources,	The location of the Project adjacent to the existing Rothbury Zone Substation promotes productivity through the efficient development and management of the State's energy resources. Utilising established grid infrastructure minimises land take, avoids duplication of assets, and optimises the performance of the existing transmission and distribution network. By enabling energy storage, network support and improved integration of renewable generation, the Project enhances the reliability and efficiency of the electricity system, supports economic activity, and contributes to the productive use of NSW's energy resources in a manner that aligns with long-term infrastructure and energy objectives.
d. to protect the environment, including the conservation of threatened species of native animals and plants and ecological communities and their habitats,	A BDAR has been prepared in accordance with the BAM. The Project applies the mitigation hierarchy by avoiding and minimising impacts through site selection and design refinement and managing residual impacts through construction and operational controls (refer to Section 6.2). Where residual impacts remain, the BDAR identifies the biodiversity credits required under the NSW Biodiversity Offsets Scheme, which will be secured and retired prior to construction to provide like-for-like offsets and long-term conservation outcomes. The Project will also implement biodiversity management measures such as pre-clearing surveys, exclusion zones, weed and pathogen controls, fauna management and rehabilitation. Together, these measures ensure biodiversity impacts are avoided and minimised

Object	Response
	where practicable and appropriately offset where unavoidable, consistent with environmental protection objectives.
e. to promote resilience to climate change and natural disasters through adaptation, mitigation, preparedness and prevention,	The Project promotes resilience to climate change and natural disasters by strengthening the reliability and adaptability of the electricity network. By providing energy storage, rapid response capacity and grid support services, the Project enhances the system's ability to manage increased demand, variability associated with renewable generation, and disruptions arising from extreme weather events. Resilience considerations have been incorporated into the Project's design, including flood mitigation measures and the provision of new stormwater management and drainage infrastructure designed to manage storm events and reduce flood risk onsite and downstream. The location of the Project adjacent to the existing Rothbury Zone Substation supports efficient emergency response and recovery, limits additional land disturbance, and contributes to broader climate change mitigation and adaptation objectives by supporting a more stable, low-emissions energy system.
f. to promote the sustainable management of built and cultural heritage, including Aboriginal cultural heritage,	The Project has been planned to avoid and appropriately manage Aboriginal and non-Aboriginal heritage values. The ACHAR (Appendix G) confirms the site forms part of a culturally significant landscape, with Aboriginal material of moderate to high significance identified in the western portion of the site. To avoid intact deposits, the Project has been located within the more disturbed central area, and an ACHMP will guide avoidance measures, unexpected finds procedures and cultural awareness training.
g. to promote good design, amenity and the proper construction and maintenance of built environments, including the protection of the health and safety of the occupants of buildings,	Potential amenity impacts relating to visual amenity, noise and vibration, and air quality have been assessed in Section 6.6, Section 6.7 and Section 6.13 respectively. With the implementation of the proposed mitigation measures, these impacts are predicted to be manageable and consistent with relevant guidelines and performance criteria. The Project is designed to integrate with the existing utility land use associated with the Rothbury Zone Substation. Its scale, form and layout are appropriate to the surrounding context and incorporate measures such as landscaping to minimise visibility. Accordingly, the Project would result in limited visibility from nearby sensitive receivers and would not give rise to unacceptable impacts on local amenity or the quality of the built environment. All components of the Project have been designed in accordance with relevant electrical, structural and building safety standards. Construction would be undertaken in compliance with the Building Code of Australia and applicable legislative requirements, as detailed in Chapter 4.0 with appropriate construction management measures in place to maintain site safety. During operation, the Project would be subject to regular inspection, maintenance and asset management to ensure ongoing safe and reliable performance and to minimise risks to workers and the surrounding community.

Object	Response
h. to provide opportunities for participation in environmental planning and assessment,	The Project has been developed with an emphasis on meaningful community and stakeholder engagement, consistent with the environmental planning and assessment framework. Consultation undertaken during Project development is detailed in Chapter 5.0 and documented in the Community and Stakeholder Outcomes Report (Appendix C). Early engagement with community stakeholders and relevant authorities has informed Project design, impact assessment and mitigation measures. Further opportunities for community participation will be provided during the public exhibition of this EIS, during which formal submissions may be made as part of the assessment process.
i. to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	This EIS has been prepared to identify and assess the environmental, economic and social impacts of the Project in accordance with the relevant planning and assessment requirements. The outcomes of these assessments have informed site selection, design refinement and the development of appropriate avoidance, mitigation and management measures. The EIS demonstrates that economic, environmental and social considerations have been balanced throughout the planning process to support informed decision-making. The Project's consistency with the principles of ecologically sustainable development (ESD) is discussed in Section 7.4, and the integrated assessment approach facilitates long-term economic and energy system benefits while avoiding or minimising environmental and social impacts.
j. to promote a proportionate and risk-based approach to environmental planning and assessment,	The Project has been assessed within the NSW statutory environmental planning and assessment framework, as outlined in Chapter 4.0, applying a proportionate and risk-based approach that is commensurate with the nature, scale and potential environmental impacts of the Project. Relevant State and local government agencies have been consulted throughout the assessment process (refer to Chapter 5.0), with consultation and technical investigations focused on matters of material risk. Agency feedback has informed Project design, impact assessment and the identification of targeted mitigation measures. If approved, the Project would remain subject to regulatory oversight during construction and operation, including compliance reporting and enforcement activities that are aligned with identified environmental risks. This approach supports effective coordination between authorities, ensures accountability for environmental performance, and delivers public interest outcomes in a manner that is efficient, transparent and proportionate.

Object	Response
k. to promote the orderly and economic use and development of land,	The Project is a permissible form of development and is consistent with the statutory planning framework and applicable planning controls. Development of a BESS on Ausgrid-owned land adjacent to the Rothbury Zone Substation represents an orderly and efficient use of land for essential electricity infrastructure. Co-location with existing network assets optimises the use of established utility land, avoids unnecessary greenfield development and minimises land use conflict, while reducing the need for new service corridors and ancillary infrastructure. The scale, siting and design of the Project support efficient land utilisation, align with strategic energy reliability and transition objectives, and would deliver positive economic outcomes during construction and operation. Accordingly, the Project promotes the orderly and economic development of land in a manner consistent with the planning framework and the broader public interest.

7.3 Summary of Project impacts

This EIS has considered all relevant potential environmental, social and economic impacts associated with the Project. This section summarises the potential impacts on these factors and provides an overall justification for the Project.

7.3.1 Environmental impacts

This EIS has assessed the potential biophysical impacts that may result from the Project. These potential impacts are summarised in **Table 7.3-1**.

Table 7.3-1: Summary of environmental impacts

Matter and location	Summary
Biodiversity Section 6.2	The BDAR prepared for the Project (Appendix E) identified potential direct, indirect and prescribed impacts on biodiversity values, primarily associated with vegetation clearing during construction. The Project would involve the removal of 0.48 ha of native vegetation (PCT 3315 Central Hunter Ironbark–Spotted Gum Forest in moderate condition), 4.07 ha of non-native vegetation and a 0.01 ha farm dam. The Project Area contains 0.71 ha of mapped Swift Parrot Important Habitat, of which 0.42 ha is native vegetation. While presence is assumed under BAM mapping, the BDAR concluded the Project is unlikely to result in a significant impact due to the small area affected, low to moderate foraging value and availability of higher quality habitat nearby. No hollow-bearing trees would be removed. Potential indirect impacts during construction and operation would be localised and manageable with standard controls. Mitigation measures such as pre-clearing surveys, ecological supervision, erosion and sediment controls, weed hygiene and habitat retention will be implemented. Following the application of avoidance and mitigation measures, residual impacts will be offset through the retirement of biodiversity credits in accordance with the NSW Biodiversity Offsets Scheme, including nine ecosystem credits (PCT 3315) and 13 Swift Parrot species credits.
Aboriginal heritage Section 6.3	The ACHAR prepared for the Project (Appendix F) identified Aboriginal cultural heritage values within the site through consultation with Aboriginal stakeholders, desktop research and field investigations. The Project Area forms part of a broader Aboriginal cultural landscape; however, no registered Aboriginal sites were identified within the Project Area in AHIMS searches.

Matter and location	Summary
	Field investigations identified an area of moderate to high archaeological potential in the western portion of the site, where Aboriginal cultural material was confirmed through excavation. In contrast, the central portion of the site, which would accommodate most Project infrastructure, is substantially disturbed and has lower archaeological sensitivity. While infrastructure has been sited to avoid intact areas where practicable, some potential for disturbance of buried material remains. An ACHMP will be prepared in consultation with RAPs to guide avoidance measures, cultural awareness training and unexpected finds procedures. Sensitive areas will be protected, and any discoveries will trigger stop-work protocols and consultation with Aboriginal stakeholders and Heritage NSW.
Soils and contamination Section 6.4	Construction of the Project would involve vegetation clearance and ground disturbance, with potential risk to soils given site conditions of low inherent stability and poor drainage. No ASS are expected within the Project Area. Soil erosion and sedimentation risks during construction will be managed through a SWMP, including an ESCP. With these measures in place, residual soil impacts are expected to be low, and no soil disturbance or erosion impacts are anticipated during operation. A Detailed Site (Contamination) Assessment (Appendix G) confirmed the site is not contaminated and is not listed on any NSW EPA contaminated land registers. While there is potential for accidental spills during construction and operation, the predominance of hardstand areas and standard spill prevention and response measures mean residual risks to soil, surface water and groundwater are expected to be low.
Land use Section 6.5	The Project is located on land zoned as 'RU2 Rural Landscape' zoned land adjacent to the existing Rothbury Zone Substation and is situated within a substantially modified infrastructure setting that is not in active agricultural use. While surrounding land uses include agriculture, viticulture and rural residential development, the Project is appropriately sited and compatible with the existing land use context. Construction would be confined to the Project Area, with temporary impacts such as noise, traffic, dust and visual intrusion localised and managed through standard controls. The LUCRA (Appendix H) found construction-related land use conflicts to be low risk following mitigation. During operation, the Project would function as an unmanned, low-intensity land use within a defined footprint. The LUCRA confirmed that potential operational conflicts can be mitigated to acceptable levels, with no ongoing constraints on surrounding rural or agricultural activities. Overall, residual land use impacts are expected to be minor and localised.
Landscape character and visual amenity Section 6.6	The LCVIA (Appendix I) found that the Project is located within a rural landscape already influenced by existing infrastructure, including the adjacent Rothbury Zone Substation. The Project would result in a localised, moderate adverse impact on landscape character within the Rural/Residential/Tourism Landscape Character Zone, while effects on adjacent zones would be negligible. Visual impacts would be most noticeable during construction, resulting in temporary high adverse effects for nearby sensitive receptors. During operation, low to moderate adverse impacts would occur at a limited number of nearby private viewpoints, with low to negligible impacts for most public viewpoints. With the implementation of landscaping, design and lighting mitigation measures, residual landscape character and visual amenity impacts would be localised and acceptable.

Matter and location	Summary
Noise and vibration Section 6.7	The NVIA (Appendix J) identified that construction noise is predicted to exceed noise management levels at nearby residential receivers during standard working hours; however, impacts would be temporary and no receivers would be highly noise affected. Construction traffic noise is expected to be negligible. Mitigation measures will be implemented to manage construction noise, although limited exceedances may occur during certain activities. Operational noise modelling indicated potential exceedances at sensitive receivers, which will be addressed through the installation of permanent noise barriers. With mitigation in place, residual impacts are predicted to be minor and barely perceptible at three receivers. Construction vibration would remain within acceptable criteria, and no operational vibration impacts are anticipated.
Traffic and transport Section 6.8	Construction would represent the peak traffic period for the Project, generating up to approximately 190 vehicle trips per day at peak and around 95 trips per day on average. The TIA (Appendix K) concluded that the road network can accommodate the level of construction traffic generated by the Project, however minor intersection upgrades and localised widening on Old North Road would be required to accommodate heavy vehicles. Construction traffic impacts would be managed through a CTMP. Operation of the Project would generate up to four vehicle movements per week, resulting in a negligible change to existing traffic conditions and no discernible effects on road capacity, intersection performance or road safety.
Surface water, groundwater and flooding Section 6.9	A WIA (Appendix L) assessed potential impacts to surface water, groundwater and flooding during construction and operation. The Project is located within the Black Creek catchment, approximately 205 m east of Black Creek. No impacts to waterfront land are expected. Surface water quality impacts may occur during construction as a result of soil disturbance or accidental spills. Impact would be managed through the implementation of standard mitigation measures. During operation, stormwater would be managed through permanent drainage and treatment infrastructure, resulting in low residual surface water impacts. Shallow groundwater flows toward Black Creek. Excavation during construction may temporarily intercept shallow groundwater, potentially resulting in short-term localised changes to groundwater levels, turbidity, or flow paths. Appropriate mitigation measures are proposed to manage potential groundwater impacts during construction. No impacts to groundwater are anticipated during operation. The site is subject to flooding from overland flow drainage within the local catchment, as well as regional (riverine) flooding from Black Creek. Flood modelling indicates that operational flood behaviour would remain broadly consistent with existing conditions, with no significant increase in flood hazard or downstream flood risk. Overall, with the implementation of proposed mitigation measures, the Project is expected to result in low residual risks to surface water, groundwater, and flood behaviour.

Matter and location	Summary
Hazards and risk Section 6.10	A preliminary risk screening concluded the Project is not a potentially hazardous industry; however, a PHA (Appendix M) was undertaken to assess potential operational risks. The PHA identified battery unit and transformer fires as hazard events with potential offsite effects. Consequence modelling confirmed that heat radiation and toxic exposure distances for these events would be contained within the site, with only minor irritation-level effects extending marginally beyond the boundary in areas without sensitive land uses. All risks were assessed as Low or Very Low and consistent with land-use safety planning criteria. EMF emissions are expected to be low and within applicable guideline limits. Given setback distances to sensitive receivers and the implementation of standard design and operational controls, EMF impacts are expected to be negligible.
Bushfire Section 6.11	A BRA (Appendix N) concluded that, while the site is classified as bushfire-prone land, the surrounding landscape presents a low bushfire risk due to grassland vegetation, gentle topography and limited bushfire history. The BRA identified a requirement for a minimum 10 m Asset Protection Zone around the Project, in accordance with relevant bushfire planning guidance. The proposed APZ, together with vegetation management and non-combustible Project infrastructure, would limit radiant heat and ember attack risk, and a battery unit fire is unlikely to ignite surrounding vegetation. Bushfire risks during construction, operation and decommissioning will be managed through design measures, firefighting access and water supply, vegetation management and bushfire emergency response procedures developed in consultation with NSW fire authorities.
Social and economic Section 6.12	A SEIA (Appendix O) concluded that construction would result in minor, temporary social impacts associated with short-term changes in noise, traffic and visual amenity, which would be managed through standard mitigation and communication measures. Construction would also deliver positive economic impacts through local employment, contractor use and increased regional expenditure. During operation, social impacts are expected to be minimal due to the small workforce and limited operational footprint. The Project would deliver ongoing economic and broader social benefits by supporting grid reliability, energy security and regional economic activity. With mitigation in place, residual social impacts are considered low and acceptable, and overall economic outcomes are expected to be positive at local, regional and state levels.
Non-Aboriginal heritage Section 6.13	A desktop heritage assessment did not identify any non-Aboriginal heritage items listed on Commonwealth, State or local heritage registers within the Project Area. One locally listed heritage item located approximately 30 m to the south-east of the Project Area, would not be directly affected by construction or operation. The Project is located within the eastern extent of the Pokolbin Valley Landscape Conservation Area, which is a non-statutory listing and does not impose heritage protection requirements. Given the disturbed nature of the site and the absence of statutory heritage items, impacts on non-Aboriginal heritage are expected to be negligible. An unexpected finds procedure will be implemented during construction to manage any unforeseen archaeological material.

Matter and location	Summary
Waste Section 6.13	The Project would generate typical construction, operational and decommissioning waste, including spoil, green waste (vegetation), construction materials, packaging, general waste and small quantities of hazardous waste. Construction would represent the peak waste-generating phase, with waste volumes expected to be manageable and largely reusable or recyclable in accordance with the waste hierarchy. Operational waste generation would be minimal due to the unmanned nature of the facility, while decommissioning waste would be managed through reuse, recycling and disposal at appropriately licensed facilities. A WMP implemented through the CEMP and OEMP will ensure compliance with NSW regulatory requirements. With these measures in place, waste impacts are expected to be low and manageable.
Air quality Section 6.13	A qualitative air quality assessment found that existing regional air quality is generally good. Construction may result in short-term, localised dust and vehicle emissions, which would be temporary and managed through standard mitigation measures in the CEMP. During operation, air quality impacts would be negligible due to the limited workforce and infrequent vehicle movements. With mitigation in place, the Project is not expected to result in significant adverse air quality impacts.

7.3.2 Economic impacts

The Project is expected to provide direct, indirect and broader system-level economic benefits to the NSW and local economy, as detailed in **Section 6.12** and **Appendix O**. The overall economic benefits of the Project include:

- Direct economic output from Project expenditure of \$231 million, as outlined in the EDC (**Appendix P**)
- Direct employment generation, including up to 100 FTE construction jobs at peak, and up to five part-time operational roles (equating to up to two FTE positions)
- Indirect expenditure activity generated through demand for local and regional goods and services, particularly food and beverage services, retail, transport and specialist contracting sectors
- Indirect employment opportunities supported through Project supply chains and increased business turnover in surrounding centres
- Ongoing operational expenditure, contributing to regional economic stability and diversification
- Broader electricity market benefits, including improved grid reliability and reduced wholesale electricity prices, supporting long-term economic efficiency for NSW consumers.

7.3.3 Social impacts

The social impacts of the Project have been assessed in **Section 6.12** and **Appendix O**.

The Project is expected to deliver positive social benefits at the state and regional level by supporting the stability and reliability of the NEM, which underpins the provision of essential services and community wellbeing. Potential adverse social impacts are anticipated to be minor, localised and largely temporary, primarily during construction, and will be effectively managed through the implementation of the mitigation and communication measures outlined in **Section 6.12.7**. With these measures in place, residual social impacts are considered low and acceptable.

7.3.4 Cumulative impacts

The cumulative impacts of the Project have been assessed in **Section 6.14**. Existing, approved and proposed developments in the vicinity of the Project were identified and screened based on their scale, status, data confidence, spatial proximity, overlapping receptors and potential overlap in construction timeframes. Through this process, five nearby projects were identified and screened in for detailed

cumulative assessment, including the Sunshine Estate BESS, which occupies a portion of the Project Area and is located directly adjacent to the north.

Potential cumulative impacts associated with the Project relate primarily to construction-phase biodiversity impacts, visual amenity, construction noise and traffic on the surrounding road network and surface water quality. Assessment of the Project's residual impacts in combination with those of other developments indicates that, with the implementation of standard and Project-specific mitigation measures, no significant cumulative impacts are expected during either construction or operation.

7.4 Ecologically sustainable development

7.4.1 The principles of ecologically sustainable development

This section provides an assessment of the Project, its potential impacts, and associated safeguards in the context of the principles of ESD. The assessment has been prepared in accordance with the requirements of the EP&A Regulation and the *Protection of the Environmental Administration Act 1991* (NSW).

The ESD principles, as set out in clause 193 of the EP&A Regulation, are summarised as follows:

- **the precautionary principle** - where there are threats of serious or irreversible environmental damage, lack of full scientific certainty is not to be used as a reason for postponing measures to prevent environmental degradation. In applying this principle, decision-making should be guided by:
 - careful evaluation of options to avoid, wherever practicable, serious or irreversible environmental harm
 - assessment of the risk-weighted consequences of alternative courses of action.
- **inter-generational equity** - the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- **conservation of biological diversity and ecological integrity** - the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making
- **improved valuation, pricing and incentive mechanisms** - environmental factors should be incorporated into the valuation of assets and services, including:
 - the *polluter pays* principle, whereby those who generate pollution or waste are responsible for the costs of containment, avoidance or remediation
 - ensuring users of goods and services pay prices reflecting the full lifecycle costs, including resource use and end of life disposal
 - pursuing environmental goals in the most cost-effective manner through incentive structures and, where appropriate, market-based mechanisms that enable efficient environmental outcomes.

The following sections describe how each of these principles has been considered applied in the planning, design and assessment of the Project.

7.4.2 Precautionary principle

The precautionary principle is a risk-management approach that applied where there is uncertainty in scientific knowledge and the potential for serious or irreversible environment harm. It promotes the adoption of caution and preventive measures, recognising that a lack of full scientific certainty should not be used as a reason for delaying action to prevent environmental degradation.

The EIS process itself is inherently precautionary, as it requires the systematic identification, assessment and management of potential environmental impacts prior to decision-making. Accordingly, this EIS has been prepared by appropriately qualified and experienced specialists and provides a comprehensive assessment of the potential environmental impacts associated with the Project in accordance with relevant statutory requirements, policies and technical guidelines.

Where uncertainty existed in the assessment of potential impacts, conservative assumptions and worst-case scenarios were applied to ensure that potential risks were not underestimated. For example,

the construction noise assessment assumed that all plant and equipment would operate simultaneously at locations closest to sensitive receivers, despite this scenario being highly unlikely in practice. This approach ensured that potential impacts were assessed conservatively and appropriate mitigation measures were identified.

The Project has been designed to avoid impacts wherever practicable, and a suite of mitigation and management measures has been incorporated to minimise any residual impacts. With these measures in place, the Project is not expected to result in serious or irreversible environmental harm. On this basis, the precautionary principle has been appropriately and effectively applied throughout the planning, assessment and design of the Project.

7.4.3 Inter-generational equity

Inter-generational equity requires that the present generation manages the environment in a way that maintains or enhances the health, diversity and productivity of natural and built systems for the benefit of future generations.

Forecast modelling for the NEM indicates that, without intervention, network capacity constraints and reliability issues are expected to increase over the coming years. The Project would contribute to addressing this challenge by providing additional electricity storage capacity, which is critical to improving system stability and resilience and supporting the continued transition towards a predominantly renewable electricity grid. Increased storage capability enables the network to respond rapidly to periods of supply variability and demand peaks, thereby reducing the risk of outages and improving long-term energy security.

By facilitating greater integration of renewable energy and reducing reliance on fossil-fuel-generated electricity, the Project would support decarbonisation of the electricity sector and contribute to reductions in greenhouse gas emissions. These outcomes align with broader state and national climate and energy objectives and provide long-term environmental and social benefits, including a more sustainable, reliable and resilient electricity network for future generations.

This EIS has identified and assessed the potential environmental impacts of the Project and has documented mitigation and management measures to avoid or minimise those impacts. With these measures in place, the Project is considered consistent with the principle of inter-generational equity, as it supports long-term environmental sustainability while meeting present-day energy needs.

7.4.4 Conservation of biological diversity and ecological integrity

Biological diversity refers to the variety of life forms and ecosystems, while ecological integrity relates to the maintenance of ecosystem structure, composition and function. This principle requires that the conservation of biodiversity and ecological integrity be a fundamental consideration in the planning, design and implementation of development.

A BDAR was prepared (**Appendix E**) to identify, assess and quantify potential impacts on biodiversity values. The assessment confirmed that the Project would require the removal of 0.48 ha of native vegetation, representing the residual impact after the application of avoidance and minimisation measures during Project design. Direct impacts have been carefully limited through site selection, layout refinement and design controls.

Residual biodiversity impacts would be addressed through the retirement of biodiversity offset credits and managed through the implementation of appropriate mitigation measures, as outlined in **Section 6.2**. These measures are intended to avoid adverse impacts where practicable and maintain ecological function within the broader landscape.

Taking into account the relatively small extent of vegetation removal, the disturbed nature of much of the site, the application of offsetting and mitigation measures, and the overall siting and design of the Project, the Project's impacts on biological diversity and ecological integrity are considered acceptable. The Project is therefore consistent with the principle of conserving biodiversity and maintaining ecological integrity.

7.4.5 Improved valuation and pricing of environmental resources

The Project applies the principle of improved valuation and pricing by balancing economic, environmental and social costs and benefits over its full life. It would deliver positive economic outcomes through construction and operational employment and broader regional benefits.

By supporting renewable energy integration, improving network stability and reducing reliance on fossil-fuel generation, the Project would contribute to lower emissions and long-term energy market efficiency.

Environmental costs have been explicitly recognised and internalised through mitigation and management measures and, where residual impacts remain, through the retirement of biodiversity credits under the NSW Biodiversity Offsets Scheme. The costs of these measures have been incorporated into Project capital and operational expenditure. Overall, the Project internalises environmental costs and delivers net economic and environmental benefits consistent with the objectives of ESD.

7.5 Conclusion

The Project involves the development of a BESS with a maximum power output capacity of up to 135 MW and storage capacity of up to 540 MWh on Ausgrid-owned land at 1309 Wine Country Drive, Rothbury, NSW 2320.

The Project aims to support the transition of the NEM toward increased renewable energy generation by providing energy storage and system services that enhance the stability, reliability and resilience of the wider electricity network.

The assessment determined that, with the implementation of appropriate avoidance, mitigation and management measures, any residual impacts would be low to negligible. Mitigation measures have been identified to manage potential impacts during construction, operation and decommissioning, ensuring that environmental values, community amenity and economic conditions are appropriately protected.

The Project would deliver net benefits at local, regional and state levels, including:

- Alignment with relevant Commonwealth, state and local planning and energy policies, strategies and statutory requirements
- Provision of additional energy storage capacity to support the broader increase in renewable energy generation across the electricity grid, addressing projected shortfalls due to the closure of coal-fired generators
- Improved network stability and resilience through the delivery of essential system support services
- Employment opportunities and investment, including construction jobs and ongoing operational roles, contributing to the Hunter region economy and NSW more broadly.

Overall, the environmental, social and economic benefits of the Project are considered to significantly outweigh the impacts that would result from its construction, operation and decommissioning. On this basis, and having regard to the findings of this EIS, it is recommended that development consent be granted.

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Appendix A

SEARs Compliance Table

Appendix A SEARs Compliance Table

Secretary's Environmental Assessment Requirements	Location addressed in EIS
General requirements	
The Environmental Impact Statement (EIS) for the development must comply with the requirements in Part 8, of the <i>Environmental Planning and Assessment Regulation 2021</i> (the Regulation) and must have regard to the <i>State Significant Development Guidelines</i> , the <i>Renewable Energy Planning Framework</i> and any relevant planning circulars.	The EIS is compliant with the EP&A Regulation, with regard to the <i>State Significant Development Guidelines</i> , the <i>Renewable Energy Planning Framework</i> and any relevant planning circulars. The responses below provide justification of this. The responses below provide justification of this.
In particular, the EIS must include:	
A stand-alone executive summary;	A stand-alone summary, as per the <i>State Significant Development Guidelines</i> is provided at the start of the EIS.
- A full description of the development, including: - details of construction, operation and decommissioning, including any staging of the development	Chapter 3.0 provides a detailed description of the Project, including details of construction, operation and decommissioning.
a high quality site plan at an adequate scale showing all infrastructure and facilities (including any infrastructure that would be required for the development, but the subject of a separate approvals process);	Figure 3-1 depicts the Project Area and indicative Project layout.
the Project Area (as per Table 1 of the <i>SSD guidelines – preparing an environmental impact statement</i>) and Development Footprint (disturbance area including but not limited to areas for infrastructure, road works, access tracks, defensible space, fencing and temporary laydown);	A description of the Project Area is provided in Chapter 1.0 . Chapter 3.0 provides an overview of the Project, detailing the Project Area and development footprint as per Table 1 of the SSD guidelines.
a high quality detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development; and	A detailed environmental constraints map is provided in Figure 2-2 in Chapter 2.0 . Land use constraints are shown in Figure 1-4 in Chapter 1.0 .
confirmation if the project is designated development in accordance with the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act) and the Regulation;	Chapter 4.0 details how the Project is a designated development in accordance with the EP&A Act and the Regulation.
consistency in information presented in the EIS and all technical reports, including distances, development footprint, project design and infrastructure proposed, construction timeframes and receiver numbers;	Information presented, including distances, development footprint, project design and infrastructure proposed, construction timeframes and receiver numbers, is consistent in the EIS and all technical reports provided in the appendices.

Secretary's Environmental Assessment Requirements	Location addressed in EIS
a strategic justification of the development focusing on site selection and the suitability of the proposed site with respect to potential land use conflicts with existing and future surrounding land uses (including and use, other proposed or approved energy facilities, major projects, rural/residential development, Crown lands within and adjacent to the project site and subdivision potential);	Section 2.1 in Chapter 2.0 provides a strategic justification of the Project. Surrounding land uses are discussed in Section 2.5.1 .
a risk assessment of the potential impacts of the development, identifying the key issues for further assessment;	Chapter 6.0 addresses potential impacts of the Project.
- an assessment of the likely impacts of the development on the environment, and any other significant issues identified in the above risk assessment, focusing on the specific issues identified below, including: - a description of the existing environment likely to be affected by the development using sufficient baseline data;	An existing environment section, using sufficient baseline data, is included in each section in Chapter 6.0 .
an assessment of the likely impacts of all stages of the development (which is commensurate with the level of impact), including any cumulative impacts of the site, and existing, approved or proposed developments in the region, and impacts on the site and any road upgrades, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the <i>Cumulative Impact Assessment Guideline</i> (DPE, 2022);	Chapter 6.0 assess likely impacts of the Projects at all stages of the development. Section 6.14 includes an assessment of potential cumulative impacts.
a description and assessment if staging of the project is proposed including any site mobilisation or pre-construction works;	Section 3.4 outlines the proposed construction stages of the Project, including a description of enabling works.
a description of the measures that would be implemented to avoid, mitigate and/or offset the impacts of the development (including draft management plans for specific issues as identified below); and	Measures that would be implemented to avoid, mitigate and/or offset the impacts of the Project are explored within their appropriate sections in Chapter 6.0 .
a description of the measures that would be implemented to monitor and report on the environmental performance of the development	
a model for community-benefit sharing prepared in accordance with the <i>Benefit-Sharing Guideline</i>, including the terms of any proposed voluntary planning agreement with the relevant local council	It is anticipated that a voluntary planning agreement would be negotiated with Cessnock City Council. Further details are included in Chapter 5.0 .
A consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS	Appendix D provides a consolidated summary of all the proposed environmental management and monitoring measures to mitigate potential environmental impacts identified in the assessments in Chapter 6.0 .

Secretary's Environmental Assessment Requirements	Location addressed in EIS
A detailed evaluation of the merits of the project as a whole having regard to:	
the requirements in Section 4.15 of the EP&A Act, including the objects of the Act and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development;	Section 4.15 of the EP&A Act is discussed in Section 4.2.2 in Chapter 4.0. Section 7.4 in Chapter 7.0 describes how the principles of ecologically sustainable development have been incorporated into the Project.
the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses;	Chapter 2.0 and Chapter 4.0 discuss the suitability of the site with respect to land use. An assessment of potential land use conflicts is provided in the LUCRA in Appendix H which is summarised in Section 6.4.
feasible alternatives to the development and its key components, including siting and project design alternatives to avoid areas of biodiversity value and high archaeological sensitivity, opportunities for shared infrastructure with proposed developments in the region, and the consequences of not carrying out the development; and	Section 2.2 in Chapter 2.0 provides a description of the feasible alternatives considered.
a detailed consideration of the capability of the project to contribute to the security and reliability of the electricity system in the National Electricity Market, having regard to local system conditions and the Department's guidance on the matter.	Section 2.1 in Chapter 2.0 details the capability of the Project to contribute to the security and reliability of the NEM.
The EIS must also be accompanied by an Estimated Development Cost (EDC) report, providing:	
a detailed calculation of the EDC of the development prepared in accordance with the relevant planning circular using the Standard Form of EDC Report.	An EDC report has been prepared by a suitably qualified quantity surveyor in accordance with the SEARs. The EDC is provided in Section 3.7 and the EDC report is included in Appendix P.
an estimate of the retained and new jobs that would be created during the construction and operational phases, including details of the methodology to determine the figures provided.	Section 2.1.3 in Chapter 2.0 provides an estimate of jobs created. Further details on direct and indirect employment are provided in Section 6.12.
The development application must also be accompanied by:	
The consent of the owner/s of the land (as required in Section 23(1) of the EP&A Regulation)	Landowner consent is not necessary as Ausgrid is the landowner.

Secretary's Environmental Assessment Requirements	Location addressed in EIS
A declaration from a Registered Environmental Assessment Practitioner that the EIS includes the information specified in the Department's <i>Registered Environmental Assessment Practitioner Guidelines</i>	A declaration from a REAP is provided at the start of the EIS.
Key issues	
The EIS must address the following specific matters:	
Biodiversity – including:	
- an assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with Section 7.9 of the <i>Biodiversity Conservation Act 2016 (NSW)</i> (BC Act), having regard to the <i>Biodiversity Assessment Method (BAM) 2020</i> and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must: - be prepared using the approved BDAR template; - document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM; - assess the impacts associated with all ancillary infrastructure, including the transport route road upgrades; - include an assessment for serious and irreversible impacts (SAIL) in accordance with Section 9.1 of the BAM; - include a strategy to offset any residual impacts of the development in accordance with the BC Act; and - be finalised by an accredited assessor as BAM-compliant within 14 days of submission; unless Conservation Programs, Heritage and Regulation Group (CPHR) and the Department of Planning, Housing and Infrastructure (DPHI) determine the proposed development is not likely to have any significant impacts on biodiversity values;	An assessment of the biodiversity values and the likely biodiversity impacts of the Project are included in a BDAR in Appendix E . The BDAR is summarised in Section 6.2 .
an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the <i>Fisheries Management Act 1994</i>, and a description of the measures to minimise and rehabilitate impacts;	Potential impacts to listed aquatic threatened species are discussed in Section 6.2.4 and the BDAR in Appendix E .
a cumulative impact assessment of biodiversity values in the region from nearby developments; and	Cumulative impacts are discussed in Section 6.14 .

Secretary's Environmental Assessment Requirements	Location addressed in EIS
if an offset is required, details of the measures proposed to address the offset obligations.	Biodiversity offsets are discussed in Section 6.2.4.4 and Appendix E .
Heritage – including:	
An assessment of historic heritage (including archaeological impacts) in accordance with the <i>Guidelines for preparing a Statement of Heritage Impact and Guidelines for Archaeological Sites and Relics</i> including consideration of potential visual impacts on any heritage item(s)	The impact that the Project will have on historic heritage is discussed in Section 6.13.1 .
An Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the <i>Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW</i> (OEH, 2011) and the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW, 2010), identifying, describing, and assessing any impacts to any Aboriginal cultural heritage sites or values associated with the site (including impacts from any proposed earth works, construction works and road upgrades), including results of archaeological test excavations (where required), undertaken in accordance with the relevant standards and requirements;	An ACHAR has been prepared and is provided in Appendix F and is summarised in Section 6.3. The ACHAR identifies, describes, and assesses impacts to any Aboriginal cultural heritage sites or values associated with the site, and includes result of the archaeological test excavation undertaken within the site.
evidence of adequate consultation with Aboriginal communities in determining and assessing impacts, identifying and selecting options for avoidance of Aboriginal cultural heritage and identifying appropriate mitigation measures (including the final proposed measures), having regard to the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECCW, 2010).	A description of consultation with Aboriginal communities is provided in Section 6.3.2 . Further details are provided in Chapter 5.0 and the ACHAR in Appendix F .
Land – including:	
a detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, land contamination, permissibility, strategic context and existing site constraints;	Site suitability is discussed in Section 2.3 . A detailed justification of the suitability of the site is provided in Section 7.1 .

Secretary's Environmental Assessment Requirements	Location addressed in EIS
- an assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: - agricultural land, flood prone land, nearby drinking water catchments, Crown lands, mining, quarries, mineral or petroleum rights (if relevant); - a soil survey to determine the soil characteristics and consider the potential for salinity, acid sulfate soils, and erosion to occur; - a cumulative impact assessment of nearby developments; - an assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including: - consideration of the zoning provisions applying to the land, including subdivision (if required); and - completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industries Land Use Conflict Risk Assessment Guide (if required). - an assessment of impact on agricultural resources and agricultural production on the site and region; - a preliminary investigation into potential contamination across the site, in accordance with the State Environmental Planning Policy (Resilience and Hazards) 2021 (Hazards SEPP) (as required).	Potential impacts on existing land uses and adjacent land are discussed in Section 6.5.4.1 and Section 6.5.4.2. An assessment of impacts on agricultural land is provided in Section 6.5.4.1 and Section 6.5.4.2. Flood prone land and drinking water catchments are discussed in Section 6.5.3.2 and detailed in Section 6.9. Soil characteristics are discussed in Section 6.4.3.1. Potential impacts to soils during construction and operation are detailed in Section 6.4.4.1 and Section 6.4.5.1, respectively. Appropriate management measures are provided in Section 6.4.6. Potential cumulative impacts are detailed in Section 6.14. An assessment of the compatibility of the Project with existing land uses on the site and adjacent land is detailed in Section 6.5.4.1 and Section 6.5.4.2. The zoning provisions that apply to the land are described in Section 6.5.3.1 and considered further in Section 6.5.4.1 and Section 6.5.4.2. A Land Use Conflict Risk Assessment (LUCRA) is provided in Appendix H and summarised in Section 6.5.4.1 and Section 6.5.4.2. An assessment of impacts on agricultural resources and agricultural production is provided in Section 6.5.4.1 and Section 6.5.4.2. A site investigation into potential contamination across the site was conducted for the Project and is summarised in Section 6.4. Further details are provided in the Detailed Site (Contamination) Assessment in Appendix G.

Secretary's Environmental Assessment Requirements	Location addressed in EIS
Landscape and visual – including:	
a detailed assessment of the likely visual impacts of all components of the project on surrounding residences (including approved developments, lodged development applications and dwelling entitlements), and key locations, scenic quality of significant vistas and road corridors in the public domain	A Landscape Character and Visual Impact Assessment (LCVIA) has been prepared, which addresses the impacts to the surrounding residences and other key locations and scenic vistas and is provided in Appendix I . A summary of the LCVIA is provided in this section (Section 6.6).
details of measures to mitigate and/or manage potential impacts (including a draft landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners).	Mitigation measures to manage potential landscape and visual impacts, including a draft landscaping plan, are outlined in Section 6.6.6 .
Noise – including:	
An assessment of the construction noise impacts (including impacts from proposed road upgrades) of the development in accordance with the <i>Interim Construction Noise Guideline</i> (ICNG), operational noise impacts in accordance with the <i>NSW Noise Policy for Industry</i> (2017), traffic noise in accordance with the <i>NSW Road Noise Policy</i> (DECCW, 2011) and cumulative noise impacts (considering other developments in the area), including (where appropriate):	A Noise and Vibration Impact Assessment (NVIA) has been prepared, which provides an assessment of construction and operational noise impacts in accordance with the relevant guidelines and policies. The NVIA is provided in Appendix J and a summary of the NVIA is provided in Section 6.7 .
- identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours;	An assessment of construction and operational noise impacts associated with site emissions and traffic is provided in Section 6.7.4 and Section 6.7.5 . Noise contours are provided in Appendix J .
- details of noise monitoring survey, background noise levels and amenity noise levels at the most-affected residential receivers;	Section 6.7.3 provides details on noise monitoring surveys, background noise levels and amenity noise levels at the most-affected residential receivers.
- details of likely daily charging/discharging load profile, manufacturer specification for plant and equipment and noise source inventory (including intensity, quantity, location, directivity and frequency information);	Details of the likely daily charging/discharging load profile is provided in Section 6.7.2.6 . Manufacturer specifications for plant and equipment and noise source inventory are provided in Appendix J .
- an assessment of 'worst case' noise emission scenarios during periods of discharging and charging;	Section 6.7.2.6 outlines the worst-case noise emissions scenarios during operation and Section 6.7.5 provides an assessment of this scenario.

Secretary's Environmental Assessment Requirements	Location addressed in EIS
- consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area; and	Section 6.7.2.4 considers annoying characteristics of noise and Section 6.7.2.4 and Section 6.7.2.6 outline the consideration of meteorological conditions in the noise modelling.
- details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration impacts following application of these mitigation measures and details of any proposed compliance monitoring programs.	Consideration of potential residual noise impacts is provided in Section 6.7.5.3. Section 6.7.6 provides the mitigation and management measures, including compliance monitoring, to adequately manage noise impacts.
Transport – including:	
• an assessment of the peak and average traffic generation, including light vehicles (including shuttle buses), heavy vehicles, heavy vehicles requiring escort, high risk heavy vehicles requiring escort (noting Table 1 in TfNSW Fact Sheet - Transport Management Plans for Over Size and/or Overmass Movements in NSW) and construction worker transportation (including during construction and during pre-construction works);	An assessment of peak and average traffic during construction, including light vehicles, construction workers, standard heavy vehicles, heavy vehicles requiring escort and high-risk oversize and/or OSOM vehicles requiring escort is included in Section 6.8.4.
• an assessment of the likely transport impacts to site access routes, road capacity, conditions, safety and intersection performance (including consideration of local climatic conditions, driver behaviour and crash data), taking into consideration the above listed vehicles, site access points and any crown land;	The preferred access routes for heavy vehicles and OSOM) vehicles and the transport impacts to the access routes and site access point are discussed in Section 6.8.4.2. A review of the existing road safety data and casualty crash history is provided at Section 6.8.3.5.
• a concept Level Route Analysis required for heavy vehicles requiring escort and high-risk heavy vehicles requiring escort;	There are no heavy vehicles requiring escort or high-risk heavy vehicles requiring escort proposed for this Project. As such this has not been provided.

Secretary's Environmental Assessment Requirements	Location addressed in EIS
- provide details of measures to mitigate and / or manage potential impacts (developed in consultation with the relevant road authorities) including: - a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes) - clear figures of proposed road upgrades (including the site access point); and - road maintenance contributions, and other traffic control measures.	Mitigation measures to address traffic and transport impacts are provided in Section 6.8.8. Road upgrades required to facilitate the Project are discussed in Section 6.8.4.3. A schedule of all required road upgrades is provided in Table 6.8-5. Details on road maintenance contributions and other traffic control measures are outlined in Section 6.8.8. Further details will be provided in a Construction Traffic Management Plan (CTMP).
Water – including:	
an assessment of the likely impacts of the development (including flooding and pre and post development flood modelling covering the 1% AEP and probable maximum flood level) on surrounding watercourses (including their Strahler Stream Order), groundwater resources and surface water movements, and measures proposed to monitor, reduce and mitigate these impacts including water management;	Potential impacts to surface water, groundwater and flooding are assessed in the Water Impact Assessment (WIA) in Appendix L and summarised in Section 6.9.4. Appropriate mitigation and management measures are outlined in Section 6.9.5.
a site water balance for the development	An initial estimate of water demand and current availability for the Project is provided in Section 6.9.4.1. A conceptual site water balance is provided in Figure 6.9-5.
details of water requirements and supply arrangements for construction and operation (including consultation with suppliers)	Water requirements and supply arrangements are discussed on Section 6.9.4.
a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with <i>Managing Urban Stormwater: Soils & Construction</i> (Landcom, 2004) and <i>Managing Urban Stormwater: Soils and construction – Volume 2A manual</i> (Landcom, 2008);	Erosion and sediment control measures are detailed in Section 6.9.5.
assessment of the impacts of the development on hydrology and groundwater (if extraction or interference is proposed), including any changes to overland flows and groundwater levels on-site or off-site, and detail design solutions and operational procedures to manage impacts;	Impacts on hydrology and groundwater are detailed in Section 6.9.4. Design solutions to mitigate the impacts are provided in Section 6.9.5.

Secretary's Environmental Assessment Requirements	Location addressed in EIS
where the project involves works within 40 metres of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the DPI Guidelines for Controlled Activities on Waterfront Land (2018) and (if necessary) Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (DPI 2003), and Policy & Guidelines for Fish Habitat Conservation & Management (DPI 2003); and Policy & Guidelines for Fish Habitat Conservation & Management DPE, 2013); and	Proximity of the Project to waterfront land is considered in Section 6.9.4 .
- identification of any flood risk on site having regard to adopted flood studies, the potential effects of climate change and any relevant provisions of the <i>NSW Flood Risk Management Manual</i>; - where the development could alter flood behaviour, affect flood risk to the existing community or expose its users to flood risk, provide a flood impact and risk assessment (FIRA) prepared in accordance with the <i>Flood Impact and Risk Assessment – Flood Risk Management Guide LU01</i>; and - detailed design solutions and operational procedures to mitigate flood risk where required.	Discussion of how the Project affects flooding during construction and operation is provided in Section 6.9.4 and detailed in Appendix L. Section 6.9.5 outlines mitigation measures to manage any potential impacts to flooding.
Hazards – including:	
<i>Health</i> – an assessment of potential hazards and risks including but not limited to fires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure against the <i>International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields</i>;	Potential hazards and risks (including health risks) are assessed in Section 6.10.4 .
<i>Bushfire</i> – identify potential hazards and risks associated with bushfires including the risks that a BESS would cause a bush fire and demonstrate compliance with <i>Planning for Bush Fire Protection 2019</i>;	Potential hazards and risks associated with bushfires is summarised in Section 6.11 and detailed in the Bushfire Risk Assessment in Appendix N .
<i>Dangerous Goods</i> - a preliminary risk screening completed in accordance with the State Environmental Planning Policy (Resilience and Hazards) 2021;	A preliminary risk screening of dangerous goods is outlined in Section 6.10.3.1 and detailed in the Preliminary Hazard Analysis (PHA) in Appendix M .

Secretary's Environmental Assessment Requirements	Location addressed in EIS
<i>Battery Energy Storage System</i> – a Preliminary Hazard Analysis (PHA) prepared in accordance with <i>Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis</i> (DoP, 2011) and <i>Multi-Level Risk Assessment</i>. The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation and compliance with <i>Hazardous Industry Advisory Paper No. 4, Risk Criteria for Land Use Safety Planning</i>.	The PHA for the Project (Appendix M) has been prepared in accordance with the relevant guidelines and considers all recent standards and codes.
Social – including:	
An assessment of the social impacts or benefits of the project for the region and the State as a whole in accordance with the <i>Social Impact Assessment Guideline</i> (DPE, 2023), including consideration of any increase in demand for community infrastructure services, and consideration of construction workforce accommodation.	An assessment of the social impacts of the Project is provided in Section 6.12.4 and Appendix O.
Economic and Benefit Sharing – including:	
an assessment of the economic impacts or benefits of the project for the region and the State as a whole and provide details of any proposed voluntary benefit sharing, having regard to the <i>Benefit-Sharing Guideline 2024</i> and <i>Private Agreement Guideline 2024</i>.	An assessment of the economic impacts of the Project is provided in Section 6.12.5 and Appendix O.
Waste – including:	
identify, quantify and classify the likely waste stream to be generated during construction, operation, and decommissioning, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste (in consultation with waste facilities, including Council).	Section 6.13.2 identifies likely waste streams during construction, operation and decommissioning of the Project and outlines management measures to manage these.
Plans and Documents	
The EIS must include all relevant plans, diagrams and relevant documentation required under Part 3 of the EP&A Regulation. Provide these as part of the EIS rather than as separate documents. In addition, the EIS must include high quality files of maps and figures of the subject site and proposal.	This EIS follows the directions of the <i>State Significant Development Guidelines</i> in providing all relevant plans, diagrams and relevant documentation required under Part 3 of the EP&A Regulation. Maps and figures of the site are provided in Chapter 1.0 and Chapter 3.0.

Secretary's Environmental Assessment Requirements	Location addressed in EIS
Engagement	
During the preparation of the EIS, you should consult with the relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners and any exploration licence and/or mineral title holders. In particular, you must undertake detailed consultation with affected landowners surrounding the development, the owners of all exploration licences across the proposed development, the operator of any pipelines on or adjacent to the site, and all relevant government agencies, including the relevant local Council. The EIS must: • detail how engagement undertaken was consistent with the <i>Undertaking Engagement Guidelines for State Significant Projects</i> (DPHI, 2024); and • describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, an explanation should be provided.	Chapter 5.0 and Appendix C detail engagement and consultation undertaken for the Project. Section 5.2 describes the consultation process, Section 5.3 outlines the stakeholders engaged and Section 5.4.1 identifies the key issues raised during consultation. Further details are provided in the Community and Stakeholder Outcomes Report in Appendix C. Section 5.2 provides information on how engagement undertaken was consistent with the <i>Undertaking Engagement Guidelines for State Significant Projects</i>. Section 5.2.5 outlines the Project's consistency with DPHI guidelines.
References	
The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. A list of some of the legislation, policies and guidelines that may be relevant to the assessment of the project can be found at: • https://www.planning.nsw.gov.au/Policy-and-Legislation/Planning-reforms/Rapid-Assessment-Framework/Improving-assessment-guidance; • https://www.planningportal.nsw.gov.au/major-projects/assessment/policies--and-guidelines; and • http://www.environment.gov.au/epbc/publications#assessments	Chapter 4.0 describes all relevant guidelines, policies, plans and legislation.
Expiry date	
If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, your SEARs will expire. If an extension to these SEARs will be required, please consult with the Planning Secretary 3 months prior to the expiry date.	N/A

Appendix B

Statutory Compliance Table

Appendix B Statutory compliance table

Legislation	Purpose/description	Where addressed/ considered in EIS
NSW legislation		
<i>Environmental Planning and Assessment Act 1979</i>	An approval (development consent) is required under the EP&A Act.	Section 4.2
<i>Aboriginal Land Rights Act 1983</i>	There is no active Aboriginal Land Claim over the Project Area. Approval is not required under the <i>Aboriginal Land Rights Act 1983</i> .	Section 4.3.4.1 Section 6.3 Appendix F
<i>National Parks and Wildlife Act 1974</i>	An AHIP is not required for a project that is an SSD. Approval is not required under the <i>National Parks and Wildlife Act 1974</i> .	Section 4.3.4.2 Appendix F
<i>Water Management Act 2000</i>	The Project is not considered to be a 'controlled activity' under section 90 and 91 of the WM Act, and therefore no approvals are required.	Section 4.3.4.3 Section 6.9 Appendix L
<i>Protection of the Environment Operations Act 1997</i>	An EPL is not required as the Project does not fall under the list of activities outlined in Schedule 1 of the POEO Act.	Section 4.3.4.4
<i>Contaminated Land Management Act 1997</i>	The Detailed Site (Contamination) Assessment did not identify the site as being contaminated or requiring contamination regulation. An approval is not required under the CLM Act.	Section 4.3.4.5 Section 6.4 Appendix G
<i>Biodiversity Conservation Act 2016</i>	An approval (development consent) is required under the BC Act.	Section 6.2 Appendix E
<i>Biosecurity Act 2015</i>	No approvals or consent are required under the <i>Biosecurity Act 2015</i> .	Section 6.2 Appendix E

Legislation	Purpose/description	Where addressed/ considered in EIS
<i>Rural Fires Act 1997</i>	The Project will fully comply with the relevant provisions of the <i>Rural Fires Act 1997</i> .	Section 4.3.4.8 Section 6.11 Appendix N
<i>Roads Act 1993</i>	The Project would require works within road reserve areas. As such, approval under section 138 of the <i>Roads Act 1993</i> would be required.	Section 4.3.4.9 Section 6.8 Appendix K
<i>Heritage Act 1977</i>	No approval is required for SSD under the <i>Heritage Act 1977</i> .	Section 4.3.4.10
Commonwealth legislation		
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	There are no Commonwealth or national heritage listed places within the Project Area, and as such, the heritage provisions of this Act do not apply.	Section 6.3 Appendix F
<i>Airports Act 1996 and Airports (Protection of Airspace) Regulations 1996</i>	The Project is located near several aerodromes, but none are core regulated airports, and the Airports Act and Airports Regulations do not apply. However, temporary crane use during construction may trigger CASA tall-structure reporting requirements, and Ausgrid will consult with the RAAF and Airservices Australia as required.	Section 4.3.5.2
<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>	An approval from the Australian Government Minister under the EPBC Act is not required as the Project is not likely to have significant impact on MNES or the environment in general (i.e. the Project is not a controlled action).	Section 6.2 Appendix E
<i>Native Title Act 1993 (Native Title Act) (Cth)</i>	A search of the National Native Title Tribunal Register confirmed that the land is not subject to a Native Title claim.	Section 4.3.5.4

Appendix C

Community and Stakeholder Outcomes Report

Appendix C Community and Stakeholder Outcomes Report

Appendix D

Proposed mitigation and
management measures

Appendix D Proposed mitigation and management measures

ID	Mitigation/management measure	Timing
Biodiversity		
B-1	The following measures to minimise biodiversity impacts will be included in a Biodiversity Management Plan (BMP), prepared as part of the CEMP, and implemented during construction: - Monitoring of retained vegetation, including scheduled inspections by suitably qualified personnel to confirm vegetation condition is maintained and no unauthorised disturbance has occurred. Inspection outcomes will be documented in site inspection records and reported through routine CEMP compliance reporting. - Mapping and communication of clearing and protection area, including clearly defined clearing extent, exclusion zone, tree protection zones and revegetation areas. - Approved clearing extents will be shown on construction drawings, demarcated on site prior to works, and verified through site inspections. - Pre-clearance procedures and inspections, undertaken by a suitably qualified ecologist and documented through pre-clearance checklists and inspection reports, including: - Demarcation of all approved clearing areas prior to works - Installation and maintenance of temporary fencing around approved clearing extents and tree protection zones for the duration of works - Identification and marking of habitat trees within or adjacent to clearing areas - Completion of a pre-clearing inspection prior to any vegetation removal - Scheduling of pre-clearing surveys outside the Swift Parrot foraging period (May–August). If Swift Parrots are observed foraging within or adjacent to the proposed clearing area, temporary buffers will be implemented and/or the timing of works in that area will be modified in consultation with the Project ecologist. - Ecologist supervised vegetation clearing, with clearing activities supervised by a suitably qualified ecologist to identify fauna present and implement appropriate management measures to avoid or minimise harm, in accordance with the BMP - Fauna management protocols, including procedures for a suitably qualified ecologist or licensed wildlife handler to manage unexpected fauna encounters, fauna displacement and injured fauna. Fauna incidents and responses will be recorded and included in CEMP compliance reporting. Compliance with this mitigation measure will be demonstrated through maintained site records, inspection reports, ecologist clearance and supervision reports, and inclusion of outcomes in regular CEMP compliance reporting.	Pre-construction Construction

ID	Mitigation/management measure	Timing
B-2	A Weed Management Plan will be prepared and implemented as part of the CEMP to control the introduction and spread of weeds, pests and pathogens during construction. The Weed Management Plan will apply to all construction areas, including laydown areas, access tracks, material stockpile sites, disturbance footprints, site compounds and adjacent retained vegetation. The Weed Management Plan will include the following measures: • Hygiene controls, including ensuring all vehicles, plant and equipment enter the site clean; implementing wash down procedures; and inspecting all imported fill, mulch, topsoil and landscaping materials to confirm they are weed free • Weed monitoring and inspection, including a pre-construction baseline weed assessment and regular inspections of disturbed and adjacent areas, with additional inspections following high risk activities such as earthworks or material importation • Weed control and response, including the timely implementation of appropriate control measures where weeds are identified, prioritising declared and high-risk species, and modifying or temporarily suspending works if required to prevent further spread • Reporting and documentation, including maintaining a weed register and reporting inspection outcomes, infestations and control actions in routine CEMP compliance reports, with notification of any declared or significant infestations.	Pre-construction Construction
B-3	Prior to construction commencing, nine ecosystem credits and 13 species credits will be secured to offset the unavoidable residual impacts of the Project in accordance with the NSW Biodiversity Offsets Scheme.	Pre-construction
B-4	Vegetation clearing will be avoided and minimised to the greatest extent practicable, with priority given to the retention of existing vegetation onsite. Mature trees and other vegetation that provide important habitat or ecological functions will be retained where practical, consistent with the avoidance and minimisation measures outlined in the BMP.	Detailed design Construction
B-5	As far as practical, high-noise activities will be avoided during peak Swift Parrot foraging months (generally May to August) to minimise disturbance, in accordance with measures contained in the BMP.	Construction
Aboriginal heritage		
AH-1	An Aboriginal Cultural Heritage Management Plan (ACHMP) will be developed in consultation with the RAPs to guide the implementation of avoidance measures, an unexpected finds protocol, and cultural heritage awareness training for all contractors and personnel. The ACHMP will guide the appropriate management of any Aboriginal cultural material encountered during construction (as per AH-4).	Pre-construction Construction
AH-2	Cultural Heritage Awareness Training will be provided for all employees during the site induction. The training will be developed in consultation with the RAPs.	Pre-construction Construction

ID	Mitigation/management measure	Timing
AH-3	The area of moderate subsurface archaeological potential (RB-PAD-01, AHIMS #37-6-4651) will be clearly fenced and signposted prior to construction to prevent disturbance. The exclusion zone will be shown on site plans, communicated during site inductions, and monitored every 3 months by a suitably qualified heritage professional throughout works.	Pre-construction Construction
AH-4	Should unanticipated Aboriginal archaeological material be encountered during construction of the Project, all work will cease in the vicinity of the find and an archaeologist contacted to assess the find and advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation will be undertaken, if required, prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.	Construction
AH-5	In the unlikely event that human remains are encountered during construction works, all activity in the vicinity of the find will cease, and NSW Police and the Coroner's Office notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both Heritage NSW and the RAPs for the Project will be required.	Construction
Soils and contamination		
SC-1	A construction Soil and Water Management Plan (SWMP), including an Erosion and Sediment Control Plan (ESCP), will be prepared in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) (the "Blue Book"). These plans will be prepared by a Certified Practitioner of Erosion and Sediment Control (CPESC) or an accredited soil scientist and implemented for the duration of construction. The ESCP will include protocols and measures for: • Minimising the risk of erosion and sedimentation, with a priority on minimising the extent and duration of disturbance. Disturbed areas will be vegetated and stabilised as soon as practicable to do so • Handling of soils, including the management of unexpected finds of contaminated materials • Handling of hazardous materials and procedures to manage spills to reduce and address soil and water contamination, including fuel storage and management of transformer oils • Environment control measures to manage the handling of and interactions with any dewatered groundwater • Consideration of nearby projects and monitoring of conditions upstream and downstream during any overlapping construction periods • A documented inspection and maintenance protocol, with erosion and sediment controls inspected at least weekly, prior to forecast rainfall events, and following rainfall events greater than 20 mm in 24 hours, to identify erosion, sediment movement or control failures. Any non-compliance or failure of erosion and sediment controls will be recorded, reported to the Site Supervisor, and rectified as soon as practicable, including immediate repairs or upgrades to controls. Where controls are not functioning effectively, works in the affected	Construction

ID	Mitigation/management measure	Timing
	area will cease until corrective actions are implemented and the risk of offsite impacts is addressed.	
SC-2	All construction personnel will undertake a site induction and training covering the potential for contaminated material to be encountered onsite, typical indicators of contamination (e.g. unusual odours, staining, buried waste, hydrocarbons, asbestos containing materials), and required response procedures if suspected contamination is identified.	Construction
SC-3	If evidence of contamination is uncovered during construction, the following measures will be implemented: • Immediate cessation of ground disturbance at the affected location and within the immediate vicinity, to be directed by the Site Supervisor, with the area isolated to prevent further disturbance • Investigation and assessment undertaken by a suitably qualified environmental consultant, engaged by the Contractor, to determine the nature and extent of contamination and identify appropriate remedial or management actions in accordance with relevant guidelines and regulatory requirements • Documentation and reporting, with findings, assessment outcomes and recommended actions recorded in site inspection records and the Project's contamination register, and included in routine CEMP compliance monitoring. • Implementation of agreed remedial actions, coordinated by the Contractor, prior to recommencement of works in the affected area, where required.	Construction
SC-4	If groundwater is encountered during excavation, works in the affected area will cease where there is a risk of uncontrolled groundwater discharge or potential contamination, until appropriate management measures are identified and implemented. A groundwater quality testing program will be developed and implemented by a suitably qualified hydrogeologist or environmental scientist, engaged by the Contractor. The program will be prepared in accordance with relevant Commonwealth and NSW regulatory requirements and guidelines, including the <i>National Environment Protection (Assessment of Site Contamination) Measure</i>, the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG)</i>, relevant NSW EPA guidance, and applicable Australian Standards for water sampling (e.g. AS/NZS 5667). All observations, sampling results, assessments and management actions will be documented in site inspection records, groundwater monitoring reports and the Project's environmental register, and reported through routine CEMP compliance reporting. Works will only recommence once required management or mitigation measures have been implemented, and the risk of environmental harm has been suitably managed	Construction
SC-5	An Emergency Response Plan (ERP) will be prepared and implemented as part of the Project's CEMP and OEMP. The ERP will be developed in accordance with relevant legislation, standards and Project requirements, and will define clear roles and responsibilities, communication and notification pathways, and response actions for emergency events.	Construction Operation

ID	Mitigation/management measure	Timing
	The ERP will include procedures for the identification, notification, response and reporting of emergencies, including but not limited to: • Fire (including bushfire and onsite fire incidents) • Flooding and extreme weather events • Spills or releases of fuels, chemicals or hazardous materials • Discovery of contaminated land or groundwater • Fauna incidents requiring emergency intervention • Environmental incidents with the potential to cause off site impacts • Any other incident posing a risk to human health, property or the environment. The ERP will include: • Emergency contact details and escalation protocols • Site-specific response actions and containment measures • Evacuation procedure • Requirements for incident documentation, investigation and reporting • Training and induction requirements to ensure all personnel are aware of emergency procedures. The ERP will be communicated to all site personnel through site induction and toolbox talks, and emergency incidents and responses will be recorded and reported in accordance with the CEMP and OEMP and regulatory requirements.	
SC-6	Hazardous materials such as chemicals, fuels and oils will be handled and stored in accordance with relevant Australia Standards and the <i>Storing and Handling of Liquids: Environmental Protection – Participants Handbook</i> (DECC, 2007).	Construction Operation
SC-7	During construction diesel or other fuels will be stored within an impermeable bunded area sized to contain at least 110% of the stored volume.	Construction
SC-8	During operation, impermeable bunded diesel storage areas will be maintained and visually inspected at least weekly to ensure integrity, with any leaks or spills promptly rectified. All spills and leaks must be recorded in a site register.	Operation
SC-9	In accordance with the relevant Australian Standards, all transformers are to be located on impermeable surfaces with secondary containment. The secondary containment will consist of an impermeable surface with bunding sufficient to contain 110% of the volume of oil within the transformer.	Detailed design
SC-10	During construction, spill kits appropriate to the products used onsite will be readily available in all construction facilities and vehicles.	Construction
SC-11	Any hazardous material spills will be made safe as soon as possible by construction personnel, with the Site Supervisor informed immediately and emergency response procedures implemented in accordance with the mitigation measures in SC-5.	Construction

ID	Mitigation/management measure	Timing
SC-12	An Operational Environmental Management Plan (OEMP) will be prepared and implemented for the Project prior to commencement of operation. The OEMP will establish site-specific operational controls to manage and minimise potential impacts on soil and water resources within and downstream of the Project. The OEMP will include the following: - Procedures for the storage, handling and use of hazardous materials within the Operational Footprint, including requirements for secondary containment, spill prevention measures and weekly inspection of storage areas - Requirement that spill kits will be located in all permanent buildings onsite and operational staff vehicles - Procedures for the management of spills and leaks during operation, prompt containment, clean-up and disposal of contaminated materials, notification to the Site Supervisor, and activation of emergency response protocols where required. - Procedures for the inspection, maintenance and ongoing management of site drainage infrastructure, including open channels, culverts, pits, outlets and water quality control measures, to ensure systems remain functional, free-draining and operate in accordance with manufacturer specifications Procedures for monitoring and maintaining drainage and water management controls following rainfall events or where blockages, erosion or damage are identified.	Operation
Landscape character and visual amenity		
LCVA-1	Removal of existing trees and vegetation that provides boundary screening will be minimised as far as practicable, subject to outcomes of bushfire and fire safety assessments. The justification for vegetation removal, including the assessment outcomes and reasons why retention is not feasible, will be documented in the relevant bushfire or fire safety assessment reports and recorded in the Project's environmental records (e.g. clearing approvals, site inspection records or the Biodiversity Management Plan). This documentation will be used to demonstrate compliance with avoidance and minimisation requirements.	Detailed design Construction
LCVA-2	Existing trees adjacent to the Project Area and within the site, which are not proposed to be removed will be protected. This measure applies to retained vegetation where there is potential for incidental damage from construction activities such as access, plant movement, material storage or ground disturbance. Exclusion zones will be clearly defined and established prior to the commencement of works to protect retained trees and stands of important vegetation. Tree Preservation Zones (TPZs) will be implemented for trees proposed to be retained only, in accordance with <i>AS 4970-2009 Protection of Trees on Development Sites</i>. TPZs will include the installation of durable protective fencing to prevent disturbance, excavation, compaction or damage within the protected area. TPZs and exclusion zones will be shown on construction drawings, communicated to construction personnel and verified through routine site inspections during construction.	Detailed design Construction

ID	Mitigation/management measure	Timing
LCVA-3	The final landscaping plan will be prepared prior to construction to confirm planting locations, species selection and installation requirements. The plan will be designed to achieve the visual screening and landscape outcomes identified in the EIS and document how these will be achieved. Onsite planting included as part of the landscaping plan will be developed in consultation with affected landowners. Landowners whose properties adjoin the site boundary will be consulted on proposed planting locations, species selection and long-term landscape outcomes. Consultation undertaken will be documented in the final landscaping plan.	Detailed design
LCVA-4	The final Landscaping Plan will be implemented during construction and maintained for the duration of operation. Any planted vegetation that fails to establish or dies during the operational phase will be replaced as soon as practicable with equivalent species to ensure the ongoing achievement of the landscape and visual screening outcomes identified in the EIS.	Construction Operation
LCVA-5	A neutral colour palette (e.g. glaucous green or mid-grey) will be used for the noise barriers to blend with vegetation and reduce visual prominence.	Detailed design Construction
LCVA-6	Well-presented and maintained site fencing covered with shade cloth (or similar material) will be installed to reduce the visual impacts of construction. The shade cloth would be removed following completion of construction.	Construction
LCVA-7	The area of disturbance during construction will be limited as far as practical. All areas disturbed by construction and not required for operation of the Project will be rehabilitated in accordance with the final landscaping plan.	Construction
LCVA-8	All lighting will be designed and installed in accordance with <i>AS4228-1197 – Control of Obtrusive Effects of Outdoor Lighting</i> to effectively minimise glare and light spillage beyond the site boundary.	Operation
Noise and vibration		
NV-1	A Construction Noise and Vibration Management Plan (CNVMP) will be developed and implemented as part of the CEMP. The CNVMP will include as a minimum: • Identification of nearby residences and other sensitive land uses • Description of approved hours of work • Description and identification of all construction activities, including work areas, equipment, and duration • Description of what work practices (generic and specific) will be applied to minimise noise • A complaints handling process, including a protocol for recording all complaints • Noise monitoring and reporting procedures • Overview of community consultation required for identified high impact work.	Pre-construction Construction

ID	Mitigation/management measure	Timing
NV-2	Sensitive receivers located within 200 m of the active construction area, or at locations where construction noise is predicted to exceed the relevant construction noise management levels will be notified at least seven days prior to the commencement of noise-generating construction activities. Notification will be limited to receivers likely to experience construction noise impacts and will include details of: • The location, timing and duration of construction works • The proposed hours of work • Expected construction noise and vibration levels relative to guideline criteria • Mitigation measures being implemented to minimise noise impacts • A Project contact for enquiries or complaints. Where unplanned or short-term works are required that result in temporary exceedances of noise criteria, impacted receivers will be notified as soon as practicable.	Construction
NV-3	Construction activities will be undertaken during standard daytime working hours, as defined in the Interim Construction Noise Guidelines (ICNG). High-noise activities during construction may include, but are not limited to, the use of concrete saws, grinders, chainsaws and mulchers. Works predicted to generate noise at residences above the 'highly noise affected' noise management level of 75 dB(A) will be scheduled during less sensitive daytime periods. Affected receivers will be notified in accordance with the Project's construction noise management procedures.	Construction
NV-4	The offset distance between noisy plant and sensitive receivers will be maximised, where feasible. Noise-emitting plant will be directed away from sensitive receivers where feasible and will be regularly inspected and maintained to ensure it is in good working order. Plant used intermittently will be throttled down or shut down. Plant and vehicles will be turned off when not in use.	Construction
NV-5	Quieter construction methods will be used where feasible and reasonable, such as the use of rubber-wheeled plant instead of steel tracked plant. Where mobile plant is used, noise will be minimised through appropriate measures, including residential-grade mufflers and the silencing of air parking brake engagement. Where any of these measures are not implemented, the Contractor must document the reasons why they are not feasible or reasonable, including any technical, safety or operational constraints. This justification will be recorded in Project environmental records and made available as part of routine CEMP compliance reporting.	Construction

ID	Mitigation/management measure	Timing
NV-6	Stationary noise sources will be enclosed or shielded as far as practicable whilst ensuring that the occupational health and safety of workers is maintained.	Construction
NV-7	Traffic flow, parking and loading/unloading areas within the Project Area will be planned to minimise reversing movements (and hence triggering reversing alarms). Non-tonal reversing beepers (or an equivalent mechanisms) will be fitted and used on all construction vehicles and mobile plant regularly used onsite.	Construction
NV-8	Loading and unloading of materials/deliveries will occur as far as possible from sensitive receivers. Delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible. Truck drivers will be advised of construction access routes to the Project, parking locations, acceptable delivery hours and other relevant practices e.g. minimising the use of engine brakes, no extended periods of engine idling.	Construction
NV-9	Permanent noise barriers will be installed around the Project to achieve compliance with the Project's operational noise trigger levels. At the detailed design stage, the operational noise model will be re-run using the final plant, technology specifications and site layout, including confirmation of source locations, sound power levels and operating scenarios. The height, length, location and design of the noise barriers will be reviewed and refined based on the updated noise modelling, including re-assessment of the proposed barrier dimensions. The final noise barrier design will be consistent with the outcomes of the detailed design noise assessment, rather than the indicative Noise and Vibration Assessment prepared for the EIS (Appendix J) and will be implemented accordingly.	Detailed design Construction Operation
NV-10	To verify operational noise compliance, attended noise measurements will be undertaken at the commencement of Project operation by a suitably qualified acoustic specialist, in accordance with Australian Standard AS 1055 <i>Acoustics – Description and measurement of environmental noise</i> and the NSW <i>Noise Policy for Industry</i> . The monitoring results will be used to confirm compliance with the Project's operational noise trigger levels. Where monitoring identifies exceedances of relevant criteria, additional reasonable and feasible mitigation measures will be investigated and implemented, which may include operational controls, further acoustic treatment or modifications to noise barriers. Attended noise measurements will also be undertaken in response to any substantiated noise complaints during operation, with results used to identify the source of noise and determine whether further mitigation or management measures are required. Monitoring outcomes and any actions taken will be documented and retained as part of the Project's operational environmental records.	Operation

ID	Mitigation/management measure	Timing
NV-11	An Operational Noise Management Plan (ONMP) would be prepared and implemented for the Project prior to commencement of operation. The ONMP would set out the framework for managing operational noise to ensure compliance with the Project noise trigger levels and relevant assessment criteria. The ONMP would include, but not be limited to: - the applicable operational noise criteria and trigger levels - identification of operational noise sources and sensitive receptors - operational noise control and mitigation measures - a compliance monitoring and verification program, including monitoring locations, frequency and reporting - procedures for responding to noise complaints and non-compliance - roles and responsibilities for implementation and ongoing review of the ONMP.	Operation
Traffic and transport		
T-1	The informal school bus stop at the Wine Country Drive/Old North Road intersection will be temporarily relocated to a safe nearby location during construction, in consultation with the relevant bus operator and road authority. The temporary stop location will be clearly signed, and affected users will be notified in advance through appropriate community notifications. Traffic control measures at the temporary bus stop will be commensurate with the level of risk and duration of construction activities and may include signage, barriers or traffic control during specific high-risk construction activities only, rather than continuous staffing. The original bus stop will be reinstated once construction activities affecting the area have been completed.	Construction
T-2	A Construction Traffic Management Plan (CTMP) will be prepared and implemented prior to commencement of construction, in accordance with AS1742.3 – <i>Traffic control for works on roads</i> and the <i>Work Health and Safety Regulation 2017</i>. The CTMP will include, but not be limited to: - Forecast construction traffic volumes, vehicle types, timing and staging of works, including identification of peak movement periods and high-risk activities - Identification of approved vehicle access points, origins, destinations and haulage routes for construction vehicles and staff, including mapped primary routes and critical locations - Site access and vehicle movement controls, including B-double and OSOM access arrangements from Old North Road, requirements for vehicles to enter and exit the site in a forward direction only, and protocols to limit heavy vehicle movements to one vehicle entering or exiting the site at a time - Traffic control measures and conditions under which they would be implemented, including the use of traffic controllers during constrained sight distance or lane width conditions, delivery or removal of oversized loads, simultaneous construction activities, or other site-specific high-risk scenarios	Pre-construction Construction

ID	Mitigation/management measure	Timing
	- Permitted construction traffic hours, including management of heavy vehicle movements to avoid peak traffic periods and other sensitive times - Onsite traffic safety measures, including speed limits, driver behaviour requirements, dust suppression measures, and maintenance of internal site roads - Procedures for loading, unloading and material storage to ensure construction activities do not adversely affect public road safety or traffic operations - Management procedures for adverse weather conditions (such as wet, foggy or dusty conditions) where road safety may be affected - Procedures for complaints management, incident response and reporting, and any required contributions to road maintenance. The CTMP will be reviewed and, where necessary, updated in response to changes in construction staging, traffic conditions or safety risks, and will be communicated to all relevant personnel prior to implementation.	
T-3	Where two-way passing by 26 m B-double vehicles cannot occur at the Project entry/exit off Old North Road, B-double movements will be managed through site-specific traffic management measures. These will include: - Scheduling deliveries to minimise simultaneous arrivals and departures - Implementing driver communication protocols including radio contact with the site manager and other drivers prior to arrival or departure - Using traffic controllers to manage vehicle movements at the Project entry/exit - Priority will be given to arriving vehicles, with exiting vehicles held internally where necessary, to prevent queuing on Old North Road Further details of traffic management controls for B-double vehicle movements will be documented in the CTMP.	Construction
T-4	Sufficient onsite car parking will be provided and managed to accommodate construction personnel such that regular or ongoing parking on the surrounding public road network does not occur. Onsite parking will be clearly designated, adequately sized and actively managed, with parking controls and enforcement measures implemented as necessary, in accordance with the CTMP.	Pre-construction Construction
T-5	Pre-condition and surveys of Old North Road and Wine Country Drive will be undertaken prior to construction to establish a baseline condition, in consultation with Cessnock City Council. During construction, these roads will be monitored on a regular basis to ensure they are maintained in a condition generally consistent with the pre-construction baseline, to the extent practicable, and remain safe for public use. Any deterioration or damage attributable to construction of the Project will be identified and rectified by the Contractor in a timely manner. All inspections, identified impacts, maintenance actions	Pre-construction Construction

ID	Mitigation/management measure	Timing
	and repairs will be documented and recorded and made available for consultation with Cessnock City Council, including post-construction condition surveys where required to confirm reinstatement.	
T-6	Prior to the commencement of any OSOM movements, all required B-double and Class 1 permits will be obtained from the relevant roads authority and/or the NHVR.	Prior to use of the access routes
T-7	Project OSOM vehicle movements will be scheduled through the NHVR permit process, in consultation with Transport for NSW and relevant local councils to avoid conflicts with other OSOM movements in the surrounding area.	Pre-construction Construction
T-8	All applicable route restrictions and travel conditions along the approved construction access routes, and any other routes, will be complied with at all times.	Construction
T-9	Neighbours of the Project will be notified regarding the timing of major deliveries which may require additional traffic control and/or disrupt access. Evidence of consultation must be maintained.	Pre-construction Construction
T-10	A Decommissioning Traffic Management Plan will be prepared prior to the decommissioning phase, in conjunction with the relevant roads authorities, to ensure adequate road safety and road network operations are maintained.	Decommissioning
Surface water, groundwater and flooding		
SWGF-1	Detailed design must ensure the water quality requirements in the Cessnock Council Development Control Plan are met. The requirements will be achieved via a water quality treatment train which will be installed to address the changes in pollutant loads generated by the increased impervious area within the Project Area. The stormwater treatment train will be appropriately sized to manage the four exceedances per year design storm.	Detailed design Operation
SWGF-2	Emergency response procedures in the event of flooding will be undertaken in accordance with the Emergency Response Plan outlined in mitigation measure SC-4.	Pre-construction Construction
SWGF-3	The CEMP will include a detailed Soil and Water Management Plan (SWMP), incorporating an Erosion and Sediment Control Plan (ESCP) and contain environment control measures to manage risks to the water environment and its quality. Details of the SWMP requirements are outlined in mitigation measure SC-1.	Construction
SWGF-4	Operational controls relevant to surface water, groundwater and flooding will be included in a site-specific Operational Environmental Management Plan (OEMP). Details of the OEMP requirements are outlined in mitigation measure SC-12.	Construction
Hazards and risk		
HR-1	Review and update the BESS OEM clearances and installation requirements, and transformer type and approval for separation distances once the OEM, make, and model are selected.	Detailed design
HR-2	The final layout of the site will be confirmed during detailed design, following selection of the OEM. The final layout will be compliant with the clearance specifications and requirements of AS 2067:2016 – <i>Substations and high voltage installations exceeding 1 kV</i> . This will include the provision of appropriate risk controls, such as bunding, fire walls and/or minimum clearances to adjacent	Detailed design

ID	Mitigation/management measure	Timing
	transformers, equipment and buildings, as required to manage fire propagation, safety and environmental risks.	
HR-3	Project equipment and systems will be designed, installed tested, operated and maintained to comply with all relevant Australia and/or international standards and recognised codes of practice, including <i>AS/NZS 5139:2019 – Electrical installations – Safety of battery systems for use with power conversion equipment</i> .	Detailed design Construction Operation
HR-4	The Project will be certified under internationally recognised test methods such as the <i>Underwriters Limited (UL) 9540A Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage System</i> to demonstrate acceptable system-level fire and thermal runaway performance.	Detailed design
HR-5	Electrical systems will be independently endorsed by the Owner's Engineer and will be installed, operated and maintained by certified electrical contractors and trained personnel in accordance with approved procedures. All personnel undertaking electrical works will complete a site induction and competency verification prior to commencing work, to ensure familiarity with applicable procedures, hazards and safety controls.	Construction Operation
HR-6	A Fire Safety Study (FSS) will be prepared in accordance with <i>HIPAP No. 2 Fire Safety Study Guidelines</i> (DoP, 2011), in consultation with FRNSW and DPHI. The FSS will demonstrate compliance with the requirements of <i>FRNSW Fire Safety Guideline Technical Information: Large-scale external lithium-ion battery energy storage systems - Fire safety study considerations</i> (D22/107002). The FSS will specify the Project's fire safety design requirements, including minimum battery unit separation distances and provisions for the containment and management of fire-fighting water on site, where required.	Pre-construction
HR-7	The Preliminary Hazard Analysis prepared for the Project (Appendix M) will be reviewed against the detailed design to confirm consistency with assessed assumptions. The PHA will be re-evaluated where minimum separation distances cannot be achieved or where material changes to battery technology, layout or hazard characteristics are proposed.	Detailed design
HR-8	Controls will be included in the Project's CEMP/OEMP and implemented to manage any potentially hazardous liquids and/or other dangerous goods in accordance with Australian Standards requirements, including AS 1940 for flammable liquids control.	Construction Operation
HR-9	Warning signs will be installed and maintained as per code and standards requirements, and will include signage for dangerous goods, electrical hazards, arc flash and entry procedures.	Detailed design Construction
HR-10	Preventative maintenance practices will be put in place, including an asset protection zone, and vegetation management within the Project's Operational Footprint.	Operation
Bushfire risk		
BF-1	Essential Project equipment will be designed and housed to minimise bushfire impacts on operational capability and to avoid increasing bushfire risk to surrounding vegetation. Compliance with this measure will be demonstrated through detailed design documentation and certification, confirmation during construction	Detailed design Construction Operation

ID	Mitigation/management measure	Timing
	that approved bushfire protection measures have been implemented, and ongoing inspection and maintenance under the Project's OEMP.	
BF-2	The Asset Protection Zone (APZ) will comprise a permanent service trail encircling the Project and maintained grassed areas. The APZ will be maintained to the standard of an Inner Protection Area (IPA) for the life of the Project in accordance with Appendix 4 of NSW Rural Fire Service's <i>Planning for Bushfire Protection 2019</i> and <i>Standards for asset protection zones</i> .	Operation
BF-3	Hot work (activities involving high temperatures) and fire risk work (activities involving heat or with the potential to generate sparks) will be managed under a Hot Work and Fire Risk Work Procedure, which will be incorporated into and implemented as part of the Project's CEMP and OEMP. Measures will include, but not be limited to, controls for elevated fire danger conditions, including suspension of activities on days of elevated or extreme fire risk.	Construction Operation Decommissioning
BF-4	Non-essential works with the potential to ignite a fire or exacerbate fire spread will be postponed on days with a Fire Danger Rating of Extreme and Catastrophic and on days of Total Fire Ban (TOBAN). All personnel will receive a site induction that includes clear instruction on activities permitted and prohibited on days of TOBAN, including any exemptions notified by the Commissioner of the NSW RFS under section 99 of the <i>Rural Fires Act 1997</i> . Where essential operational works are required on a TOBAN day, such works will only proceed where permitted under the Project's Hot Work and Fire Risk Work Procedure and in accordance with any applicable NSW RFS exemptions and required controls.	Construction Operation Decommissioning
BF-5	Project access and internal site roads will be designed in accordance with property access requirements in <i>Planning for Bushfire Protection 2019</i> to ensure medium rigid firefighting vehicles can enter and exit the site safely.	Detailed design
BF-6	Provision for firefighting water has been incorporated into the Project design and assessed in the EIS. The final requirement for firefighting water infrastructure, including confirmation of capacity, location and access arrangements, will be determined through preparation of a Fire Safety Study (FSS) developed in consultation with Fire and Rescue NSW (FRNSW) and informed by the Bushfire Risk Assessment (Appendix N). The Bushfire Risk Assessment will continue to inform the FSS where its assumptions remain valid. Reassessment of the Bushfire Risk Assessment will only be required where detailed design outcomes or site conditions change materially from those previously assessed. Firefighting water infrastructure will be implemented during construction where required by the outcomes of the FSS.	Detailed design Construction
BF-7	Vegetation management will be undertaken in accordance with the outcomes of the FSS.	Construction Operation Decommissioning
BF-8	A Bushfire Emergency Management & Operations Plan (BEMOP) will be prepared and implemented in accordance with the FSS and Bushfire Risk Assessment. The BEMOP will incorporate a Bushfire Emergency Response Plan (BERP) that outlines emergency response procedures for fires occurring within, or in the vicinity of,	Construction Operation Decommissioning

ID	Mitigation/management measure	Timing
	the Project. The BERP component will include defined triggers and circumstances for modifying or ceasing Project operations (such as the approach of a bushfire or grassfire to Project infrastructure), emergency communication arrangements, and response and evacuation procedures. The BEMOP (including the BERP) will include, but not be limited to: • Measures to prevent or mitigate ignition of bushfires associated with Project activities • Identification of works that must not be undertaken during periods of elevated bushfire risk, including TOBAN days • Availability, location and access to fire-suppression equipment, including firefighting water where provided • storage, handling and maintenance protocols for fuels and other flammable materials • Procedures for notifying the local NSW RFS Fire Control Centre of proposed works with potential to ignite surrounding vegetation during bushfire danger periods, to confirm suitability of weather conditions; and • Bushfire emergency management and response procedures, including evacuation, communication and operational shutdown protocols. The BEMOP (including the BERP) will be prepared in accordance with the NSW RFS <i>Guide to Developing a Bushfire Emergency Management Plan, AS 3745-2010: Planning for Emergencies in Facilities</i>, and the NSW Hazardous Industry Planning Advisory Papers, and will be developed in consultation with the local Bush Fire Management Committee.	
BF-9	All staff will be trained during the site induction in emergency procedures applicable to the Project and the correct use of firefighting equipment.	Construction Operation Decommissioning
Social and economic		
SE-1	Consultation will be undertaken with Cessnock City Council, local residents, businesses and other relevant stakeholders prior to and during construction to coordinate Project works, minimise amenity and cumulative impacts, address stakeholder concerns and enhance potential community benefits. A Construction Communications and Engagement Plan (CCEP) will be prepared prior to commencement of construction and implemented for the duration of construction. The CCEP will provide a framework for ongoing consultation and communication and will: • Identify key stakeholders and appropriate engagement methods to ensure engagement activities are accessible to a broad range of community groups, including the use of digital communications and physical (hard copy) materials where required • Provide advance notification to affected residents and businesses of construction activities that may affect amenity, including traffic disruptions, noise or changes to access, to enable affected parties to plan accordingly • Ensure sufficient prior notice is provided for any works required to occur outside standard construction hours to minimise disruption	Pre-construction Construction

ID	Mitigation/management measure	Timing
	- Include mechanisms for ongoing engagement and feedback, including regular updates to community information channels, which will be regularly monitored to identify and respond to stakeholder enquiries and concerns - Provide a dedicated phone number and email address for stakeholder, business and community enquiries, issues and complaints. Consultation activities and communication measures will be regularly reviewed and updated, where necessary, to respond to community feedback and evolving Project requirements.	
SE-2	The Proponent and its contractors will promote local employment through a merit-based, legally compliant local employment preference by advertising roles locally, incorporating local participation initiatives into contractor workforce plans, encouraging use of local suppliers and trainees where feasible. These measures are to be reported.	Construction Operation
SE-3	Project infrastructure will be procured in line with <i>Ausgrid's Modern Slavery Statement</i> (Ausgrid, 2024), which has been developed in accordance with the <i>Modern Slavery Act 2018</i> .	Construction
SE-4	Relevant construction worker behaviour codes, such as the <i>Workplace behaviour: Code of practice</i> (Commission for Occupational Safety and Health, 2022) will be implemented to help promote respectful and appropriate behaviours in the community.	Construction
Non Aboriginal heritage		
NAH-1	A procedure will be included in the CEMP to guide the response to the discovery of any previously unknown items of heritage significance (being items of State heritage significance and/or local heritage significance) during construction. This will include guidelines on regulatory consultation, and physical management, include collection and salvage, as relevant.	Construction
Waste		
W-1	A Waste Management Plan will be developed and implemented as part of the CEMP and would: - Identify requirements consistent with the waste hierarchy and circular economy initiatives - Include relevant measures from the <i>National Waste Policy: Less Waste, More Resources</i> (Department of Agriculture, Water and the Environment, 2018) - Provide a framework to target resource efficiency through the design and construction phases - Provide consistent clear direction on waste and resource handling, storage, stockpiling, use and reuse management measures - Set out processes for disposal, including onsite transfer, management, and the necessary associated approvals/permits - Describe the process for regularly removing waste from the Project Area to avoid issues associated with odour, visual amenity, and the attraction of animal/pest species - Outline procedures for waste generated to be segregated at source and suitably stored in designated waste management areas within the Project Area - Include material tracking measures to track waste and	Construction Operation

ID	Mitigation/management measure	Timing
	recyclables generated from the Project and removed from the Project Area Include a protocol for reporting on the above elements of the WMP.	
W-2	Onsite waste management will require the assessment, classification, separation, storage and handling of all waste streams to maximise reuse and recycling. Waste will only be disposed of to landfill where it is demonstrated that materials cannot be reasonably reused or recycled. All waste will be classified, managed, and disposed of in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014) and other applicable legislation, with hazardous wastes (e.g. waste oils, paints, septic wastewater and asbestos) collected and disposed of by a licensed waste contractor at an appropriately licensed facility.	Construction Operation Decommissioning
W-3	All generated and regulated waste records will be retained for waste tracking purposes.	Construction
Air quality		
AQ-1	The CEMP will include air quality management measures to minimise visible dust moving offsite including: - During dry or adverse weather conditions (including hot, dry or windy conditions), dust from uncovered stockpiles and unsealed or exposed areas will be managed through targeted dust suppression measures that minimise additional handling of materials, such as controlled water application or surface stabilisation, and by modifying the location, timing or scale of dust-generating activities where necessary to reduce dust emissions and avoid unnecessary disturbance or rehandling of materials. - Minimising exposed surfaces, such as stockpiles and cleared areas. Dust-generating stockpiles will be covered when exposed to wind, comprised of fine or dry material, inactive for extended periods, or where other dust controls are ineffective, or dust complaints are received. - Burning of material onsite will be prohibited - Visual monitoring of air quality to verify the effectiveness of controls and to enable and encourage early intervention - Covering all vehicle loads during transport - Using wheel washes/shaker grids to minimise tracking of dirt onto surrounding roads - Maintaining plant and equipment in good condition and in accordance with manufacturers' specifications - Minimising idling by turning off vehicles, plant and machinery when not in use - Reporting on actions taken to manage air quality, including its effectiveness - A complaints handling process, including a protocol for recording all complaints.	Construction

Appendix E

Biodiversity Development Assessment Report

Appendix F

Aboriginal Cultural Heritage Assessment Report

Appendix G

Detailed Site (Contamination) Assessment

Appendix H

Land Use Conflict Risk Assessment

Appendix I

Landscape Character and Visual Impact Assessment

Appendix J

Noise and Vibration Impact Assessment

Appendix K

Traffic Impact Assessment

Appendix L

Water Impact Assessment

Appendix M

Preliminary Hazard Analysis

Appendix N

Bushfire Risk Assessment

Appendix O

Social and Economic Impact Assessment

Appendix P

Estimated Development Cost Report