Prepared for Mangoplah BESS Pty Ltd

Environmental Impact Statement

Mangoplah BESS

November 2025

Wagga Wagga LGA, Mangoplah, NSW

Project Number: 240779

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We acknowledge the Traditional Owners of this land and pay our respect to Elders past, present and emerging. We recognise that the First Nations peoples of Australia have traditionally managed the resources of this land in a sustainable way, and that they are the original custodians of the Australian environment.

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REAP declaration

This Environmental Impact Statement has been prepared by NGH Pty Ltd for Samsung C&T Renewable Energy Australia (SREA) Pty Ltd with the assistance of a range of specialists.

Declaration of registered environmental assessment practitioner	
Name	Brooke Marshall
Registration number	R80042
Organisation registered with	NGH Pty Ltd

The undersigned declares that this EIS:

- Has been prepared in accordance with Schedule 2 of the *Environmental Planning and Assessment Regulation 2021*
- Contains 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 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 the 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 principles 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: 05/11/2025

Author Qualifications

Author	Qualification
Brooke Marshall: NSW Practice Leader – Planning and Environmental Management	• BNatRes (Hons1) • CEnvP • REAP
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Acronyms and abbreviations

AHIMS	Aboriginal Heritage Information Management System
AC	Alternating Current
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BESS	Battery Energy Storage System
BSAL	Biophysical Strategic Agricultural Land
CIA	Cumulative Impact Assessment
Cth	Commonwealth
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cth) (formerly DAWE)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (NSW) (formerly DPE)
DPE	(Former) Department of Planning and Environment (NSW) (now DCCEEW and DPHI)
DPHI	Department of Planning, Housing and Infrastructure (NSW) (formerly DPE)
DPIE	(Former) Department of Planning, Industry and Environment (NSW) (now DPE)
EDC	Estimated Development Cost

EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIS	Environmental impact statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
ESD	Ecologically Sustainable Development
FM Act	*Fisheries Management Act 1994* (NSW)
FTE	Full time equivalent
GHG	Green House Gas
GIS	Geographic information system
ha	hectares
Heritage Act	*Heritage Act 1977* (NSW)
ISEPP	State Environmental Planning Policy (Infrastructure) 2007 (NSW)
ISP	Integrated Systems Plan
KFH	Key Fish Habitat
kL	kilolitres
km	kilometres
kV	kilovolt
LEP	Local Environment Plan
LGA	Local government area
LSC	Land and Soil Capability
m	metres
ML	Megalitres
MW	Megawatt
MWh	Megawatt hours
MNES	Matters of national environmental significance
NEM	National Electricity Market
NES	Matters of National Environmental Significance under the EPBC Act (*c.f.*)

NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
O&M	Operations and maintenance
OEH	(Former) Office of Environment and Heritage (NSW) (now EES)
OSOM	Over Size Over Mass
PCS	Power Conversion System
REZ	Renewable Energy Zone
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development
TEC	Threatened ecological community
TISEPP	State Environmental Planning Policy (Transport and Infrastructure)
VIC	Victoria
WWCC	Wagga Wagga City Council

Terms used in this report

Mangoplah Battery Energy Storage System	The development, construction, operation and decommissioning of an up to 100 MW / 400 MWh (4hr) Battery Energy Storage System (BESS), generally comprising of battery storage units, transformers, access roads, underground and above ground cables, onsite substation and associated operational facilities.
The Project	Mangoplah Battery Energy Storage System
The Applicant	Mangoplah BESS Pty Ltd as Trustee for Mangoplah BESS Unit Trust.
Involved Lands	All lots and easements that are intersected by the Project Site (listed in Section 1.4.2)
Subject Lot	The lot of the associated receiver who would host the battery. This lot is Lot 222 DP754557
Project Site	The area of land that was investigated for siting of the Project.

Development Footprint	The area that would be impacted directly by the Project (including temporary construction impacts). In total the Development Footprint covers an area of approximately **13.8ha.**
Indicative Layout	The Indicative Layout refers to the current concept layout of the Project that is presented in the Project Description (refer to Section 3.1).
Associated receiver	A receiver on privately-owned land where the owner has reached an agreement with the Applicant in relation to hosting infrastructure or the management of impacts. They are considered 'Project associated' and may relate to only one impact type; for example, noise.
Non-associated receiver	A residence on privately-owned land where owner has not reached an agreement with the Applicant in relation to the development. Non-associated receivers are fully assessed for all environmental impacts, such as noise, vibration and visual impacts.

Executive summary

Project

Mangoplah BESS Pty Ltd as Trustee for Mangoplah BESS Unit Trust (The Applicant) is proposing the development of the Mangoplah Battery Energy Storage System (the Project) at **4178 Holbrook Road, Mangoplah NSW 2652**. The Project would involve the construction, operation and decommissioning of a Battery Energy Storage System (BESS) with a capacity of up to approximately 100 Megawatts (MW)/400MWh (4 hours duration). It would supply electricity to the National Electricity Market (NEM) during peak periods.

Construction of the Project would occur over approximately 12 months, limited to Monday to Friday 7 am -6pm, and Saturday 8am to 1pm. The expected operational life of the Project is approximately 35-40 years. The Project would primarily be operated remotely. Key components of the Projects are summarised in Table 3-1 and shown in Figure 3-1 and described in detail within this Environmental Impact Statement (EIS) and supporting specialist studies.

Table 1 Main components of the Project

Aspect	Description
Project summary	The Project includes the development, construction and operation of a utility-scale BESS. The Project is forecasted to utilise lithium-ion phosphate (LFP) batteries with the generation of up to 100MW / 400MWh connecting to the Transgrid transmission network. Works include: • Preconstruction – site establishment including earthworks, intersection/access upgrades • Construction – including the construction of battery modules, inverter switch room, transformer, noise wall, temporary works areas and ancillary infrastructure • Overhead 132kV lines to connect to the existing 132kV transmission line • Landscaping • Stormwater management infrastructure, lighting, fencing and security
Project location	4178 Holbrook Road, Mangoplah NSW 2652 Lot 222, 225 and 228 DP754557
Project Site	26 ha
Development Footprint	13.8 ha

Aspect	Description
Access route	• Two options are being explored for the heavy vehicle access route: Port of Melbourne and Port of Geelong. • All heavy vehicles will enter the site from Holbrook Road.
Site access	Access and upgrade from existing site access off Holbrook Road
Construction	Construction of the Project would occur over approximately 12 months limited to Monday to Friday 7 am to 6pm and Saturday 8am to 1pm. No work on Sundays or public holidays.
Operation	The expected operational life of the Project is approximately 35-40 years. At the end of operational life, this may be extended subject to the replacement and/or refurbishment of components and market conditions.
Hours of operation	24 hours a day, 7 days a week.
Employment	Up to 60 construction jobs, 1-2 operational jobs
Estimated Development Cost	$135 million including mitigation strategies proposed in this report.
Voluntary Planning Agreement (VPA)	$60,000 per annum (CPI adjusted) from the commencement of operation until the cessation of operations of the Project. This is based on $150 per megawatt hour per annum.

Strategic context

The Project aligns with the current strategic direction of the Commonwealth, NSW and Local Governments, which supports investment in renewable energy and storage to ensure secure and reliable energy.

Due to the small area of impact proposed, the Project will have minimal impact on existing and adjacent primary production land use. The Project will encourage diversification of land use.

Site values

The Project is located within the Wagga Wagga Local Government Area (LGA), approximately 3.1 kilometres (km) east of the township of Mangoplah, and approximately 30.6km south of the regional city of Wagga Wagga, New South Wales (NSW).

The area surrounding the Project Site includes rural farmland and scattered vegetation and is adjacent to Burkes Creek on the northern border of the Project Site. The Project Site is currently utilised for agricultural purposes, predominantly cropping. The entirety of the Project Site and surrounding area is mapped as Class

4 in accordance with the Land and Soil Capability Scheme (LSC). Class 4 land has limitations that must be managed to prevent soil and land degradation.

The Project Site is bushfire prone category 3 (medium risk of bushfire) and management measures for design, construction and operation are required. The proposed BESS site is not mapped as flood prone, although areas of the access road are subject to flood inundation. No current mineral and/or extractive licence exists over the Involved Lands.

Project benefits

The Project:

- Builds on the aims of the NSW Electricity Infrastructure Roadmap to transition towards greater levels of renewable energy
- Has the capacity to power approximately 112,000 households for a 4 hour period during a full discharge
- Stabilises and secures the supply of electricity for residents, business owners and service providers
- Assists to drive down the wholesale electricity prices for energy consumers.
- Generates local employment, economic stimulus and other local economic benefits
- Includes broader benefits to the community through a Community Benefit Fund (CBF).

Statutory context

State Significant Development (SSD)

Section 20 of Schedule 1 of the NSW State Environmental Planning Policy (Planning Systems) 2021 states Development for the purpose of electricity generating works with an estimated development cost of more than $30 million is classified as State Significant Development (SSD).

Electricity generation works as defined in the Standard Instrument – Principal Local Environmental Plan (2006) includes a building or place used for the purpose of electricity storage.

The Project would have a capital investment cost estimate of more than $30 million ($165 million). Therefore, The Project is classified as “SSD” under division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The NSW Minister for Planning is the consent authority for SSD projects and SSD applications are assessed by the Department of Planning, Housing and Infrastructure (DPHI).

Permissibility

The Project Site is located within land zoned (RU1 – Primary Production) under the *Wagga Wagga Local Environmental Plan 2010*.

Section 2.36(1)(b) of the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) states development for the purpose of electricity generating works may be carried out by any person with consent on any land in a non-prescribed residential zone. The land is zoned RU1 and under Section 2.35 of the TISEPP, a non-prescribed residential zone.

Mandatory matters for consideration

Section 4.4 of this EIS details the relevant mandatory matters for consideration, including:

- *Environmental Planning and Assessment Act 1979*
- Environmental Planning and Assessment Regulation 2021
- State Environmental Planning Policy (Transport and Infrastructure) 2021
- State Environmental Planning Policy (Planning Systems) 2021
- State Environmental Planning Policy (Resilience and Hazards) 2021
- State Environmental Planning Policy (Biodiversity and Conservation) 2021
- State Environmental Planning Policy (Primary Production and Rural Development) 2021
- *Wagga Wagga Local Environmental Plan 2010*
- *Biodiversity Conservation Act 2016*
- Biodiversity Conservation Regulation 2017

Engagement

Community

Community consultation for the EIS phase of the Project recommenced in November 2024 and continued through to the EIS submission to the DPHI in November 2025. Throughout this period, the Applicant actively engaged with a broad range of stakeholders, including directly impacted landowners (non-associated receivers), targeted stakeholders, and members of the broader community.

Key issues raised by community members during consultation activities included:

- Environmental impacts (including fire risk, pollution, flooding)
- Visual and noise concerns
- Access restrictions and local road disruption
- Property devaluation, mental health concerns, and insurance impacts
- Uncertainty around decommissioning and long-term site management
- Perceived imbalance of risk and reward for nearby landowners; not clear what the benefits are to the community and neighbours
- Loss of agricultural land and farming continuity
- Lack of confidence in the consultation process and the regulatory framework.

Opportunities that were identified during consultation activities included:

- Local job creation and training pathways
- Cultural heritage preservation
- Infrastructure upgrades (roads)
- Partnerships with educational institutions
- Community benefit initiatives and investment
- Environmental rehabilitation and stewardship.

Engagement throughout the EIS phase revealed a mixed community sentiment, but tended to be negative among those living in close proximity to the Project site.

In response to community feedback, the Project has gone beyond initial commitments by making a series of refinements to reduce potential impacts, strengthen transparency, and demonstrate genuine responsiveness. These measures include:

- The Landscape Character and Visual Impact Assessment (LCVIA) was expanded to include additional photomontages from property viewpoints, rather than limiting the assessment to dwellings.
- A commitment was made to establish western screening, even though the visual impact in that area was assessed as low impact.
- Detailed project updates were provided to the community to directly address concerns.
- Nearby receivers were given access to specialist reports prior to the EIS being made publicly available.
- Communication lines were kept open, with the Applicant taking a proactive approach by responding directly to nearby residents via phone and email.

Aboriginal community

Two avenues for engagement with the local Aboriginal community were adopted:

1. Engagement through the Engagement Action Plan in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Applicant*
2. Formal consultation was undertaken by the Heritage team regarding the potential to impact Aboriginal cultural heritage as part of the Aboriginal Cultural Heritage Assessment (ACHA) process.

Registered Aboriginal Parties who registered an interest in the Project participated in the survey, assessment and development of mitigation strategies related to Aboriginal cultural heritage.

Agency

The following agencies were consulted as part of the EIS process:

- Department of Planning, Housing and Infrastructure (DPHI)
- Wagga Wagga City Council
- Riverina Water
- Stage Emergency Services
- Conservation Programs, Heritage and Regulation
- Commonwealth Department of Climate Chage, the Environment
- Transport for NSW
- Transgrid
- NSW Heritage
- V/Line (rail), ARTC
- Greater Hume Shire Council
- Maribyrnong Council
- Geelong City Council
- Victorian Department of Transport and Planning.

Assessment of key issues

Table 3 Key issues investigated as part of this EIS

Environmental impact	Impact and key outcomes
Biodiversity	The Development Footprint for the BESS occurs mostly on highly modified agricultural land, with native vegetation present within the private site access road only. Two Plant Community Types (PCTs), three flora species and seven fauna species were identified or assumed present onsite in areas that would be impacted. An offset obligation has been generated for impacts on native vegetation and candidate species either identified or assumed to occur* onsite, in accordance with the Biodiversity Assessment Method: • Plant community type 277 - Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion • Plant community type 76 - Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions • A Spear-grass* • Euphrasia arguta* • Yass Daisy* • Barking Owl • Golden Sun Moth* • Masked Owl • Southern Myotis • Squirrel Glider • Squirrel Glider in the Wagga Wagga Local Government Area • Striped Legless Lizard* Further surveys are planned that may reduce this obligation for species assumed to occur* prior to Project determination. The Project was referred under the EPBC Act and has been determined 'not a controlled action'. No further assessment is required under this act.
Aboriginal heritage	Two artefact scatters, two isolated finds and one scarred tree were identified within the Project Site, of which the scarred tree falls outside of the Development Footprint. The assessment of harm overall for the Project is assessed as low. Mitigation strategies have been developed in consultation with Registered Aboriginal Parties who registered an interest in the Project.
Access and traffic	Access to the Project Site would be off Holbrook Road via a private access road. The available sight distance at the intersection exceeds requirements however, traffic assessment has determined that a Basic Left Turn (BAL) and a Basic Right Turn (BAR) treatment are required.

Environmental impact	Impact and key outcomes
	The Project is expected to generate approximately 3 high risk over-size over-mass (OSOM) vehicles during construction; a period of approximately 12 months. The minimum clearance for underpasses of 5.1m is provided along the entire OSOM route. During operation the BESS is expected to generate a negligible amount of additional traffic.
Preliminary Hazards Analysis	Preliminary risk screening found that the Project is not considered as 'potentially hazardous industry'. Systematic identification of possible hazards, both on-site and off-site identified 13 medium-risk events. Most are related to fire incidents resulting from various causes, such as the release of flammable materials, battery thermal runaway, transformer fire, and bushfires. Considering the identified controls, the highest likelihood for these events was rated as very unlikely, and the risk assessment concluded that there is negligible potential for offsite fatality or injury. Specific design requirements and safety studies now form part of the Project to address the risks identified. Electric and Magnetic Fields created from the Project will not exceed the International Commission on non-Ionizing Radiation Protection (ICNIRP) Guidelines reference level.
Bushfire	Bush fire risks during construction and decommissioning would be managed through the standard mitigation measures recommended in the EIS. Existing access roads and informal farm roads, as well as proposed Asset Protection Zones, and BESS internal service roads would provide RFS and emergency service access throughout the Project Site.
Visual amenity	No notable visual impacts would occur. Field work has confirmed that the theoretical (modelled) visibility of the infrastructure would be screened by existing and proposed vegetation screening. Nearby residential receivers and public view points result in low and very low visual impacts. The Project commits to planting landscaping screening on the western side of the BESS in response to neighbour concerns.
Noise amenity	No noise exceedances (including sleep disturbance criteria) are relevant to construction or operation for non-associated receivers. No vibration or traffic noise exceedances would occur. No noise exceedances during the construction would occur for any non

Environmental impact	Impact and key outcomes
	involved receivers.
Water and flooding	An analysis of 1% annual exceedance probability (AEP) event flood behaviour indicates the Project will have a minimal impact on existing flood patterns and characteristics. Maximum flood depths, hazard levels, and flow velocities remain consistent with the existing, pre-development conditions. The BESS facility is shown to experience minimal inundation in the modelling, and the overall flood behaviour of the Involved Lands remains largely unchanged, when the Project is modelled. Modelling of the 1% AEP event indicates that the access road off Holbrook Road would be impacted if Paper Forest Creek overtops, creating a wide flow path from south to north. The development of a Flood Emergency Response Plan (FERP) would facilitate safe evacuation prior to inundation of the site.
Aquatic	Threatened aquatic species assessments were undertaken for the Southern Pygmy Perch and the Lower Murray River Aquatic Endangered Ecological Community. The assessment determined the Project is not likely to significantly impact either of these species.
Soils and contamination	Results for the soil contamination sampling program were below the Limit of Reporting (LOR) for all analytes, except for some metals/metalloids and nutrients. Disturbance of site soils during construction activities are not likely to present a risk to human health or the environment under a commercial/industrial land use.
Land use compatibility	The Project Site is currently utilised for agricultural purposes, predominantly cropping. The relatively small operational BESS footprint would be sterilised from ongoing agricultural use but the surrounding land would benefit from improved site access and can continue to be farmed. No current exploration licences are present over the Involved Lands. Land use conflict risk assessments have been used to develop mitigation strategies to address risks to adjacent agricultural, residential, utility, mining and environmental land.
Social and economic	The social impact assessment has concluded that the perceived community division, procedural unfairness, and loss of rural identity that the community have identified may outweigh potential economic or infrastructure benefits at a local level, unless the project delivers tangible, equitable outcomes and adopts engagement practices that build trust and demonstrate genuine

Environmental impact	Impact and key outcomes
	inclusion in decision-making. A series of strong recommendations regarding continued engagement, accommodation and employment and training from the assessment have been included as project commitments and aim to maximise the project benefits for the local community.
Non-Aboriginal heritage	The Project Site is not listed on any heritage register at a State or Local level and no items or structures of historical significance were encountered during the site visit or identified as likely to occur during the desktop assessment.
Resource use and waste	The impact from waste generation during construction on regional waste facilities has identified several recycling and reuse measures. It is critical that all waste stream end locations are identified prior to construction, and any limitations managed through a waste management plan. With the implementation of detailed plan, the impact is assessed to be minor. Any spent batteries during operation would be recycled at a B-Cycle accredited, EPA permitted and licensed recycler of LFP batteries. Batteries would be handled, stored, and transported according to manufacturer's guidelines and the ADG Code.
Cumulative impacts	Several positive strategic cumulative impacts have been identified for the Project, including alignment with federal, state and local regional renewable energy and storage policies and land use plans. While most adverse cumulative impacts are best mitigated on a project-by-project basis, traffic and social impacts may be more significant and are more uncertain. They are also an area of particular interest to the local council and community. While the chance of overlap with other large projects cannot be known with certainty at this time, the period of overlap of peak construction traffic is not considered significant in terms of the ability of the local road network to handle this overlap. Cumulative traffic impacts will require more accurate data, closer to construction with regard to managing overlapping constructing schedules. Key negative cumulative impacts identified include potential impacts to property values, increased pressure on housing and accommodation, and consultation fatigue. An Accommodation and Employment Strategy is required prior to construction and will be central to managing the latter

Environmental impact	Impact and key outcomes
	impacts.

Justification

The project as presented in this EIS meets all relevant planning provisions and guidelines. On balance, the Project is considered appropriate to both:

- To the sites location being within close proximity to existing transmission infrastructure and within a future Candidate Renewable Energy Zone.
- To the site's environmental values and the values identified by the local and broader community; impacts have generally been assessed as low and mitigation strategies with high confidence have been adopted to manage residual risk.

The Project is considered justifiable and approvable.

Where to from here?

During the public exhibition of this EIS, the local community, local council and government agencies are invited to make informed submissions in relation to the Project. The consent authority will consider formal submissions made during the exhibition period, if relevant to the Project. The Applicant's response to all matters raised in submissions will also be exhibited as DPHI commence preparation of their own assessment of the Project's impacts and its merits and make a recommendation regarding its ability to be approved.

Furthermore, the local community is encouraged to take the opportunity to make a submission directly to the DPHI and to participate in the future engagement activities planned prior to the Project's determination.

1. Introduction

1.1. Project outline

Mangoplah BESS Pty Ltd as Trustee for Mangoplah BESS Unit Trust (The Applicant) is proposing the development of the Mangoplah Battery Energy Storage System (the Project) at **4178 Holbrook Road, Mangoplah NSW 2652**. The Project would involve the construction, operation and decommissioning of a Battery Energy Storage System (BESS) with a capacity of up to approximately 100 Megawatts (MW)/400MWh (4 hours duration). It would supply electricity to the National Electricity Market (NEM) during peak periods.

The Project would involve construction of the following primary infrastructure:

- 100MW/400MWh(4hr) BESS and associated equipment
- Onsite substation
- Connection works
- Permanent office and control room
- Site access and parking.

1.2. Project objectives

The Project objectives centre on the construction of a viable and appropriate energy storage facility that will provide a meaningful contribution to the state's transition to renewable energy. Additional storage provided by this project will better integrate the contribution of renewables and should act to stabilise the grid and drive electricity prices down.

Energy storage technologies can unlock electricity generation growth in areas experiencing network constraints. They will also support on-demand energy needs as the network transitions to more renewable sources of energy.

The development of energy storage facilities projects aligns with the NSW Electrical Infrastructure Roadmap (NSW DPIE, 2020):

> *'Coordinated build out of new transmission, generation and storage infrastructure will deliver lower power prices for households and businesses in NSW and support an expected 6,300 construction jobs and 2,800 ongoing operational jobs in 2030 mostly in regional NSW, as a result of attracting an estimated $32 billion of private sector investment*.'

As well as these broader benefits, to ensure the development is appropriate to its context, the development aims to address the following key issues:

- Policy context:
  - Assist Australia's energy transition from fossil fuels to renewable energy and contribute to achieving net-zero emissions by 2050.
- Regional benefit:
  - Provide system strength services to the transmission (and distribution) networks in the area and therefore, provide security of supply and safeguard the energy network.
  - Increased economic activity locally and more broadly though grid investment.

- Local benefit:
  - Delivering direct employment and labour opportunities.
  - Avoid, minimise and mitigate adverse impacts on the environment and community during construction and operation.
  - Establish a strong network of positive relationships within the local community.
  - Make efficient use of existing electrical infrastructure, notably the existing 132 kilovolt (kV) transmission line that intersects the Project Site to minimise the need for additional easements.

The Project aims to construct and operate the Mangoplah BESS within a site that minimises potential environmental impacts. The land is sited within a suitable planning context, within proximity to existing electrical infrastructure, and in a location that would not impede potential future town growth.

1.3. Applicant details

The Project is being developed by Mangoplah BESS Pty Ltd as Trustee for Mangoplah BESS Unit Trust (The Applicant) (refer to Table 1-1).

Samsung C&T Renewable Energy Australia Pty Ltd (SREA) began operations in Australia in 2022 and has solar and storage project interests across New South Wales, Victoria, and Queensland. SREA currently operates out of offices in Sydney and Brisbane, with personnel working remotely in Victoria.

To meet the needs of clients aiming to diversify their energy mix amid stringent carbon emissions requirements, SREA strives to become a full-spectrum energy provider in the clean energy sector. The company is committed to deploying sustainable energy resources with a vision to create value globally.

Over the past two decades, SREA has completed several renewable projects worldwide, including the world's largest wind and solar power cluster in Ontario, continuously delivering solutions that enable customers to fully leverage renewable resources.

Table 1-1 Applicant details

Condition	Detail
The Applicant	Mangoplah BESS Pty Ltd as Trustee for Mangoplah BESS Unit Trust
Office Address	Suite 8.04, Level 8 227 Elizabeth Street Sydney, 2000
ABN	55 684 502 690
ACN	684 502 690

1.4. Site overview

1.4.1. The locality

The Project is located within the Wagga Wagga Local Government Area (LGA), approximately 3.1 kilometres (km) east of the township of Mangoplah, and approximately 30.6km south of the regional city of Wagga Wagga, New South Wales (NSW). Works for the Project and associated ancillary infrastructure would be located at **4178 Holbrook Road, Mangoplah NSW 2652.** Nearby localities include The Rock, located 17.8km northwest, Big Springs 13.1km northeast and Westby 15.4km southeast. The location of the Project is shown in Figure 2-4.

The Livingstone National Park and Nest Hill Nature Reserve are located 2.5km northeast and 13.2km southeast of the Project Site.

There are no state listed heritage items in proximity to the Project Site. The historic Scots Uniting Church is listed as a local heritage item and is located 4.1km west of the Project Site, within the town of Mangoplah (refer to Figure 1-1).

The Wagga Wagga LGA, and therefore, the Project, is situated within a Candidate Renewable Energy Zone (REZ) and is immediately adjacent to a 132kV transmission easement (Figure 1-2), that feeds into the Wagga Wagga 330kV Substation. There are a number of renewable energy proposals in the region, (the cumulative impact potential from these projects is considered in Section 7.3.

The Project would connect to the existing overhead 132kV transmission line that transects the Project Site. Connection from the onsite substation to the transmission line would be per Transgrid's requirements. Further detail is provided in Section 1.6 below.

Main access is currently provided to the Project Site from the west via an unnamed private access road off Holbrook Road. The access point would need upgrading to enable safe entry and exit from the Project Site for all vehicles. Holbrook Road is currently utilised for a variety of vehicles, from heavy vehicles, light vehicles and agricultural vehicles, and is an approved B-Double road. The private access road is currently utilised for agricultural and light vehicles.

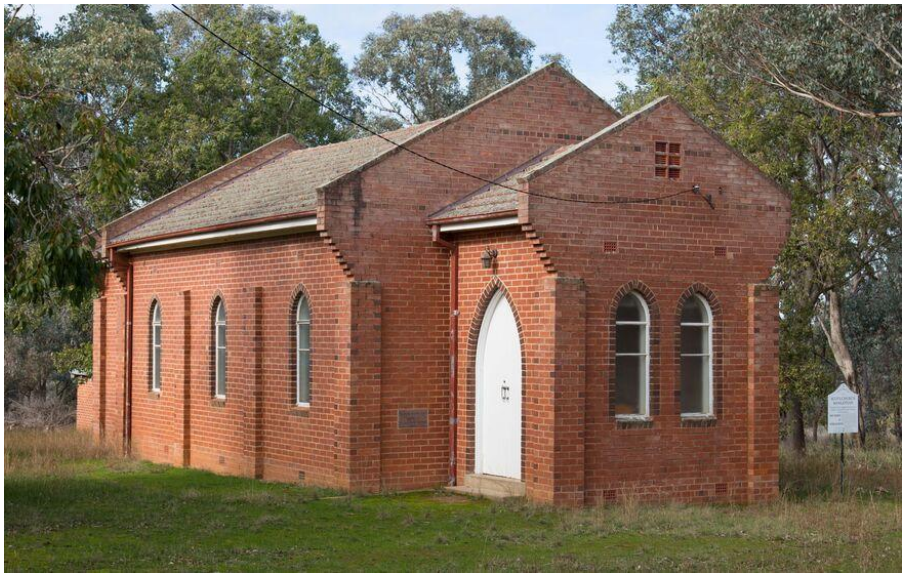


Figure 1-1 Scots Uniting Church (Australian Christian Heritage)

Mangoplah
Creasys Road
Holbrook Road
Henty Road
PAPER FOREST CREEK
BURKES CREEK
Lot 222
DP754557
Lot 225
DP754557
Lot 228
DP754557

LEGEND

- Involved Lands
- Project Site
- Development Footprint
- Suburb
- Waterways
- Roads
- 132kV Transmission Line

BESS Layout

- Batteries
- Roads
- Substation
- Switchroom and O&M
- Construction Laydown / Compound
- Proposed Visual Screening

Datum: GDA2020 / MGA Zone 55

NGH

0 0.5 1 km

Mangoplah BESS

Figure 1-2 Mangoplah BESS locality

1.4.2. Tenure

There are two associated landholders:

- The primary associated landholder will host the BESS infrastructure (Lot 222 DP754557) and part of the access road (Lot 225 DP 754557). Their dwelling is mapped as R4 in Figure 2-2.
- The secondary associated landholder will host part of the access road (Lot 228 DP 754557). They do not have a dwelling mapped within 4km of the Project.

The Involved Lands are made up of the lots and easements detailed in Table 1-2, owned by the two associated landowners. Within these lots, the Project Site is the area of land that has been investigated for siting of the Project and covers an area of approximately 26 hectares (ha). Of this, the proposed Development Footprint (or "impact area") is **13.8ha**.

Table 1-2 Lots and easements intersected by the Project

Ownership	Zoning	Proposed Project components	Lot	Deposited Plan (DP)/easement	Area of Proposed Project components
Freehold (primary associated landowner)	RU1	Siting of the BESS and grid connection point	222	DP754557	~8.9ha
Freehold (associated landowners)	RU1	Site access from private road off Holbrook Road	225 228	DP754557 DP754557	~4.3ha
Wagga Wagga City Council	SP2	Holbrook Road site access	N/A	Holbrook Road	~0.4ha
Crown Land	RU1	In between Involved Lands	N/A	N/A	~0.20
		TOTAL		~13.8ha	

The Applicant would lease part of Lot 222 DP754557 from the primary associated landholder for the operation of the Project. Electrical substations are treated as premises rather than fixtures due to the substantial and permanent nature of their construction. As such, subdivision may not be required for the Project.

Both landholders are in consultation with Crown Lands to purchase crown lands (Figure 1-3) in between the Involved Lands. It is expected that these crown roads will be closed prior to construction. However, if roads continue to exist at the commencement of construction, an appropriate licence or another form of access rights will be sought.

Mangoplah

Burrandana Road

Mcraes Road

Creasys Road

Holbrook Road

Henty Road

Lot 222
DP754557

Lot 225
DP754557

Lot 228
DP754557

LEGEND

- Involved Lands
- Project Site
- Roads

Land ownership

- Freehold
- Crown
- Cadastral boundary

Datum: GDA2020 / MGA Zone 55

NGH

0 1 2 km

Mangoplah BESS

Figure 1-3 Land ownership

1.5. Background to site selection and Project design

1.5.1. Project Site values

The area surrounding the Project Site includes rural farmland and scattered vegetation and is adjacent to Burkes Creek on the northern border of the Project Site.

There are two mapped dams, connected by an ephemeral 1st order steam on the western extent of the surrounding area. The siting of the BESS is not mapped as flood prone, although areas of Involved Lands and the access road are subject to flood inundation.

There are no existing buildings within the Project Site. The Project Site is traversed by one 132kV transmission easement, that transects north to south through the Project Site on the eastern extent of the Project Site.

The Project Site is currently utilised for agricultural purposes, predominantly cropping. The entirety of the Project Site and surrounding area is mapped as Class 4 in accordance with the Land and Soil Capability Scheme (LSC) (NSW OEH, 2012). This category is described as important for its high potential as grazing land with capacity for occasional sowing of pastures and crops, however, it does have moderate to severe limitations for some land uses (refer to Figure 1-4). The Project Site is not located on identified Biophysical Strategic Agricultural Land (BSAL).

Figure 1-4 Current cropped Project Site

Parts of the surrounding area supports terrestrial biodiversity and are mapped as biodiverse riparian land. The indicative access road (see Figure 1-5) crosses over Paper Forest Creek, which is mapped as biodiverse riparian land and as key Fish Habitat (KFH).

No current mineral and/or extractive licence exists over the Involved Lands. The Project Site is bushfire prone category 3 (medium risk of bushfire).

Figure 1-5 View from the existing access point off Holbrook Road facing east along the site access road

1.5.2. Site selection and application of 'avoid and minimise' impacts principles

The Project Site has been selected with the goal of balancing the assessed social, environmental and economic aspects associated with the development of a BESS. A focus objective is the establishment of a project that would proceed at a scale that takes these factors into consideration.

The Project Site is considered suitable as it is not on identified BSAL, is a relatively small footprint and would not impact greatly on the surrounding agricultural enterprises by sterilising a large area of high-quality land, nor by fragmenting the agricultural landscape due to its small size and location to an existing 132kV electricity transmission network.

The Project Site does not hold high ecological values, having been used extensively for cropping and sowing of exotic (non-native) pastures. While there are paddock trees within the Involved Lands, the siting of the Development Footprint and access avoids impacts to any trees or woodland.

The location proposed for Project was initially selected following a detailed desktop analysis and onsite investigations of the Project site and of the wider region which considered:

- Sufficient levels of available capacity on the grid distribution system
- Proximity to a grid connection
- Excellent road access
- Suitable planning context
- Extremely low potential impacts to biodiversity and heritage
- Minimal sensitive receivers within 2km of the Project Site
- Low potential for land use conflicts.

This specific Project Site has been selected on the following basis:

- Land: The landowners support the Project and has entered into an agreement for the development.
- Environment: The open landscape (minimal trees) and current agricultural use means the design can be flexible to avoid any sensitive areas.
- Community: Low rural settlement density and the ability to provide large setback distances to neighbouring dwellings will reduce potential for community impacts.
- Council: The Council is generally supportive.
- Planning: The State Government and local Council are supportive and there is a well-defined planning approvals pathway to assess the Project.
- NEM: The ability to connect to the BESS to the grid via the nearby 132kV transmission line brings significant benefits as the network has the capacity to absorb the energy stored within the BESS and deliver it anywhere in the network.
- Design: The preliminary design, as shown in the Indicative Infrastructure Layout (Figure 3-1), has demonstrated a viable project while minimising any potential impacts to the environment or the local and regional community.

Key actions taken early in the Project's planning stages in response to environmental constraints included:

- Consultation with Council and the broader community, with mixed overall sentiment, leaning towards negative.
    - Use of approved haulage routes to minimise traffic impacts on the community
    - Council and community input into proposed community benefits
- Responding to visual concerns of surrounding non-associated residents, with the addition of visual screening on the western side of the BESS siting
- Early noise modelling to confirm no operational noise exceedances to non-associated landholders
- Confirmation of water allocation and source, as not to impacts water availability to the region
- Early biodiversity surveys and consultation with Conservation Programs, Heritage and Regulation (CPHR) (Formally BCS) were undertaken to verify:
    - The condition and habitat values onsite
    - The potential for Serious and Irreversible Impacts (SAII)
    - The potential for avoiding and minimising biodiversity impacts through Project design
    - Land Category
- Early design input for the access road of Holbrook Road to avoid and minimise clearing of native vegetation.

1.6. Related development

There are no existing or approved developments that will be incorporated into the Project or operated in conjunction with the Mangoplah BESS.

The Applicant, in discussion with Transgrid have identified the following non-contestable works that would be required to facilitate the connection of the Project to the existing 132kV transmission line:

- Upstream optical ground wire cable and underground fibre installation

Transgrid have advised the Applicant that the establishment of new transmission structures would be required to facilitate the cut-in, and the broader network upgrades – such as the optical ground wire cable –

could be sought through a separate approval under Part 5 of the *Environmental Planning and Assessment* (EP&A) Act. Regular meetings, email and phone correspondence between the Applicant and Transgrid's department (Lumea) that deals with new connections are ongoing (refer Section 5.4).

1.7. Restrictions applicable to the Project Site

No restrictions for the Project Site have been identified.

The identified Crown Lands within the Involved Lands are expected to be purchased and closed prior to construction. However, if roads continue to exist at the commencement of construction, an appropriate licence or another form of access rights will be sought.

1.8. Format of this Environmental Impact Statement (EIS)

The purpose of this Environmental Impact Statement (EIS) is to assess the economic, environmental and social impacts of the Mangoplah BESS Project, proposed at **4178 Holbrook Road, Mangoplah NSW 2652**.

This EIS is structured to help the community, local council, government agencies and the consent authority understand the Project and its impacts, so they can make informed submissions or decisions on the merits of the Project.

The EIS has been prepared in line with the following guidance documentation:

- State Significant Development Guidelines (DPHI, 2024a)
- State Significant Development Guidelines Appendix B – preparing and environmental impact statement (DPHI, 2022)
- Undertaking Engagement Guidelines for State Significant Projects (DPHI, 2024b)
- Cumulative Impact Assessment Guidelines for State Significant Projects (DPHI, 2022)
- Social Impact Assessment Guidelines for State Significant Projects (DPIE, 2023)
- Benefit-Sharing Guideline – Guidance for large-scape renewable energy projects (DPHI, 2024c).

It has been prepared in two parts:

1. The main report describes the Project, summarises the findings of consultation activities and detailed environmental assessment of impacts. It includes all mitigation measures proposed to manage the impacts on the community and the environment.
2. The supporting appendices include more detail in relation to:
    i) The Project specific Secretary's Environmental Assessment Requirements (SEARs) which prescribe the structure and content of the EIS, including a cross reference to where each requirement is addressed in the EIS.
    ii) Statutory compliance of the Project.
    iii) Engagement activities and outcomes, with the community and agencies.
    iv) Detailed specialist assessments (each provided in full).

The appendices also include a consolidated table of all proposed mitigation measures to manage the impacts on the community and the environment. These form part of the Project description, and would be required to be implemented, pending Project approval. The supporting appendices include:

- Appendix A Project SEARs
- .Appendix B Statutory context table

- .Appendix C Community engagement strategy
- Appendix D Consultation documentation
- Appendix E Consolidated mitigation measures
- Appendix F Specialist reports
    - F.1 Biodiversity Development Assessment Report
    - F.2 Aboriginal Cultural Heritage Assessment
    - F.3 Traffic Impact Assessment
    - F.4 Preliminary Hazard Analysis
    - F.5 Bushfire Assessment Report
    - F.6 Landscape Character and Visual Impact Assessment
    - F.7 Construction and Operation Noise and Vibration Assessment
    - F.8 Flood Impact Assessment
    - F.10 Soil Technical Report
    - F.11 Preliminary Site Investigation
    - F.12 Social Impact Assessment

2. Strategic context

Context important to the development of the Project includes:

- Strategic need for energy storage in NSW
- Alignment with federal and state policy
- Alignment with regional and local strategies.

The above supports the justification for the project, as set out below.

2.1. Regional context

The Project is located on the outskirts of the suburb of Mangoplah within the Wagga Wagga LGA. The LGA is situated within the Riverina Murray Region of NSW, with a population of 67,609 people as per the 2021 Census (Australian Bureau of Statistics, 2021).

The Wagga Wagga LGA and surrounds have been identified as a "Candidate Renewable Energy Zone (REZ)" since 2018, within the relevant Integrated System Plans (refer to Figure 2-1 below). Candidate REZs such as the Wagga Wagga REZ may account for 11% of the total projected utility-scale variable renewable energy developments in New South Wales (AEMO, Integrated System Plan 2024, 2024).

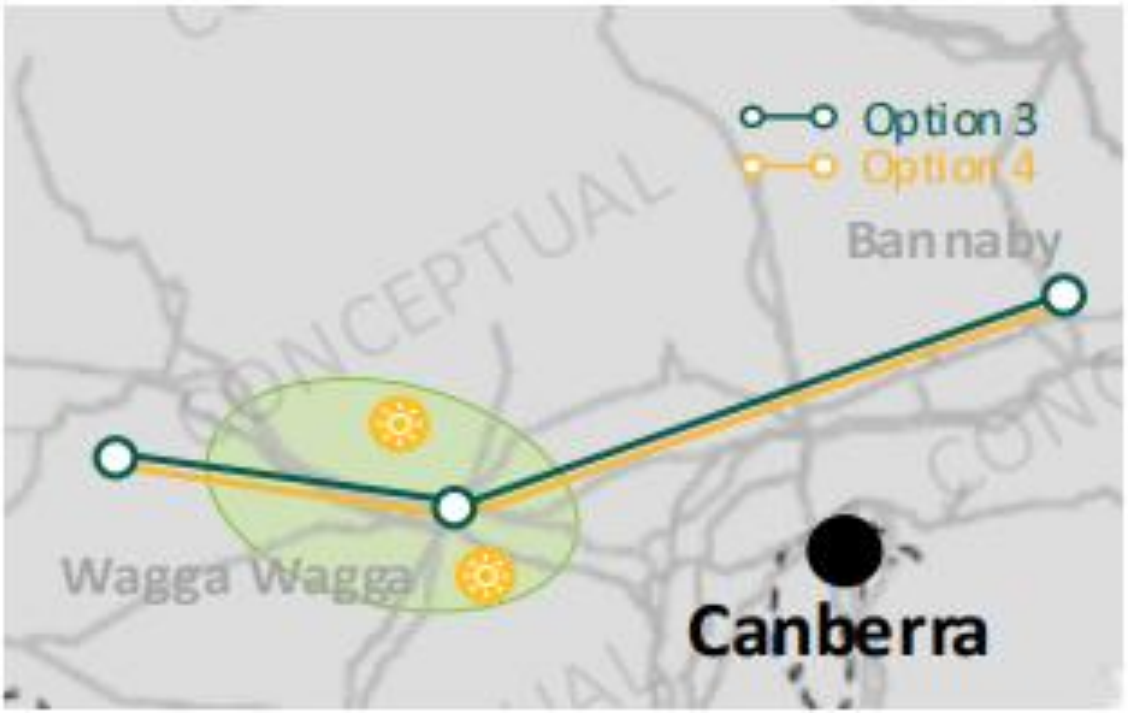


Figure 2-1 Candidate REZ - N6 Wagga Wagga indicative area (Source: (AEMO, 2024))

There are a total of 85 non-associated receivers and one associated receiver within 4km of the BESS Development Footprint (Figure 2-2). Of the total 86 receivers, there are 7 non-associated receivers and the one associated receiver within 2km of the Development Footprint. The majority of receivers are situated to the northwest of the Project within the township of Mangoplah. As detailed above in Section 1.5.1, the Project Site has an optimal combination of Project Site values that have been incorporated into the design and informed the final location of the Project. Key site values can be seen in Figure 2-3 below.

Piersons Road
Holbrook Road
Waverley Road
Yerong Creek-Mangoplah Road
R8
R6
Mcraes Road
Burrandana Road
R3
R2
R5
Creasys Road
R1
Holbrook Road
R4
R7
Henty Road
Zadows Road
Paper Forest Road

LEGEND

- Project Site
- 2km Buffer
- 4km Buffer
- Road

Receivers

- Associated Receiver
- Non-associated Receivers <2km
- Non-associated Receivers <4km

Datum: GDA2020 / MGA Zone 55

NGH

0 1 2 km

Mangoplah BESS

Figure 2-2 Nearby Receivers

Darlow Street
Cox Street
Baylis Street
Kane Street
Tywong Street
Creasys Road
Holbrook Road
BURKES CREEK
PAPER FOREST CREEK
R1
R2
R3
R4
R5
R6
R7
Lot 222
DP754557
Lot 225
DP754557
Lot 228
DP754557

LEGEND

- Project Site
- Involved Lands
- Roads

Plant Community Types

- PCT 0 - Existing Track
- PCT 0 - Non-native vegetation
- PCT 277 - Derived Grassland - Low Condition
- PCT 277 - Woodland moderate condition
- PCT 277 - Woodland-Good Condition
- PCT 76 - Derived Grassland - Low Condition
- PCT 76 - Woodland
- Non-hollow Bearing Tree
- Hollow Bearing Tree
- Waterways

Transmission Lines

- 66kV
- 132kV

Receivers

- 2km Non-associated Receivers
- 5km Receivers
- Associated Receiver

Heritage site points

- Artefact
- Modified Tree (Carved or Scarred)

Datum: GDA2020 / MGA Zone 55

NGH

0 0.5 1 km

Mangoplah BESS

Figure 2-3 Key Features

Bullenbong
Kapooka
Lloyd
Bourkelands
Tolland
Kooringal
Tatton
Lake Albert
Springvale
Forest Hill
Sturt Highway
Alfredtown
Olympic Highway
Uranquinty
Rowan
Ladysmith
Bon Accord
Gregadoo
Tamboolba
Coreinbob
Gelston Park
French Park
Tootool
The Rock
Pearson
Maxwell
Big Springs
Birdlip
Kubura
Livingstone
Book Book
Mangoplah
Yerong Creek
Burrandana
Pulletop
Paper Forest
Westby

LEGEND

- Project Site

Regional features

- Suburb
- Population Centre
- Main Road
- Local Road
- Railway
- Major Waterways
- National Park

Local Government Area

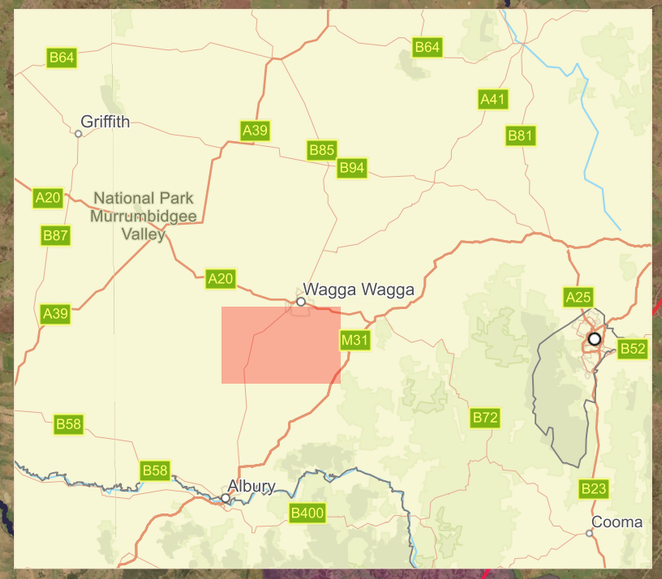
- Greater Hume Shire
- Lockhart
- Wagga Wagga

Electricity Transmission Line

- 66kV
- 132kV
- 330kV

Nearby Renewable Energy Projects

- BESS Projects
- Solar Farm Projects



Datum: GDA2020 / MGA Zone 55

0 7.5 15 km

Mangoplah BESS

Figure 2-4 Regional Context

2.2. Alignment with federal, state and regional energy policies

2.2.1. Federal

Reduction plan 2021 and Nationally Determined Contribution (2022)

Australia's long term emissions reduction plan and the Nationally determined contribution to the UN via the Paris Agreement (developed during United Nations Framework Convention on Climate Change (UNFCC) COP21) sets the nations goals towards zero emissions by 2050 and 43% below 2005 levels by 2030 (Department of Industry, Science, Energy and Resources, 2021). This was set to achieve the goal of avoiding a 1.5^{o}C rise (from pre-industrial levels) in temperature by the end of the 21st century. The Project assists in this reduction through the storage of electricity which should be primarily sourced from renewables, not fossil fuels under the forecasted energy transition.

There have been seven COP's since COP21. The latest outcomes from COP28 highlighted the need to triple global renewable energy capacity globally to meet the goals of the Paris agreement.

The Commonwealth *Climate Change Act 2022* enshrines into law an emissions reduction target of 43 percent from 2005 levels by 2030, and net zero emissions by 2050. In addition, the Act ensures a whole-of-government approach to drive towards the target. The government has formally lodged this target as an enhanced Nationally Determined Contribution under the Paris Agreement. The Act backs onto the Government's Powering Australia Plan, which is focused on creating jobs, cutting power bills and reducing emissions by boosting renewable energy.

The Project would form part of the Australian effort to help meet the above targets. The development of utility battery storage is an important contribution to:

- Providing for further reductions in Green House Gas (GHG) emission intensity for generation in the National Energy Market (NEM), by supporting renewable energy projects,
- Supporting the Government's Renewable Energy Target (RET) of 20 percent renewable energy by 2020.

While the Large-scale RET target was met in 2019/20, the scheme will continue to require high-energy users to meet their obligations under the policy until 2030.

2024 Integrated Systems Plan

Published every two years, the Integrated Systems Plan (ISP) details what, when, where, and how much electricity transmission, generation and storage is required in the NEM. This assists governments and industry to plan and invest to meet people's current and future energy needs.

The 2024 ISP was first introduced in December of 2023 and released for comment in January 2024. The Plan confirms that urgent investment is needed in new renewable energy generation, transmission, storage and flexible gas generation to continue to deliver secure, reliable and affordable energy, and reach the renewable electricity generation targets of NEM jurisdictions.

The key messages from the draft plan include:

- Household and business electricity consumption from the grid is forecast to nearly double by 2050.

- With coal expected to retire faster than currently announced, the NEM is forecast to need a seven-fold increase in large-scale wind and solar generation by 2050. The 2024 ISP predicts a 90% (or 21 Gigawatts (GW)) closure of all coal plants by 2030, a significant increase from the forecast two-thirds of coal plants (or 14GW) from the 2022 ISP.
- It also requires building close to 10,000 km of new transmission lines and upgrades to existing networks by 2050 to connect new generation across the power system.
- Delivering the transmission projects identified in this plan is expected to avoid $17 billion in additional costs to consumers if those projects were not delivered.

The 2024 ISP sets out how the Australian Energy Market Operator (AEMO) has identified the optimal development path for the NEM and is a roadmap through the energy transition. The 2024 ISP shifts from the 2022 ISP, the adjustment being in response to economic, physical and policy environmental changes. The AEMO states that “there will be a demand for 82GW of utility-scale wind and solar in the NEM by 2034-35, and 126GW by 2049-50. 34GW of this energy would need to come from NSW".

In response to an accelerated timeline for the closure of coal fired energy plants, the optimal development path is Step Change. Step Change is predicted to be the lowest cost, resilient and practical path to the NEM’s energy future rather than Progressive Change which reflects slower economic growth and energy investment or Green Energy exports which is focused on strong industrial decarbonisation and low emission energy exports. Under forecasts for the Step Change scenario (AEMO, 2023), the optimal development path requires investment that would:

- Triple grid scale variable renewable energy by 2030 and increase it seven-fold by 2050. Focus grid scale generation in REZs Almost quadruple the firming capacity using utility scale batteries, hydro and gas-powered powered generation Support a fourfold increase in rooftop solar capacity.
- Leverage system security services and operational approaches.

There is an earlier need for renewable energy with a need for 6GW of new renewable energy per year compared to 4GW in the 2022 ISP to replace the coal generation capacity that is existing faster and to meet the higher demand forecast compared to the 2022 ISP.

Being within a candidate REZ, the proposed BESS would benefit the network by shifting electricity storage closer to local consumption, thereby contributing to regional grid capacity enhancement.

Australia’s Net Zero Plan 2025

Australia is experiencing the profound and accelerating impacts of climate change. Australia’s average land temperature has increased by approximately 1.5°C since 1910. Australians are already living with increasing impacts from climate change, and are witnessing more frequent and severe events, such as droughts, floods, bushfires and heatwaves (DCCEEW, 2025).

Australia’s National Climate Risk Assessment (NCRA) provides the first comprehensive government-led assessment of the risks Australia faces as a result of climate change. It presents a future of climate-fuelled extreme weather events, that increases pressure on our natural ecosystems and the livelihoods and communities that rely on them (DCCEEW, 2025).

On 18 September 2025, the Labor Government announced Australia’s latest 2035 emissions target, as well as the Net Zero Plan along with a series of supporting documents, which outline how the targets will be achieved (DCCEEW, 2025).

The government has set a new national target to reduce emissions by 62–70% below 2005 levels by 2035. The new target is a significant step up from the 2030 target and provides a strong investment signal.

So far, the actions taken by government, businesses and households reduced Australia's emissions in 2024 by 27% on 2005 levels. The most recent data for 2025 indicates emissions are now down 29%.

The Labour Government has adopted the Climate Change Authority's recommendation (Climate Change Authority, 2025) and set Australia's 2035 target.

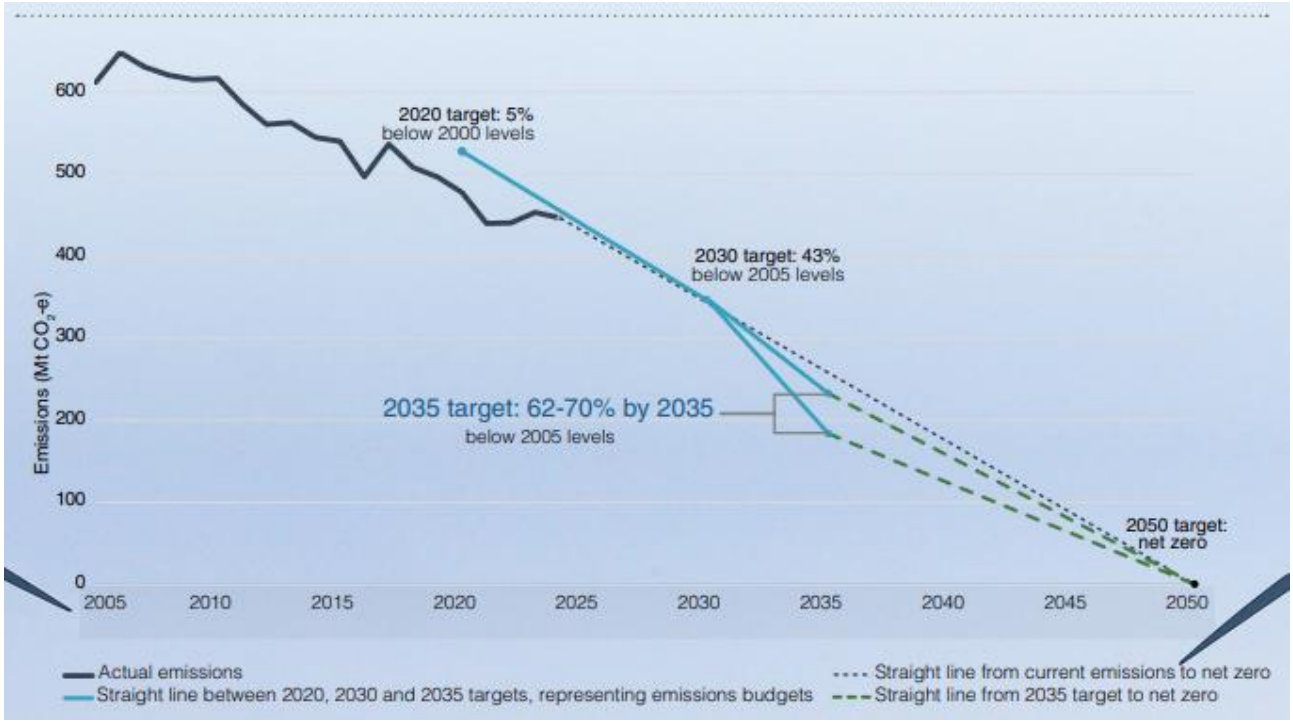


Figure 2-5 Australia's emission reduction targets

To reach the 2035 target and net zero by 2050, there will be a focus effort on five CLEAN decarbonisation priorities:

- **C**lean electricity across the economy
- **L**owering emissions by electrification and efficiency
- **E**xpanding clean fuel use
- **A**ccelerating new technologies
- **N**et carbon removals scaled up.

As detailed above, the Project would form part of the Australian effort to help meet this target.

2.2.2. New South Wales Government

NSW Climate Change (Net Zero Future) Act 2023

The NSW Climate Change (Net Zero Future) Act 2023 was agreed on 11 December 2023. It aims to '*set objective for New South Wales to be more resilient to a changing climate; and to establish the Net Zero*

Commission to monitor, review and report on progress towards the 2030 and 2050 targets and the objective and to exercise other related functions'.

The Act commits the NSW government to effective action on climate change to ensure a sustainable and fair future for the people, economy and environment of NSW. It legislates:

- Guiding principles for action to address climate change that consider the impacts, opportunities and need for action in NSW
- Emission reduction targets for NSW:
    - 50% reduction of 2005 levels by 2030
    - 70% reduction on 2005 levels by 2035
    - Net zero by 2050
- An object for NSW to be more resilient to a changing climate
- Establishing an independent, expert Net Zero Commission to monitor, review, report on and advise on progress towards these targets (NSW Government, 2023).

This Act supports the Commonwealth governments' *Climate Change Act* 2022.

Meteorology in the area surrounding the Project is affected by multiple factors such as terrain and land use. Rainfall, temperature and wind averages are recorded at the Wagga Wagga Automatic Meteorological Observatory (AMO) (being the closest Bureau station) and are summarised in Table 2-1.

Wind speed and direction are largely affected by topography at the small scale, while factors such as synoptic scale winds affect wind speed and direction on the larger scale. Wind speed and direction are of great importance while assessing potential air quality impacts, as they dictate the direction and distance air pollutant plumes travel. The Wagga Wagga AMO's wind data notes that wind speeds are generally higher during the summer months and drop off towards winter.

Table 2-1 Mangoplah climate data sourced from Wagga Wagga AMO (#072150) for 1942-2025 (BOM, 2025)

Aspect	Annual mean	Mean minimum range	Mean maximum range
Temperature	22.3°C maximum 9.1°C minimum	16.5°C (January) to 2.8°C (July)	31.9°C (January) to 12.8°C (July)
Rainfall	573.2mm	39.6mm (February)	56.7mm (October)

The context of climate change is relevant to rural locations. Climate change refers to the long-term shift in climate over many decades which may occur as a result of natural variations of human activities which causes change in the composition of the atmosphere.

In 2014, the NSW OEH published climate change projection snapshot reports for the NSW and ACT governments as part of the NSW and ACT Regional Climate Modelling (NARCliM) Project and in 2024 this was updated with the completion of NARCliM 2.0 by AdaptNSW.

NARCliM 2.0 provides historical and projected climate data from 1951 to 2100. The two main scenarios in the NARCliM 2.0 Riverina Murray snapshot are a low-emissions future with a global transition towards sustainable and equitable development and a high-emissions future of regional conflict and development

where countries do not collaborate on tackling climate change and do not focus on sustainable and equitable development (Department of Climate Change, Energy, the Environment and Water, 2024).

Figure 2-6 below is the projected changes summary for the Riverina Murray under the low and high emissions scenario. The key takeaways for the region are that hot days are expected increase while cold nights are expected to decrease under both scenarios, severe fire weather is also expected to increase. However, it should be highlighted that changes would be vastly reduced under the low emission scenario. In terms of rainfall in the region the snapshot does predict an overall reduction in rainfall under both scenarios, which could impact agriculture productivity, water security and native species' (e.g. eucalypt woodland) reproductive cycles.

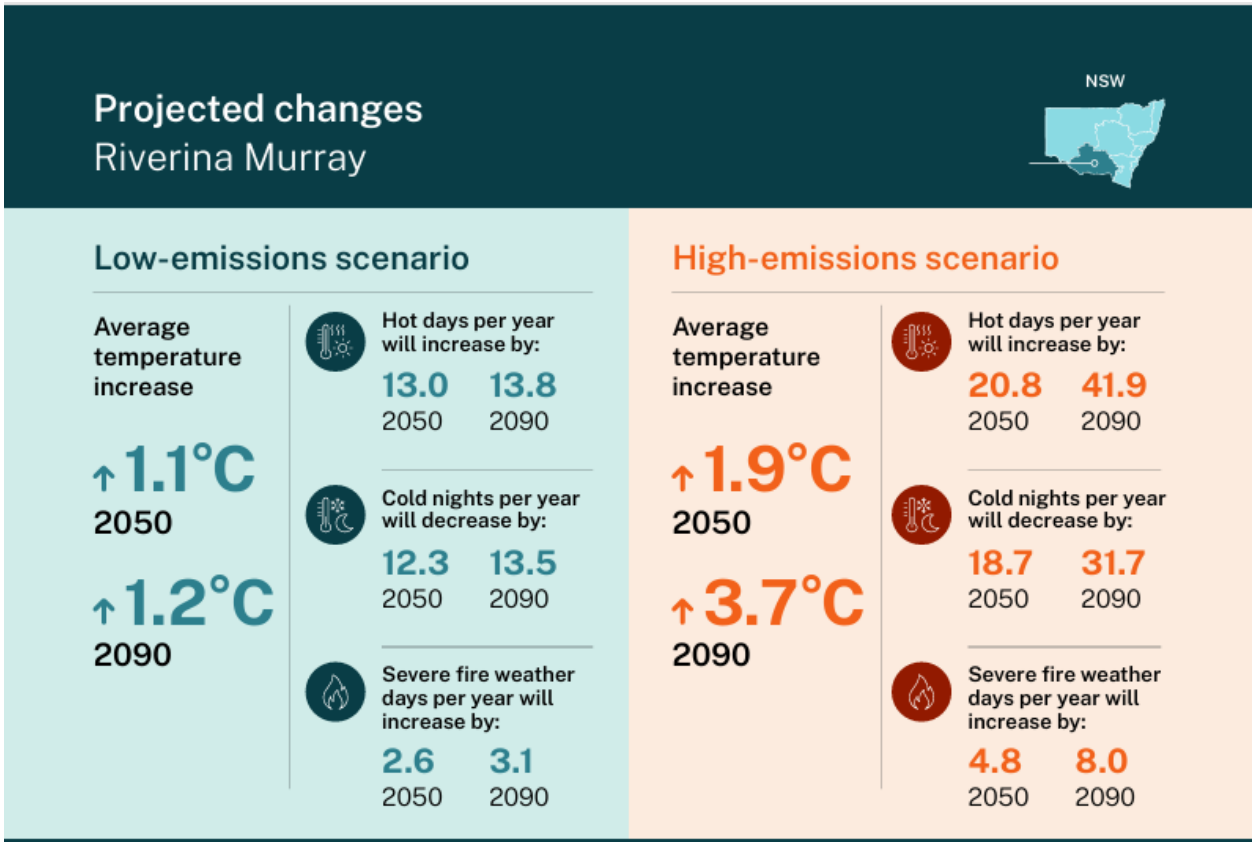


Figure 2-6 Projected climate change impacts for the Riverina Murray region (source: (Department of Climate Change, Energy, the Environment and Water, 2024)

NSW Net Zero Plan

In March 2020, the NSW Government released the NSW Net Zero Plan. This plan sets out how the NSW Government will deliver on these objectives over the next decade. The Net Zero Priorities include to:

- Drive uptake of proven emissions reduction technologies that grow the economy, create new jobs or reduce the cost of living
- Empower consumers and businesses to make sustainable choices
- Invest in the next wave of emissions reduction innovation to ensure economic prosperity from decarbonisation beyond 2030
- Ensure the NSW Government leads by example.

The Net Zero Plan Stage 1:2020-2030 is the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050. The proposed Project aligns with this goal.

Renewable Energy Zones (REZ's)

The Project is located within an identified candidate REZ.

To strategically maximise benefits and smooth the transition to greater renewable energy development, the ISP identified REZ locations that can connect to the existing transmission network and:

- Reduce the need to build transmission lines into new areas
- Reduce Project connection costs and risks
- Optimise the mix of generation, storage and transmission line investment across multiple connecting parties
- Co-locate and optimise the otherwise 'lumpy' investments in network and system support infrastructure
- Promote regional expertise and employment at scale.

As stated above, the Project is strategically placed next to an existing transmission line (refer to Figure 1-2), which feeds into the Wagga Wagga 330kV Substation. It will support the increased renewable energy input into the grid in this region.

NSW Electrical Infrastructure roadmap

The NSW Electricity Infrastructure Roadmap ('The Roadmap') aims to redefine NSW as a modern, global energy superpower by delivering the electricity infrastructure needed to support a modern prosperous economy (NSW DPIE, 2020). The roadmap sets out a plan to transition the electricity sector from the existing power sources that are coming to the end of their lives, to cleaner, cheaper and more reliable energy sources including wind, solar, batteries and pumped hydro.

The electricity sector in NSW would be underpinned by five foundational pillars outlined in The Roadmap:

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 (REZs): coordinating 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 Roadmap reiterates the need to act now given four of the five coal fired power stations in NSW are anticipated to close within 15 years, starting with the Liddell power station that closed in 2023 and Eraring that is planned to close in 2027. These power stations provide, as of 2020 power mix generation, around three quarters of NSW's electricity supply and two thirds of the firm capacity needed during summer heat waves, and as they age, tend to fail more frequently resulting in reliability problems. The infrastructure needed to replace coal fired power stations has long lead times, further justifying the need for action to coordinate and unlock investment before they close.

The Mangoplah BESS is strongly justified due to its potential to contribute to pillars 1, 2 and 4 of the Roadmap, by providing reliable energy storage to the NEM.

NSW Transmission Infrastructure Strategy 2018

The NSW Transmission Infrastructure Strategy is the NSW Government's plan to unlock private sector investment in priority energy infrastructure projects, which can deliver least-cost energy to customers to 2040 and beyond (NSW Department of Planning and Envrionment, 2018). The strategy states that for every 20 projects looking to connect to the grid, only one can. This comes despite the fact that in October 2018 more than 20,000MW of large-scale projects were progressing through the planning system, representing more than $27 billion in potential investment, mostly in regional NSW. The NSW Transmission Infrastructure Strategy sets a plan to facilitate private sector investment in energy projects throughout the state. The NSW Transmission Infrastructure Strategy sets out the following guiding principles:

- Supporting projects that may contribute to lowering energy bills
- Taking a technology neutral approach to energy generation projects
- Private sector led investment
- Regional economic growth and increased job opportunities
- Ongoing secure and reliable energy to power the NSW economy.

The strategy also outlines the aim to boost NSW connectivity through large-scale transmission connections with surrounding states and regional areas. This would be primarily spearheaded by upgrades and infrastructure in defined energy zones.

NSW Electrical Strategy

The three objectives of the NSW Government for the state's electricity system, as stated in the NSW Electricity Strategy (NSW DPIE, 2019), are reliability, affordability and sustainability.

The NSW Government's Electricity Strategy would:

- Improve the efficiency and competitiveness of the NSW electricity market by reducing risk, cost, Government caused delays and by encouraging investment in new price-reducing generation and energy saving technology.
- Prompt Government to act if there is a forecast breach of the Energy Security Target which private sector projects are unlikely to address. This should be done in a way that minimises costs to consumers and taxpayers and does not give rise to moral hazard risk.
- Ensure that there are appropriate powers available for Government to analyse and respond to electricity supply emergencies if they arise.

Renewables are now the most economic form of new generation and battery storage is a critical part of this transition.

2.2.3. Regional/local policy

Regional and local context setting, zoning and key environmental features such as;

- Flooding
- Bushfire prone land
- Contaminated land

- Slope
- Mine subsidence
- Climate change

The above supports the justification for the project, as set out below.

Riverina Murray Reginal Plan 2041

The Riverina Murry Regional Plan 2041 provides a framework for recent government priorities, and draws from the local strategic planning statements prepared by each council for their LGA. The key outcomes in the regional plan relevant to the Project are:

- Ensure the aims of the *Biodiversity Conservation Act 2016* are considered early in the strategic planning and development process
- Support the transition to a net zero carbon emission State by 2050, including enabling the establishment of the South-West REZ
- Plan for the implications of climate change and the need for resilient and sustainable communities.

The Project aligns with the above key outcomes through:

- Early design of the access road to avoid and minimise impact on native vegetation and through the siting of the BESS on low-quality exotic farming land
- Providing appropriate infrastructure to assist in firming and supporting the electricity grid
- Providing reliable energy storage and electricity grid distribution in times of high energy demand

More specifically, the Project aligns with two of the planning objectives of the Regional Plan. These are objective 11 and objective 13 and is considered suitable development for the area.

- Objective 11: Community and places – Plan for integrated and resilient utility infrastructure

The Project aligns with the objectives through firming the grid, providing a reliable electricity supply that will be readily available for the area.

- Objective 13: Economy – Support the transition to net zero by 2050.

As renewable electricity generation demand increases, so does the requirement for effective storage. The Project assists with the regions transition to net zero by 2050 through providing reliable energy storage and electricity grid distribution in times of high energy demand.

Wagga Wagga Local Environmental Plan 2010

‘Electricity generating works’ as defined by the Standard Instrument - Principal Local Environment Plan (2006) includes electricity storage.

The Project Site is zoned Primary Production (RU1) under the *Wagga Wagga Local Environmental Plan 2010* (Wagga Wagga LEP) (refer to Figure 2-7). The objectives of the zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To foster strong, sustainable rural community lifestyles.

- To maintain the rural landscape character of the land.
- To allow tourist and visitor accommodation only where it is in association with agricultural activities.

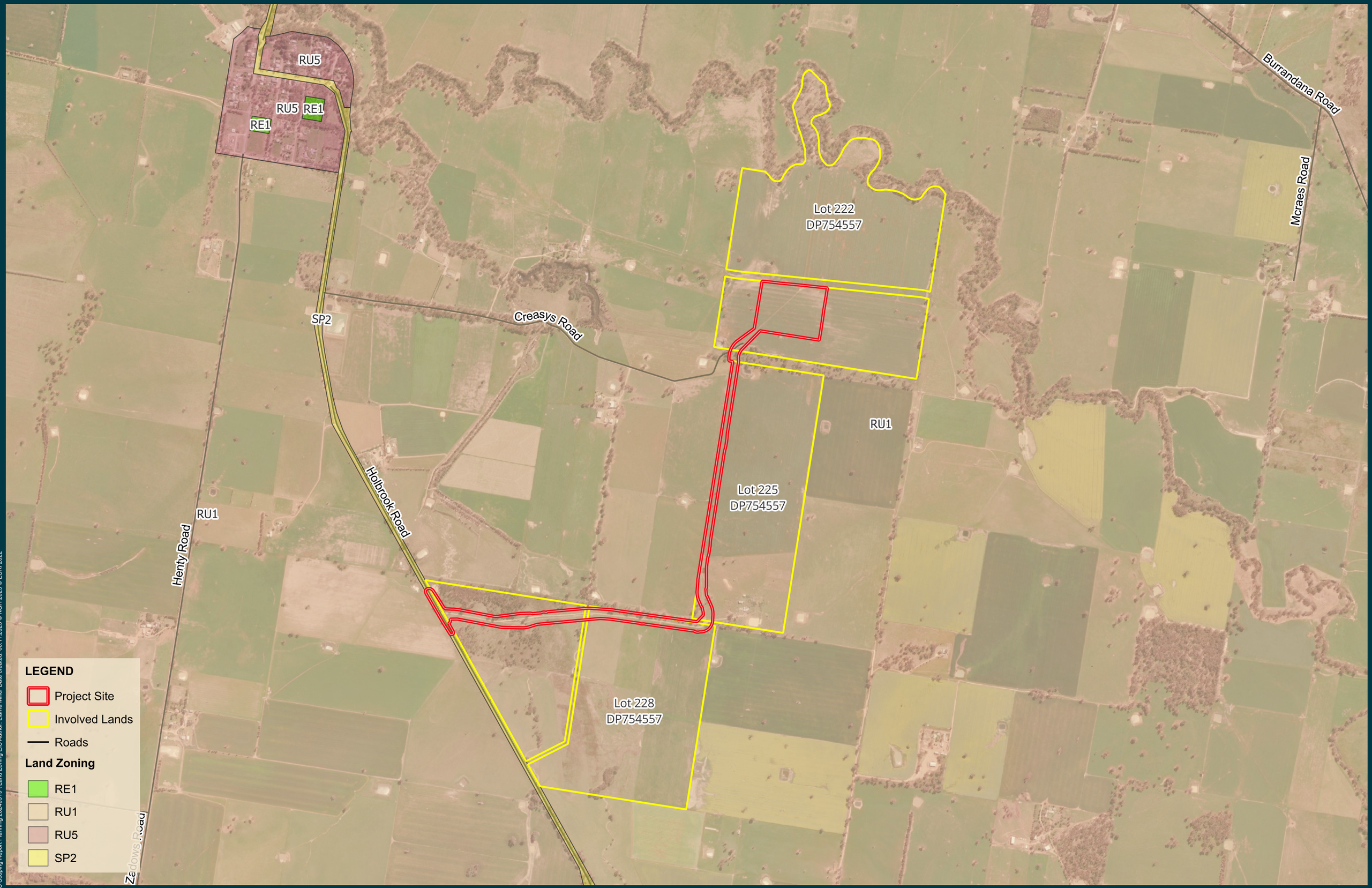
Electricity generating works are permitted with consent under this zone within the LEP. The selection of the site to develop an energy storage facility supports the RU1 objectives. The development of electricity generating works within a prescribed non-residential zone is permissible with consent both under the LEP and the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP).

For the life of the Project, it would store and harness a renewable natural resource (i.e. renewable energy). While the activity would have minor impacts on land available locally for primary production, the land would meet the second and third objectives as identified above; it would allow for diversity in land use appropriate to the area and it would not fragment resource lands.

Being largely reversible and involving limited ground disturbance, it would not remove the potential to use the land for primary production at the end of the life of the Project.

Leasing of the land, rather than subdividing, will also reduce any potential for permanent fragmentation or alienation of resource lands. Noting this, a minor subdivision may be required for the Project substation.

Visual and community impacts have been considered carefully in this EIS and mitigation strategies to minimise impacts form part of the Project.



Datum: GDA2020 / MGA Zone 55

0 0.5 1 km

Mangoplah BESS

Figure 2-7 Land zoning

Wagga Wagga Operational Plan 2024 – 2025

The Wagga Wagga Operational Plan outlines the actions that Council will undertake each financial year that contribute to achieving the commitments of the overarching Delivery Program and Community Strategic Plan. It identifies the annual budget required to deliver the actions and the responsible service area and is created each financial year and is year four of Council's four-year Delivery Program 2022/23 – 2025/26. The five strategic directions outlined in this Plan are:

- Community leadership and collaboration
- Safe and healthy community
- Growing economy
- Community place and identity
- The environment

The construction of the Project aligns with the Plans strategy to support and empower the community to help the transition to net zero emissions through firming the grid and providing reliable energy supply in times of high demand.

Wagga Wagga Local Strategic Planning Statement 2040

The Wagga Wagga Local Strategic Planning Statement 2040 set the long-term strategic framework for planning and development in the Wagga Wagga LGA over the next 20 years. The Project aligns closely with two planning principles for the Wagga Wagga City Council (WWCC). These include Principle 1, and Principle 2, and is considered suitable development for the area.

- Principle 1: The environment – Protect and enhance natural areas and corridors

The Project aims to balance the natural environment and development through minimising impact on terrestrial biodiversity within the Project Site and surrounding areas.

- Principle 2: The environment – Increase resilience to natural hazards and land constraints

The Project's objectives align with Council's for achieving the NSW Governments Net Zero 2050 goal through providing a meaningful contribution to the state's transition to renewable energy and stabilising the grid.

Wagga Wagga Community Net Zero Emissions 2050 Roadmap

In 2022, WWCC resolved to set a target of 50% reduction in community emissions by 2030, and zero by 2050. Community emissions refer to all emissions attributed to the LGA, while corporate emissions refer to emissions created by WWCC in its day-to-day operations.

The Roadmap (WWCC, 2022) identifies a list of pathways the LGA needs to consider to achieve the targets for net zero emissions. This involves achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere.

Although the Project does not play a driving role in this strategic goal, it is clear from the Roadmap that WWCC is supportive and committed to contributing to the net-zero emissions goal for the LGA, NSW, and Australia by 2050.

Further local policy considerations

As of July 2025, Wagga Wagga City Council (WWCC) voted to enhance protections for prime agricultural land from the development of renewable energy projects, which includes battery energy storage facilities. This decision comes in response to growing community concerns, particularly from local landowners who fear the impact of such developments on farming viability and rural lifestyles.

WWCC is also currently drafting a Community Benefit Policy for energy developments, and creating a recycling policy for renewable energy technologies, with the aim to identify areas unsuitable for future renewable energy developments, rather than banning them outright.

Potential impacts on prime agricultural land are discussed in Section 6.11 of this EIS.

Community benefit sharing and social and economic impacts are discussed in Section 5 and Section 6.12.

2.3. Consideration of alternatives and options analysis

Specific alternatives considered include:

- Location of Project site
- Project layout
- Location of access point
- Storage technology type
- Grid connection
- Scale
- The ‘do nothing’ option

2.3.1. Alternative site locations

An alternative site within the Greater Hume LGA was considered. However, the Mangoplah site was chosen as the site provides an optimal combination of

- Sufficient levels of available capacity on the grid distribution system
- Proximity to an existing 132kV transmission line
- Appropriate location on land zoning that permits for the development of a BESS with consent
- Appropriate siting of the BESS on low-condition exotic farming land
- Appropriate transport access to Holbrook Road and to the Project Site off Holbrook Road
- Only 7 non-associated receivers within 2km of the Development Footprint
- Low land use conflict.

2.3.2. Project layout

The Indicative Layout has been developed to be responsive to the site’s environmental features (refer to Figure 3-1) and has minimised impact on biodiversity values. Remaining environmental considerations on this site were considered minor and appropriately addressed with mitigation measures that are summarised in Appendix E.

In addition, vegetative screening was not considered due to limited impacts on surrounding non-associated landholders. However, due to the non-associated landholders' concerns on potential views to the west of the Project, screening was added to the project.

2.3.3. Alternative site access points

Consideration was given to accessing the site from Creasy's Lane, and from the WWCC owned Paper Forest Road, and travelling north on an unnamed, unsealed private road. These options were not considered further as:

1. Project related traffic would be directed closer to non-associated receivers
2. Additional landowners agreements would need to be sought
3. The current internal access traverses the land of the associated landholders, is further away from the township and would utilise and upgrade an existing access track which has been used for agricultural purposes. Suitable design flexibility of this access road has been allowed for in the EIS assessments, and through detailed design, potential biodiversity impacts will be minimised in consultation with relevant stakeholder requirements (constructability, emergency access, etc).

2.3.4. Alternative technologies

Over recent years, the underlying technology supporting BESS development has been evolving at an increasingly rapid rate. The Applicant would utilise the latest technical and cost-efficient technology available at the time of construction. At this stage, it is proposed to utilise the Tesla Megapack which utilises a Lithium-iron phosphate (LFP) chemistry.

While other battery technology exists, LFP battery technology is currently selected as the preferred option based on the following criteria:

- Minimal risk of thermal runaway
- Safety, fire management and containment
- Ability to support the network to increase renewable energy penetration
- Ability to provide energy during periods of peak demands
- Minimal environmental impact
- Safety and ease of integration
- Demonstration and maturity of technology
- Value for money.

At this stage there are no notable battery technologies competing with LFP for this scale of development.

2.3.5. Grid connection

The Project will connect directly to the grid via a grid-forming arrangement.

Grid-forming batteries can create and regulate grid voltage and frequency independently, while grid-following batteries synchronize with the existing grid, relying on it for stability. This allows them to operate independently of the grid. This capability makes them ideal for providing backup power during outages or in remote areas without grid access. Grid-forming systems proactively control the energy flow, ensuring stability

and reliability even in the absence of a stable grid. They can manage large disruptions and restore power quickly after an outage.

As more renewable energy sources like solar and wind are integrated into the grid, grid-forming systems play a vital role in maintaining grid stability. They can quickly respond to fluctuations in power supply, making them essential for a future powered by renewables.

2.3.6. Scale and suitability of the Project

The scale of the Project has been determined after considering the following factors:

- A desire to provide more secure energy for times of need and supporting Commonwealth and State level efforts to mitigate the effect of climate change
- A need to ensure that the Project is commercially viable
- The capacity of the electricity grid to absorb the energy generated by the Project
- The opinions expressed by landowners and the local community
- The constraints identified during the preparation of this EIS.

A brief overview of the Project's regional setting is included in Section 1.4.

2.3.7. Alternative to do nothing

Once the general area was selected by the Applicant, the only alternative option is to not undertake the Project. This is reflected as Option 1.

Option 1: Do nothing

The do-nothing option considers the consequences of not carrying out the development. The strategic need for the Project is justified to address the state's current need for storage methods that address grid firming to support climate change commitments that are moving away from reliance on fossil fuels. Not undertaking the Project would not assist in the transition away from fossil fuel reliant energy production.

It would also forgo any benefits of the Project as detailed in Section 2.6 of this report.

The do-nothing option would not generate the environmental impacts required to construct and operate the BESS. Key impacts are detailed in Sections 0 and 7 of this report, however, no impacts were concluded to be substantive, or lead to long term negative impacts to the environment and community.

Option 2: Construction of the Mangoplah BESS

Option 2 is to construct and operate a BESS as outlined in Section 3 of this report. The biggest advantage of this option is the location of the Project in proximity to existing electrical infrastructure, allowing for minimal impacts related to extensive transmission line upgrades and minimal impacts to surrounding agricultural land with no fragmentation of important agricultural land.

The other advantages and disadvantages of Option 2 is presented in Table 2-2. Mitigation measures have been considered to avoid biodiversity impacts, traffic, Aboriginal heritage, visual and noise impacts. The benefits of the Project are considered to outweigh the potential impacts, which have been deemed manageable.

Table 2-2 Advantages and disadvantages of Option 2

Advantages of Option 2	Disadvantages of Option 2

• Aligns with the strategic needs and Project justification
• Strategically located in proximity to electrical infrastructure
• Ability to avoid key environmental impacts such as high biodiversity values (refer to Figure 2-3)
• No fragmentation of important Agricultural land.
• Ability to avoid key amenity impacts such as noise and visual
• Broader benefits to the community through project agreements with the WWCC.
• Assists with firming supply of electricity, which is critical to a renewable grid.
	• Select environmental impacts that will be minimised through mitigation measures to be developed in the EIS, including:
	  ○ Minor loss of agricultural land – to be rehabilitated post decommissioning
	  ○ Potential impact to waterways
	  ○ Minor amount of vegetation removal along access road
	  ○ Potential social impacts in relation to tourism, accommodation and employment

2.4. Project agreements

The Project has an agreement with the associated landholders.

No 'negotiated agreements' have been entered into to manage impacts on any near neighbours.

The Applicant has the intention to enter into a Community Benefit Fund (CBF) established via a Voluntary Planning Agreement (VPA) with the Wagga Wagga City Council (WWCC).

As detailed above in Section 2.2.3, WWCC is currently drafting a Community Benefit Policy for energy developments. As such, the initial terms of the agreement are subject to ongoing negotiations with WWCC and will be in line with financial contribution rates outlined in the Benefit-Sharing Guideline (DPHI, 2024a). However; WWCC have indicated they are willing to enter into an agreement with the Applicant, pending the finalisation of the Community Benefit Policy

2.5. Cumulative impact consideration

Cumulative impacts associated with the Project have been given consideration in Section 7.3 of this report and assessed in alignment with the *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPE, 2022b). Cumulative impacts can be split into two broad groupings as below:

Strategic-level Cumulative Impact Assessment (CIA) - important beneficial cumulative impacts

- Alignment with federal and state regional renewable energy policies
- Alignment with regional and local land use plans
- Responds to the site's unique environmental and social context.
- Reduction of energy costs.

Project-level CIA – risks of exacerbating adverse impacts

Being located in a region with growing interest in renewables and storage projects, local cumulative impacts anticipated from several nearby utility scale renewable facilities include:

- Visual and landscape character impacts
- Noise impacts
- Traffic impacts
- Pressure on local facilities, goods and services.

This report considers that Strategic-level CIA outweighs the Project-level CIA, resulting in a highly supportable Project that aligns with strategic planning goals as outlined in this chapter (Section 0) without generating substantive negative cumulative impacts. All environmental and social impact factors are assessed in Section 0 and Section 7 with a targeted discussion and assessment of cumulative impacts covered in Section 7.3

2.6. Project benefits

In consideration of the alternatives examined above, the Mangoplah BESS Project:

- ✓ Builds on the aims of the NSW Electricity Infrastructure Roadmap to transition away from coalfired energy, towards greater levels of renewable energy.
- ✓ Stabilises and secures the supply of electricity for residents, business owners and service providers.
    - It is estimated that the Project would have the capacity to power approximately 112,000 households for a 4 hour period during a full discharge (assuming 21.255kWh/day usage) (AER, 2023).
- ✓ Assists to drive down the wholesale electricity prices for energy consumers.
- ✓ Generates local employment, economic stimulus and other local economic benefits
- ✓ Includes broader benefits to the community through a Community Benefit Fund (CBF) established via a proposed Voluntary Planning Agreement (VPA) to be developed in consultation with WWCC.
    - Supports local initiatives that enhance community well-being and sustainability
    - Fosters collaboration between Applicant, WWCC, and local community groups
    - Considers feedback and suggestions made by community and stakeholders during engagement undertaken as part of the EIS
- ✓ The Project has been developed iteratively, with a specialist energy development and environmental assessment team. It reflects the opportunities identified early in the Project to maximise the environmental sustainability of the Project. The Project assessed in this EIS is also one that responds appropriately to the site's context and community values.

2.6.1. Suitable technology to complement the cleaner energy transition

Utility battery storage is recognised by NSW Government policies (NSW Electricity Infrastructure Roadmap and Renewable Energy Zones) as an important part of NSW's transition away from coal fired energy, towards renewable energy. They have a proven ability to complement and support the network and to allow storage of renewable energy during periods of abundant generation/low energy demand and then for export into the grid during periods of high demand. Figure 2-8 provides a representation of this process where the morning and evening peak demand periods can be filled by energy storage system exports such as the Mangoplah BESS.

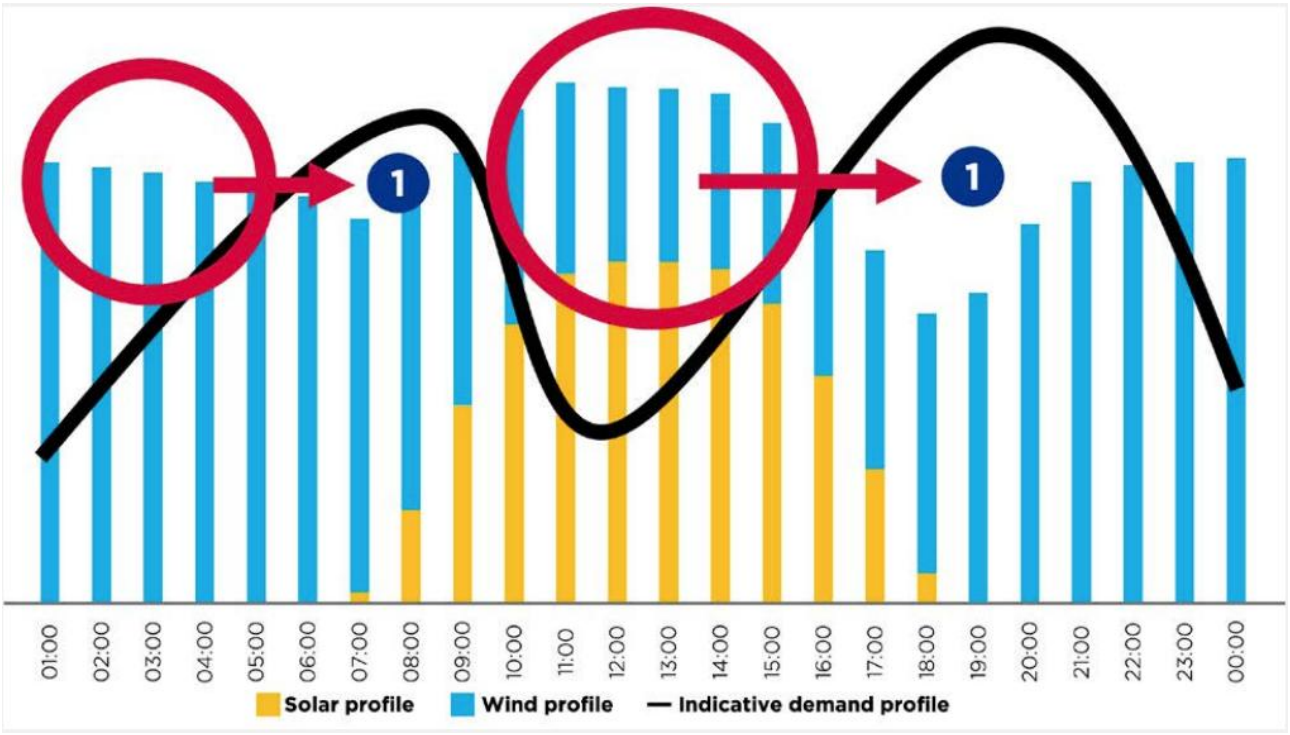


Figure 2-8 Hypothetical energy firming (DPIE, 2020)

In June 2025, the AEMO released their 2025 Electricity Statement of Opportunities (AEMO, 2025 Electricity Statement of Opportunties, 2025). The report following the closure of more coal-fired generation, more capacity will need to be procured to avert energy shortfalls that are forecast to become more prevalent. While there is substantial continued interest in battery storage to help maintain reliable supply, investment in storage alone will not suffice. Opportunities exist to maintain both reliability and system strength cost effectively through the energy transition by investing in technologies such as grid-forming batteries.

The Statement reports that if planned big battery storage projects are built and connected on time, then the reliability standards will likely not be breached in NSW with the closure of the Eraring Plant in two years' time.

2.6.2. Electricity reliability and security benefits

While most of Australia's electricity is currently provided by coal-fired power stations, as many as three-quarters of these plants are operating beyond their original design life (Department of Industry and Science, 2015). The reduction in energy supply from coal-fired power stations requires the development of reliable and sustainable energy supply.

Electricity consumption in Australia is exceptionally high, resulting in costly electricity bills and frequent disruptions to electricity supply during peak times. The renewable energy sector has responded to this high demand and to the need for viable alternative options for electricity generation contributing to 39.4% of Australia's overall electricity in 2023, a 9.7% increase from 2022 (Clean Energy Council, 2024). Large scale storage has seen a large increase in 2023 for new financial commitments, with total investment in large-scale storage standing at $4.9 billion by the end of 2023. The combined capacity of these storage projects totalled 2,949MW / 9,905MWh in 2023.

The 2024 Integrated System Plan stated that both residential and commercial batteries are becoming more numerous, with a forecasted growth in capacity from today's 1GW to an estimated 7GW in 2029-30, then

34GW in 2049-50 (AEMO, 2024) Grid scale batteries such as BESS', as well as pumped hydro and other hydro, gas-powered generation will aid in almost quadrupling the firming capacity for the NEM. This includes 49GW/646 gigawatt hours (GWh) of dispatchable storage, as well as 15GW of flexible gas. By 2030 NSW is aiming to have approximately 2GW/16GWh of dispatchable storage (AEMO, 2024)

The Project would benefit the electricity grid by balancing the network through the addition of energy storage. This stored energy would be utilised during periods of low renewable output into the energy grid. This is especially important during the states transition from centralised to decentralised power generation as coal fired plants are decommissioned. Greater utilisation of large-scale battery storage in conjunction with other dispatchable[1] energy resources may decrease peak wholesale prices. This is due to the ability of battery storage to buffer the energy market during tightened supply times when demand is high (Rangarajan, Foley, & Truck, 2023).

In 2020, almost 2GW of renewable energy made up of 32 projects were constructed and began generating electricity (Clean Energy Council, 2024). The equivalent number of households powered annually through all renewable energy generation sources totals 13,689,560 households. Projects such as the Mangoplah BESS would be important to maintain the functioning of the NSW energy system for the state's residents, business owners and service providers.

2.6.3. Employment and local economic benefits, including Project job creation

In 2024, around 32,000 Australians were employed in the renewable energy sector, with projections indicating up to 60,000 new jobs by 2030—primarily driven by upgrades to the electricity grid and battery storage systems (Clean Energy Council, 2024). This growth is expected to account for one-third of all job creation in Australia by 2030, with a high demand for skilled workers, especially electricians. The sector also emphasises inclusive workforce development, promoting training and education for women, First Nations peoples, and migrants.

The Mangoplah BESS project would contribute significantly to local employment, particularly during its 12-month construction phase, generating up to 60 full-time equivalent (FTE) jobs and up to 2 FTE operational roles. The influx of workers is expected to stimulate the local economy through increased demand for accommodation, food, fuel, and trade services. Local supply chains—including vehicle servicing, catering, cleaning, and equipment suppliers—would also benefit.

WWCC prioritises employment and economic development, as outlined in the Wagga Wagga Local Strategic Planning Statement 2040. It supports mechanisms like Voluntary Planning Agreements (VPAs) and Community Benefits Schemes (CBSs) to ensure long-term community gains from renewable energy projects. WWCC and industry stakeholders also advocate for educational partnerships with institutions such as the Charles Sturt University (CSU) and TAFE to build local capacity. However, the region faces challenges, including a shortage of accommodation for agricultural and construction workers, which must be addressed to fully realise these benefits.

The Project VPA is discussed in Section 2.4 above.

[1] Energy resources that can be accessed when needed. Definition is similar to firm generation used in the NSW Electricity strategy.

3. Project description

3.1. Project overview

The Project would include the following key built form features:

- BESS units including battery enclosures, inverters, transformers, switchgear and control room
- Onsite substation including transformer switch bays and switchgear housed in portable substation containers
- Overhead 132kV lines to connect to the existing 132kV transmission line
- Permanent office, operation and maintenance (O&M) buildings, hardstands and Project signage
- Site access to the BESS from Holbrook Road, internal site access tracks and parking
- Landscaping
- Stormwater management infrastructure, lighting, fencing and security.

The Project is forecast to utilise Tesla Megapack LFP batteries with the storage capacity of 100MW / 400MWh connecting into the Transgrid transmission network. Table 3-1 provides an overview of the Project including basic site details, its key components, Project timing and site context. The Development Footprint and indicative infrastructure layout is shown in Figure 3-1.

Table 3-1 Summary of key features of the Mangoplah BESS

Feature	Description
Project Site details and land tenure	
Street address	4178 Holbrook Road, Mangoplah NSW 2652
Involved Lands	Lot 222, 225 and 228 DP754557
Local Government Area (LGA) Zoning	Wagga Wagga
Catchment	Riverina Murray
Subdivisions and easements	• Part of Lot 222 DP754557 would be leased from operation of the Project. • Subdivision may be required subject to utility provider requirements for the onsite substation
Infrastructure components	
Battery Energy Storage System (BESS)	• 100MW/400MWh • 108 Tesla Megapack 2XL • 27 4.6 MVA step-up transformers

Feature	Description
	• 5 ring main units
Substation and switch yard	• 1 HV transformer • 33kV switch room • Auxiliary low-voltage transformer • 33/132kV Transformer
Transmission line connections	Direction connection into the 132kV overhead line. The establishment of new transmission structures would be required to facilitate the cut-in (refer Section 1.6).
Site access and intersection upgrades	Access and upgrade from existing site access off Holbrook Road
Temporary works areas: Construction compound, and construction parking/laydown areas	• Construction compound • Construction laydown area • Storage • Bunding • Drainage • Carpark
Water access	Riverina Water County Council managed standpipe
Permanent ancillary infrastructure	• Security fencing • Water tank • Pumpable sewage holding tank • Control room • Diesel generator • Onsite car parking • Internal access tracks • Landscaping
Development footprint (all areas that may be disturbed by the Project)	13.8ha
Timing	
Phases	Site establishment, construction, operation, and decommissioning. With the construction occurring over approximately 12 months (including site establishment) with no additional detailed staging breakdown.

Feature	Description
Construction timing and hours	Construction hours will be limited to: • 7am to 6pm Monday to Friday • 8am to 1pm Saturday • No work on Sunday or public holidays. The delivery of materials requiring an escort and/or emergency works may occur outside of the above construction hours.
Operational life and hours	24hr/day Expected operation for 35 – 40 years
Decommissioning and rehabilitation	When that lifespan is reached (see above), an upgrade of the BESS could be undertaken with a more current technology. If there is any inconsistency with the DA Approval, the operator will lodge a new DA. If the site is not repowered at the end of its useful life, then it would be decommissioned.
Site context	
Existing land use	Agriculture (cropping) and transmission
Receivers	7 non-associated receivers within 2km of the Development Footprint
Employment	Construction: Up to 60 Operation: 2 full-time equivalent
Estimated development cost (EDC)	~$165 million

LEGEND

- Involved Lands
- Project Site
- Development Footprint

Indicative Layout

- Batteries
- Internal Roads
- Substation
- Switchroom and O&M
- Construction Laydown / Compound
- Proposed Visual Screening
- Security fence
- Internal gates
- 132kV Transmission Line

Lot 222
DP754557

Ref: 2400552 Mangoplah BESS Scoping Report Planning 20240919 \ Indicative Infrastructure Layout (EIS) Author: Llarna Miller Date created: 06.11.2025 © NGH 2025 © ESRI 2022

Datum: GDA2020 / MGA Zone 55

NGH

0 50 100 m

Mangoplah BESS

Figure 3-1 Development Footprint and indicative infrastructure layout

3.2. Permanent infrastructure

3.2.1. Layout and specification of components

An indicative Infrastructure Layout is provided in Figure 3-1. The final design would be subject to commercial tendering and procurement processes that would ensure the Project is optimised in terms of constructability and efficiency, within the parameters of the approval. Submission of the final detailed design to DPHI *prior to construction* is a standard feature of approved State Significant Development consent conditions. This provides the final check that the detailed design is consistent with the EIS's assumptions.

It is noted that battery technology is developing rapidly. As the final specifications and location of infrastructure are subject to change during detailed design, where required in this section, upper limit quantities and power level estimates are provided below to ensure the assessment and any subsequent approval maintains the flexibility required in the detailed design stage, post approval. Capacity may also be affected by these changes.

While an indicative Infrastructure Layout provides a clearer understanding of what would be constructed, the delineation of a broader Development Footprint at this stage provides the assessment and approval some resilience to minor layout changes in the final design. Together this 'upper limit' or 'worst case' approach ensures that all impacts of construction, as well as operation and decommissioning are captured in the environmental assessment section of this EIS and that any recommendations and mitigation.

This approach will over-estimate impacts and over-scope mitigation strategies and is therefore considered conservative. With this conservative consented Development Footprint, the entire Development Footprint could be utilised. This allows flexibility in design for infrastructure, and to keep construction costs/methods and timing low. This approach helps the Project to include important details from affected-stakeholder input to form its environmental plans and final design. These commitments would help guide strategies to reduce the required Development Footprint with the final detailed design.

This approach is consistent with the *State Significant Development Guidelines – preparing an environmental impact statement* (DPHI, 2022) which states:

> ***… with some large, complex projects this flexibility is often essential as it is difficult, if not impossible, to deal with all aspects of the design of these projects at the EIS stage.***

The key features of the Project are summarised in Section 3.1 and detailed below.

3.2.2. Battery and inverters

The BESS component of the Project would consist of multiple modular segment units arranged in rows, consisting of:

- 108 Tesla Megapack 2XL units measuring approximately 8.8m x 1.7m x 2.8m. Each Megapack unit could house approximately 24 battery modules (see Figure 3-2)
- 27 Generator Step-Up transformer
- Each unit contains integrated Inverter Modules (also known as Power Conversion Systems (PCS)). Each PCS is a Bi-directional power conversion system that couples each Megapack with the power grid (AC power)
- Thermal system which provides active cooling and heating to the Megapack components

- System controller
- 5 33kV ring main units (RMUs)

Each battery module is made up of prismatic LFP battery cells. Battery modules are connected in parallel to Megapack's internal AC bus (which converts the DC energy into AC energy), each with an AC power and communications output connection. An example of a battery module and inverter configuration is shown in Figure 3-3.

Figure 3-2 Indicative Tesla Megapack BESS layout (Source: Tesla.com)

Figure 3-3 Battery module and inverter example (Source: Tesla.com)

3.2.3. Transmission lines and connections

Connecting to overhead transmission line

The Project would connect to the existing overhead 132kV transmission line that transects the Project Site via the proposed onsite substation. The transmission line runs north to the Wagga 330kV substation and south to Australian Newsprint 132kV substation.

The establishment of new transmission structures would be required to facilitate the cut-in. The EIS has been designed for flexibility to accommodate any future detailed design requirements from Transgrid.

Underground cabling

Underground cabling on the site would be designed in accordance with relevant Australian and International Standards. Underground cabling would be required for, but not limited to:

- Connection of battery units to each PCS via AC cabling
- Connection of PCSs to the switchroom
- Provision of auxiliary power, data services, and communication facilities.

A 33kV reticulation system will link the transformers to the BESS substation via the switchroom. The switchroom would collect all the individual medium-voltage cables in one location before connection to the high-voltage (132kV) transformer (see Figure 3-4). This system will be installed in accordance with relevant Australian and International Standards.

Copper conductors would be used wherever necessary to electrically bond the metal structures to earth to protect personnel and equipment in the event of lightning strikes and electrical faults.

3.2.4. Substation and switchroom

The substation is generally comprised of a high voltage switchyard, one or more large transformers, auxiliary services equipment, any required power quality components (e.g. harmonic filters, capacitors, etc).

The substation would be built on a specialized hardstand area called a bench; this is surrounded by security fencing as required by the relevant electrical safety regulations. One 132kV transformer would be installed on a large concrete bund. This bund is designed to retain the contents of the transformer and cooling system (insulating oil) in the event of failure. An oil water separator is likely to be installed in the bund as an environmental protection measure and would be subject to regular inspection and maintenance.

The substation would comprise of:

- 1 high voltage switch bay (132/33kV transformer)
- Switch room and control room
- Diesel generator.

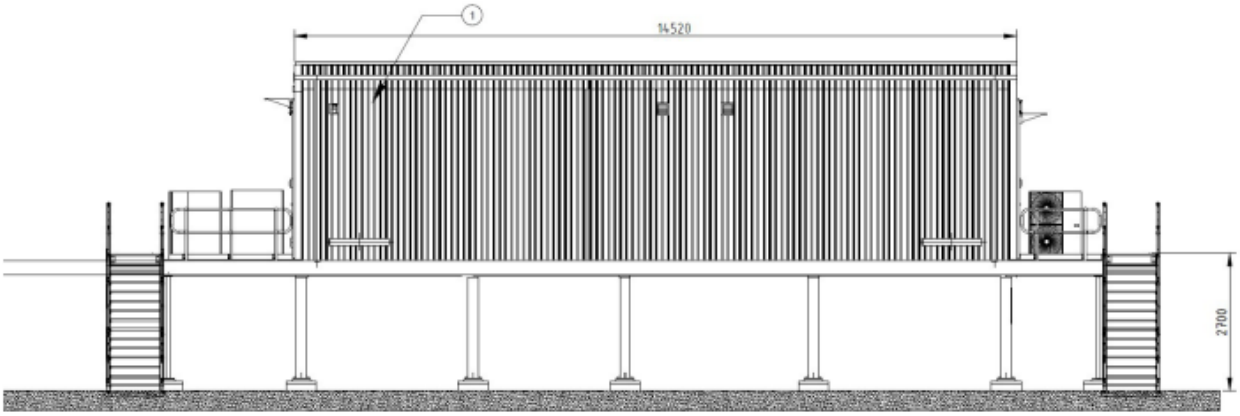


Figure 3-4 Example of switch room infrastructure

3.2.5. Operation and maintenance buildings

The Operation and Maintenance (O&M) facility is proposed in the southwestern section of the Development Footprint. The facility would house the service team providing them with office facilities and amenities. These include parking areas (for site team, contractors, and visitors), stores warehouse, and workshop building/shed, waste skips, and trailer parking area. The O&M facility would require power and water supply as well as communications. There would likely be one primary O&M facility, where the site service team would be based during the operational life of the Project. Water tanks would store some rainfall captured from the facility roofs for non-potable use. Potable water would be delivered to site. Amenities on site would need to be managed through an on-site sewerage system (e.g. septic, composting or other appropriate system). The system would be designed by an appropriate service provider and installed in accordance with local requirements. Electricity on site would be supplied from the local electricity network (Transgrid). An example of the O&M buildings design is shown in Figure 3-5.

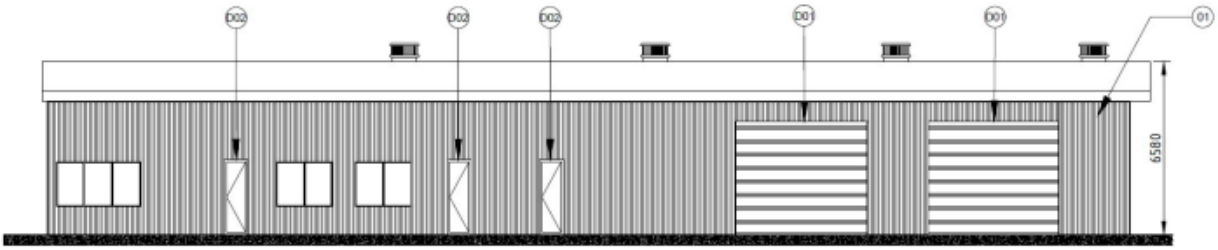


Figure 3-5 Example of the operations and maintenance facility

3.2.6. Landscaping

Landscaping, while not required to achieve low visual impacts for receivers, would be included along the western side of the Project. This would further reduce and soften views to the BESS infrastructure and is responsive to community concerns about the changing visual amenity of the area. The landscaping would include native vegetation endemic to the local area, in keeping with the existing landscape features.

The proposed landscaping will have a 3m buffer from the security fence. The planting would be a minimum of 5m in width and contain a combination of trees and shrubs. With a density of 1 shrub every 5 square meters and 1 tree every 40 square meters.

The vegetation screening would be comprised of native vegetation species and is designed to soften not block the views of the development.

An artists impression is provided below in Figure 3-6.

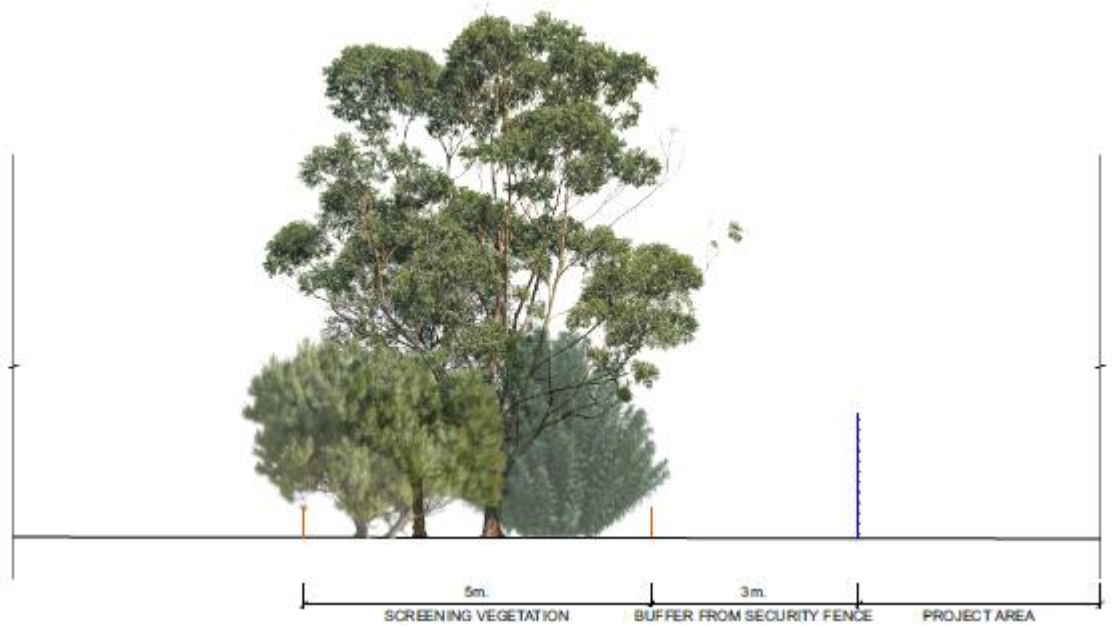


Figure 3-6 Artist impression of the proposed vegetative screening

3.2.7. Security measures

Fencing

The onsite substation area would be enclosed by a security fence in accordance with applicable Australian Standards. This is expected to be a steel security fence approximately 3m high chain link fence topped with three rows of barbed wire. Access would be via security access gates.

The BESS facility itself would also be enclosed by a security fence in accordance with applicable Australian Standards.

CCTV

The CCTV cameras would be mounted on up to 3m poles complete with sensors or infrared security lighting, which would be installed at the access road/gate, the control room and transformer/switchyard. A security company would be contracted for monitoring outside of business hours.

Lighting

It is anticipated that there would be no permanent night lighting within the BESS area. This would be confirmed during detailed design. If any permanent lighting is required, it would be limited to low illuminance security lighting. Lighting would be included in each inverter for night-time maintenance or emergency purposes only. Motion sensor or infrared security lighting would be installed at sensitive boundary locations and around the substation, battery storage facility, O&M facilities, and office areas.

All external operational lighting would be designed to reduce disturbance to neighbouring properties, as such it would be low intensity lighting (except where required for safety or emergency purposes) and would not shine above the horizontal. The external operational lighting would be used only when there are staff on site, as part of night works (where required), site security or during emergency situations including through remote operation to allow improved camera visibility.

External lighting would be installed to comply with relevant standards.

3.2.8. Site access, tracks and vehicle movements

The Project Site would be accessed from the southwest via a private access road off Holbrook Road. The private access road is largely suitable as it is being used for agricultural purposes, and would be kept as a one-way road, with implemented traffic controls to avoid and minimise clearing along the access road. Potential impacts on biodiversity are detailed in Section 6.1of this EIS.

Four culverts are present along the private access road (refer to Figure 3-7below) which have been installed by the landholder to manage water flow during wet periods. An initial assessment indicates that most culverts are in good condition; however, culverts 1 and 3 (counted 1 to 4 from Holbrook Road towards the east) appear to have flow directions opposite to natural drainage patterns. Existing culverts will require widening, along with minor grade adjustments.

A small network of tracks would be included inside the perimeter fence line of the BESS (~8m width to switchroom and substation, otherwise ~6m width). These tracks would be approximately 8m in width around the access gate and O&M buildings and approximately 6m around the HV switchyard and BESS infrastructure. The internal roads would be composed of gravel or other suitable all-weather substrate.

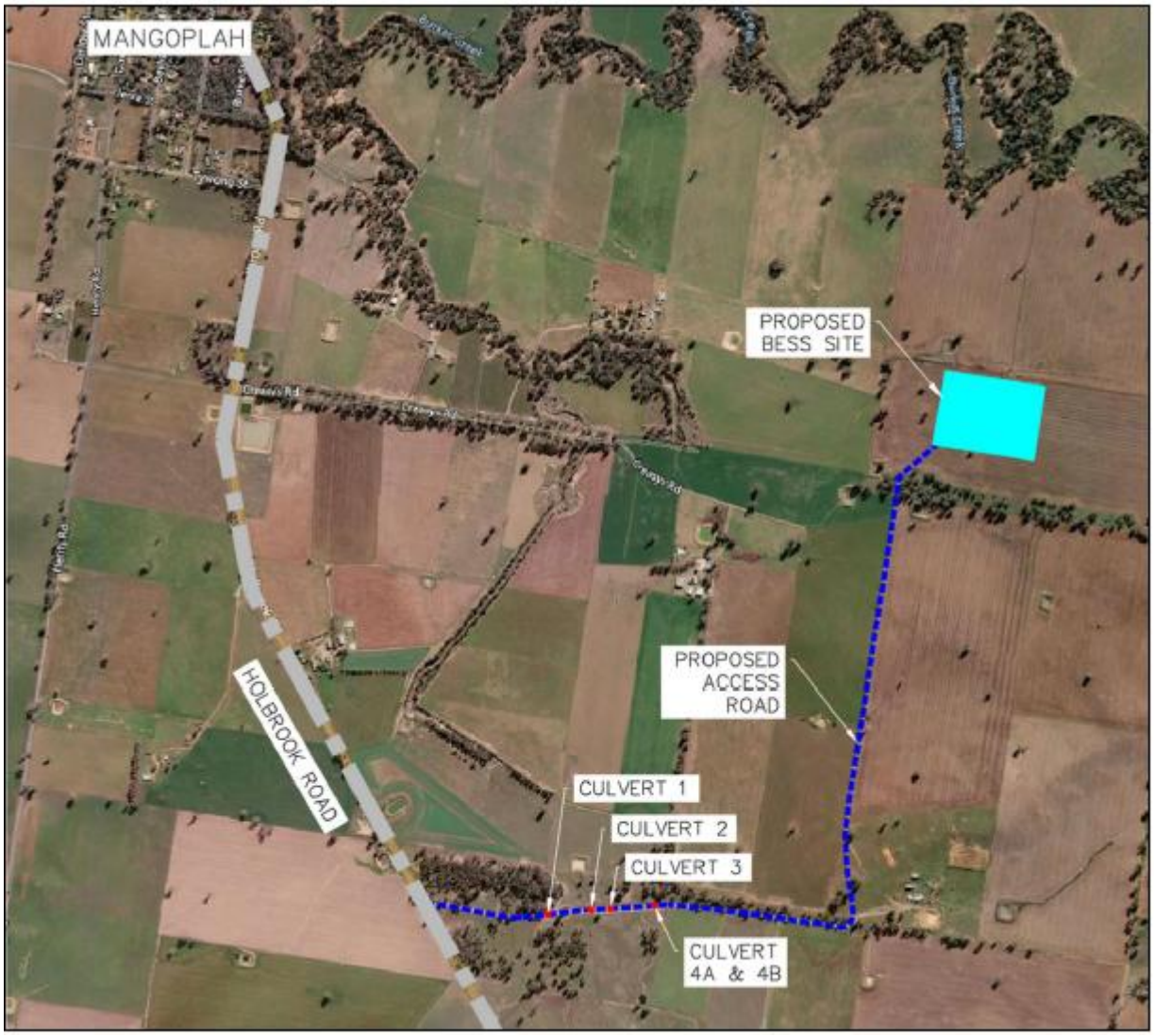


Figure 3-7 Culvert locations along access track (Source: Fyfe, 2025)

Haulage route

All specialist plant and BESS components are expected to be delivered to Port of Melbourne and/or Port of Geelong, Victoria and then transported along approved transport routes. The Port of Melbourne and the Port of Geelong haulage routes have both been assessed (included in Section 6.3 and Appendix F.3).

Vehicle movements

Vehicle movements are most relevant to the construction period, as during the operational period traffic numbers would be significantly reduced to the Project Site operations and service team and associated subcontractors on a periodic basis.

During construction, vehicles would range from light cars to heavy vehicles and Over Size Over Mass (OSOM) vehicles. An assessment of vehicle movements is included in Section 6.3 and Appendix F.3. Table 3-2 provides a high-level breakdown of main vehicle movements during the construction period, as well as a concept design for access intersection upgrade.

Table 3-2 Vehicle movements during construction

Vehicle type		Average construction periods		Peak construction period	
		Vehicle Trips per Day (vpd)	Peak Hour Trips (vph)	Vehicle Trips per Day (vpd)	Peak Hour Trips (vph)
Light Vehicles (LV)		40	20	120	60
	Rigid Trucks	12	1	12	1
	Truck and Dog	16	1	24	2
	Semitrailers	4	0	8	1
	B-Doubles	4	0	8	0
	SPV	4	0	4	0
	Non-High Risk OSOM	4	0	8	0
	HV Subtotal	44	2	64	4
Total		**84**	**22**	**184**	**64**

3.3. Temporary facilities

Temporary facilities required during the construction phase only, would include:

- Material laydown areas
- Temporary construction site offices
- Temporary parking for construction worker transportation. When the construction work is completed, a small car park would be retained for maintenance staff and occasional visitors
- Water supply for construction
- Temporary staff amenities.

Laydown requirements are limited, as most bulk equipment deliveries would be unloaded into place rather than into designated laydown areas. Some small laydowns would be required for cable drums and other auxiliary equipment, to be wholly contained within the Development Footprint (refer to Figure 3-1). The temporary laydown and compound areas would not be required post-construction and would be rehabilitated at the conclusion of the construction phase.

The staff amenities would be designed to cater for the peak number construction staff expected to be onsite and would include:

- Sanitary modules with water flush systems connected to holding tanks
- Water tanks
- Changing rooms

- Lunchrooms
- Administrative offices
- Covered walkways
- Emergency muster point
- Generator – if required
- Electrical, data and water reticulation.

3.4. Resource requirements

3.4.1. Material requirements

With the exception to the battery units, PCS, transformers, and prefabricated buildings, most general construction materials would come from the local region. The main construction materials would include:

- Aggregates, road base and concrete
- Fencing materials
- Cables, conduits, junction boxes
- Timber and fixtures for building fit-out
- Water for dust suppression, vehicle washdown and drinking (discussed in Section 3.4.3

Table 3-3 provides a general estimate of materials volumes for the Project. Some will be subject to further geotechnical investigation and detailed design.

Table 3-3 Estimated materials volume

Material	Quantity
Aggregates / engineered fill	To be determined during detailed design following geotechnical investigations and civil design.
Steel security fencing materials	Approximately 1260m
Concrete foundations	To be determined during detailed design following geotechnical investigations and civil design.
Power cabling, and conduit	Approximately 1669m of 33kV rated cabling for internal BESS reticulation (between step up transformers, ring main units and high voltage switch room) Excluding other cables such as earthing, communication/data cable, auxiliary cable, etc.
Timber and fixtures for building fit-out.	To be confirmed following detailed design.

3.4.2. Earthworks

Earthworks are expected to be minimal given the relatively flat nature of the site; extensive cut and fill batters are unlikely to be required. Earthworks would centre on the following activities:

- Form a suitable substrate for the installation of the BESS, access roads and buildings
- Install 33kV reticulation cables in trenches (expected up to 1.2m deep)
- Undertake piling to support BESS infrastructure (dependent on geological conditions)
- Establish construction laydown areas, temporary staff amenities and security fencing.

These earthworks would require removal of vegetation cover and would create soil disturbance. Accurate topographic and cadastre surveys would be undertaken as detailed design commences. This would provide information to assist to balance the cut and fill quantities as much as possible.

Ground cover would be maintained where possible during the pre-construction and construction stages of the Project and would be rehabilitated as soon as practical; after construction, for areas not required during the operational use of the Project, and upon decommissioning for the residual project footprint (refer to Section 3.5.1 below for additional detail).

3.4.3. Water demand and supply

Potable water source would be required for workforce consumption (drinking water), fire suppression water and concreting, while non-potable water requirements will be primarily for the construction phase for dust suppression. During construction, dust suppression is assumed to occur on days with no rain (75 days/year on average) (BOM, 2025). Active disturbed areas will be minimised through construction staging and erosion and sediment control planning, including consideration of chemical suppressants and establishment of groundcover to reduce dust generation and associated water demands.

Two 50kL fire water tank would also be located onsite, which would be filled by water tankers and retained for emergency use only during construction. The size of these tanks would be confirmed in consultation with key emergency service authorities and regulators. During operations, water levels will also be maintained by water tankers trucks.

A summary of the water requirements is detailed below in Table 3-4.

Table 3-4 Estimated water requirements

Stage	Demands	Source	Estimate
Construction	• Workforce consumption and amenities - 600L per day (based on 10l/person/day) • Filling of fire tanks – 2 x 50,000L • Construction activities such as: ○ Dust suppression; 10,000l per day (non-wet days)	Potable water from the Council's water supply via commercial agreement or private purchase. Non-potable water from Riverina Water County Council and / or captured rainwater onsite (i.e. roof water)	10,000L per day (during peak) Total estimate: 3ML

Stage	Demands	Source	Estimate
	○ Concreting/compacting/other; 45,000l (based on 500l per day for 3 months) ○ Landscaping establishment; 60,000L (based on weekly water cart visit for 3 month, 5000l per visit)	Reused of captured stormwater in accordance with blue book / ESCP.	
Operation	• Workforce consumption and amenities • Fire suppression • Maintenance activities (landscaping, cleaning, dust suppression)	Potable water from the Council's water supply via commercial agreement or private purchase. Non-potable water from Riverina Water County Council and / or captured rainwater onsite (i.e. roof water)	50-500L per day

Riverina Water County Council (RWCC) have confirmed that the Project's access to water is assured.

3.4.4. Labour, machinery and equipment

It is anticipated that up to 60 construction staff comprising of supervisors, tradespeople and labourers would be engaged to complete the work during the peak construction phase. Every effort would be made to hire staff locally (refer to Section 1.2 for Project objectives). Staff would be accommodated in Wagga Wagga or nearby surrounding areas.

Plant to be used during construction would include:

- Crane
- Drum roller
- Padfoot roller
- Wheeled loader
- Dump truck
- 30t excavator
- Grader
- Chain trencher
- Water truck
- Telehandler
- Forklift

3.5. Phases and timing of the Project

3.5.1. Phases

Staging of the Project is not proposed at this stage.

The Project delivery post approval can be separated into four key phases: Site establishment, construction, operation and decommissioning, see Table 3-5 below.

Table 3-5 Indicative timeline

Phase	Approximate commencement	Approximate duration
Project Approval	October/November 2025	N/A
Site-establishment	2027	Approx. 4 months
Construction	2027	Approx. 12 months
Operation	2028/29	Approx. 35 – 40 years
Decommissioning	TBC	TBC

3.5.2. Site-establishment

The Project may include physical works ahead of the main construction phase including site access and track upgrades, installation of fencing, artefact salvage, geotechnical drilling and/or surveying and preparation of construction compounds and site facilities.

Where permitted by the approval, certain early works may proceed subject to any further or secondary approvals.

3.5.3. Construction

During the construction phase of the BESS, work would be undertaken during the following hours:

- Monday – Friday: 7am – 6pm
- Saturday: 8am – 1pm.
- No work on Sunday or public holidays

Certain light construction and assembly activities would be completed outside of standard construction hours, subject to these activities having no amenity impacts on surrounding residences. These activities potentially include:

- Delivery of plant and equipment for safety reasons (e.g. OSOM vehicles)
- Commissioning and testing activities that must align with demands on the grid
- Emergency work to avoid damage to persons or property and/or to prevent environmental harm

- Construction works where it can be demonstrated and justified that these works are required to be undertaken outside of standard construction hours.

Example activities include cable termination, system assembly and testing, script testing (on computer), Supervisory Control and Data Acquisition (SCADA) testing. The performance of the BESS would be monitored through this SCADA system that would report to staff both on and offsite. The system would be capable of notifying staff of system issues and failures.

Any construction outside of these standard construction hours, if required, would be minimised and would only be undertaken with prior approval from relevant authorities.

Construction activities would be carried out over an estimated 12-month period and include the following works:

- Installation of environmental controls, earthworks and any drainage requirements, construction of concrete hardstands, and civil works. Summarised as follows:
    - Earth works (cut and fill, grading and compacting)
    - Establishment of external access road
    - Removal of existing fences
    - Cleaning and levelling the ground for buildings and structures
    - Excavating cable trenches.
- Delivery of BESS infrastructure
- Installation of BESS infrastructure (containerised units, transformer, ring main units, switch room, control room and O&M) and electrical works
- BESS testing works
- Rehabilitation of temporary construction areas upon completion of construction phase to reduce land use conflict impacts and aid in ongoing weed management.

During construction, the Project is anticipated to contribute to the employment of up to 60 personnel.

3.5.4. Operation

The battery storage facility has been designed to operate for an anticipated 35 – 40 years. At the end of operational life, this may be extended subject to the replacement and/or refurbishment of components and market conditions.

Batteries modules themselves may require replacement after around 15 – 20 years. It is expected that a replacement of the batteries would occur around 20 years from commercial operation date with the current envisaged operation of the Project.

Regular repairs of the equipment caused by wear and tear will occur progressively over time. However, given the battery degradation and in an anticipated time around 20 years, it is expected that major battery replacement would occur all at once, since the technology available in 20 years from today is unknown.

Replacement of battery containers would be loaded onto trucks and transported to an appropriate licenced recycling location, in consultation with Wagga Wagga City Council (refer to Section 7.2).

The Project would be operational 24 hours, seven days a week. The Project would generally be managed and monitored remotely apart from periodic site maintenance and optimisation which would require maintenance staff to access the site.

During operation, activities on-site would generally comprise:

- Storage of electricity and provision to the broader electricity grid as required to meet the strategic objectives of the Project
- Routine inspections
- Repair and maintenance of the Project ancillary infrastructure including fencing, roads, water infrastructure and environmental controls.
- Management of vegetation and pests
- Repair and maintenance of Project infrastructure such as battery enclosures, inverters, transformers and cables (including replacement of BESS components)
- Ongoing security monitoring.

It is estimated that two full-time staff would be employed onsite during operation, with an additional influx of staff required for refurbishment works. The BESS would primarily be operated remotely, which would require further remote full-time staff. Additional contractors local to the region would also be required for ongoing jobs, such as weed and pest control.

Any planned noise producing work would be undertaken during the standard working hours of:

- Monday – Friday: 7am – 6pm
- Saturday: 8am – 1pm

Work would only be undertaken outside of these hours in an emergency and would be kept to a minimum.

3.5.5. Decommissioning and rehabilitation

At the end of the operational lifespan of the Project, either a request for an extension of the current DA can be submitted or a new DA lodged with a more current technology.

If the site is not repowered at the end of its useful life, then it would be decommissioned. The decommissioning phase would involve removal of all above ground infrastructure (including concrete slabs, footings and internal access tracks) and below ground infrastructure where possible and return of the site to a safe, stable and non-polluting state.

Discussions with the current landholder regarding decisions on commencement of decommissioning and rehabilitation would be undertaken. Discussions may involve what project assets (i.e., internal access tracks) may be retained upon request.

3.6. Proposed subdivision and land acquisition

Subdivision may be proposed for the Project substation if required by the utility operator (TransGrid). If this is required, it would be completed in accordance with the *Real Property Act* 1990.

The balance of the BESS Development Footprint would be leased for the life of the Project from the host landholder; registered on the lot as a long-term lease under the *Real Property Act* 1900.

3.7. Estimated Development Cost

The Estimated Development Cost (EDC) of the Project is approximately $165 million. An EDC report has been provided with the EIS which includes the cost of all mitigation measures required to manage the Project's impacts.

3.8. Flexibility in development

As detailed within the State Significant Development Guidelines Appendix B – preparing and environmental impact statement (DPHI, 2022):

'The Department accepts that in some circumstances applicants may need to build some flexibility into the project description to allow the design of certain components of the project to be refined or changed over time within clear limits set by the project description, and without requiring amendments to the development application or modifications to the development consent of the project if it is approved.'

The final design would be subject to commercial tendering and procurement processes that would ensure the Project is optimised in terms of constructability and efficiency, within the parameters of the approval. This would include confirmation of the Original Equipment Manufacturer (OEM).

It is noted that battery technology is developing rapidly. The final number, specifications and location of infrastructure will likely be subject to change during detailed design.

4. Statutory context

4.1. Power to grant approval

Approval of the Project is sought under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

The NSW State Environmental Planning Policy (Planning Systems) 2021 (SEPP Planning Systems) dictates the planning pathway for the Project. Section 20 of Schedule 1 of the SEPP Planning Systems states that the following is considered a State Significant Development (SSD):

Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that:

> *(a) has an estimated development cost of more than $30 million, or*
>
> *(b) has estimated development cost of more than $10 million and is located in an environmentally sensitive area of State significance.*

Electricity generating works are defined in the Standard Instrument – Principal Local Environment Plan (2006) as:

A building or place used for the purpose of:

> *(a) Making or generating electricity, or*
>
> ***(b) Electricity storage***

The Project would have an estimated development cost estimate of more than $30 million ($165 million). Therefore, the Project is classified as "SSD" under division 4.7 of the EP&A Act.

The Minister for Planning and Public Spaces is the consent authority for SSD, and SSD applications are assessed by DPHI (unless specific conditions occur e.g., where 50 or more people have objected to the application, the local council has objected to the application; and/or the Applicant has disclosed a reportable political donation, whereby the Independent Planning Commission (IPC) would be the consent authority).

4.2. Permissibility

The Project Site is located within land zoned (Primary Production RU1) under the Wagga Wagga LEP. Electricity generating works are permissible with consent under this zone within the LEP, having not being listed as permitted or prohibited.

Section 2.36(1)(b) of the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) states development for the purpose of electricity generating works may be carried out by any person with consent on any land in a non-prescribed residential zone. The land is zoned RU1 and under Section 2.35 of the TISEPP, a non-prescribed residential zone.

4.3. Pre-condition to exercising the power to grant approval

Table 4-1 Pre-conditions to exercising power to grant approval

Statutory reference	Pre-condition	Relevance	Section in EIS
State Environmental Planning Policy (Transport and Infrastructure) 2021	In accordance with Section 2.119 The consent authority must not grant consent unless it is satisfied of certain matters relating to vehicular access to the classified road, impacts on the safety, efficiency and operation of the classified road and sensitivity of development fronting the classified road.	The Project's primary access is via Holbrook Road. The Project is considered to be consistent with Section 2.119 as it would not compromise operation of Holbrook Road as assessed in the EIS.	Section 6.3 and Appendix F.3.
	Section 2.122 of the Transport and Infrastructure SEPP requires 'traffic generating development' to be referred to TfNSW.	The Project would result in the generation of additional vehicles on the transport network. As such traffic impacts assessment has been completed. TfNSW have been consulted throughout the development of the Traffic Impact Assessment and will be able to provide a submission during the EIS submission phase.	Section 6.3 and Appendix F.3

4.4. Mandatory matters for considerations

Table 4-2 Summary of mandatory matters for consideration

Statutory reference	Mandatory consideration	Section in EIS, where relevant
Consideration under the EP&A Act and EP&A Regulation		
Section 1.3	Relevant objects of the Act • 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	Section 0 and ESD evaluation in Section 8.6.

Statutory reference	Mandatory consideration	Section in EIS, where relevant
	• To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment • To promote the orderly and economic use and development of land • To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	
Section 4.15	Relevant environmental planning instruments • State Environmental Planning Policy (Transport and Infrastructure) 2021 • State Environmental Planning Policy (Planning Systems) 2021 • State Environmental Planning Policy (Resilience and Hazards) 2021 • State Environmental Planning Policy (Biodiversity and Conservation) 2021 • State Environmental Planning Policy (Primary Production and Rural Development) 2021 • Wagga Wagga LEP 2010 Relevant planning agreement or draft planning agreement • In principal agreement to focus the Voluntary Planning Agreement on community and development outlined with the Wagga Wagga Strategic and Operational Plans. • EP&A Regulation 2021 • Biodiversity Conservation Regulation 2017 Likely impacts of the development (environmental, social and economic) Suitability of the site for development Submissions made in accordance with the Act or regulations Public interest	This table. Section 0 Biodiversity Conservation Regulation 2017 addressed in Appendix B Section 0

Statutory reference	Mandatory consideration	Section in EIS, where relevant
Mandatory relevant consideration under EPIs		
SEPP Resilience and Hazards – section 3.7	Consideration must be given to current circulars or guidelines published by DPHI as follows: • Hazard Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use and Safety Planning, • Hazard Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis, and • Multi-Level Risk Assessment. • A Preliminary Site Investigation has been undertaken in accordance with the NEPM due to previous agricultural cropping activities.	Section 6.4 and Appendix F.4
Considerations under other legislation		
BC Act – section 7.14	The likely impact of the proposed development on biodiversity values as assessed in the biodiversity development assessment report. The Minister for Planning may (but is not required to) further consider under that Act the likely impact of the proposed development on biodiversity values.	Section 6.1
Native Title Act 1993	There are no areas within the Project Site registered or under assessment under the *Native Title Act 1993*.	N/A

4.5. Approvals and licences

Table 4-3 Summary of licences and approvals required for the Project

Legal instrument	Approving authority	Approval or licence
***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW)	An EPBC Act referral was prepared for the Project (Application number 02946) to determine potential impacts on Commonwealth-listed Matters of National Environmental Significance. The EPBC Act referral decision (EPBC 2025/10220) determined the proposal is not a controlled action and no further assessment is required.

Legal instrument	Approving authority	Approval or licence
***Environmental Planning and Assessment Act 1979* (NSW) (Part 4)**	DPHI	State significant development applications require approval from the Minister for Planning or the Independent Planning Commission. This EIS has been prepared in accordance with the requirements of the Secretary of the DPHI.
***Roads Act 1993* (NSW) (Section 138)**	TfNSW	Any works to public or classified roads require consent under this Act from the road's authority. TfNSW are the road authority for the Hume Highway. Landowners consent for lodging a DA is required by the relevant Council in which the portion of Holbrook Road is within under Sections 7 and 145 of the Act.
Real Property Act 1900	Wagga Wagga City Council	Any subdivision would require a subdivision certificate under Division 6.4 of the EP&A Act. A lease of a site will be treated as a lease of premises. As the registered survey plan defines 'premises' (being BESS) it will not constitute a 'current plan' within the meaning of section 7A *Conveyancing Act 1919,* and therefore will not require subdivision consent as this is one of the exemptions under section 23G *Conveyancing Act 1919*. Any subdivision would be undertaken under the provisions of the *Real Property Act 1900.*

Table 4-4 Licences and approvals not required for the Project

Legal instrument	Approving authority	Approval or licence
Fisheries Management Act 1994 (FM Act), ***Heritage Act 1977*,** ***National Parks and Wildlife Act 1974 (NPW Act)*,**	N/A	Section 4.41 of the EP&A Act excludes the following approvals when the Project is an SSD. • A Fisheries permit under the Section 201 and 219 of the *Fisheries Management Act 1994* • An excavation permit for details heritage surveys under Section 139 of the *Heritage Act 1977* • An Aboriginal heritage impact permit under Section 90

Legal instrument	Approving authority	Approval or licence
Rural Fires Act 1997, ***Water Management Act 2000 (WM Act).***		of the *National Parks and Wildlife Act 1974*.[2] • The Project would not require a bushfire safety authority under Section 100B of the *Rural Fires Act 1997* • A water use approval (Section 89), a water management work approval (Section 90) and an activity approval (Section 91) under the *Water Management Act 2000* would not be required.

[2] Note that the Project has comprehensively assessed impacts to Aboriginal heritage as part of an Aboriginal Cultural Heritage Assessment (ACHA) during the EIS.

5. Engagement

Engagement with non-associated receivers and the broader Mangoplah township is crucial for developing a Project that aligns with its social and environmental context, especially when there is community opposition. Large-scale BESS projects have unique benefits with respect to addressing climate change and delivering energy security. These projects also bring a concentration of both direct and indirect benefits to their host region through community benefit schemes (CBS) along with economic stimulus and employment. However, the Project must also demonstrate an understanding local issues and build in strategies to reflect these.

Strong community engagement creates mutual benefits, and when undertaken and utilised successfully can:

- Improve the Project and further reduce impacts on the community
- Spread the benefits throughout the community, and
- Build long-term relationships and trust with the community.

5.1. Community/stakeholder engagement and consultation

This section summarises the detailed consultation activities undertaken to achieve the above-outlined goals, considering non-associated receivers, local community members, First Nations community, and government agency stakeholders. It identifies:

- Issues and views raised by stakeholders
- Opportunities to influence the Project
- Plans for future engagement.

5.1.1. Overview of engagement approach

The EIS engagement phase involved a strategic and multi-channel approach designed to raise awareness, address key concerns, and foster two-way dialogue between the Project team and the community.

Building on insights from the Scoping phase, the Applicant developed and distributed a diverse suite of engagement tools to ensure that stakeholders, particularly non-associated receivers and directly affected neighbours, had opportunities to be heard, informed, and involved. This included the development of targeted materials such as a fact sheet, detailed frequently asked questions, and tailored newsletters to respond directly to emerging community questions and misconceptions as they arose.

In direct response to discussions during Scoping, the Project team also actively sought feedback from non-associated receivers and other interested community members on how they would like engagement activities to be shaped moving forward. Despite these targeted efforts, no residents responded to the outreach.

The Applicant also maintained a strong presence with local residents, opting to call non-associated receivers and community members directly rather than relying solely on indirect channels. This approach was aimed at avoiding any “us and them” sentiment, instead fostering quality relationships and ensuring responses were empathetic and grounded in mutual respect.

The engagement approach also placed emphasis on:

- Layered engagement, allowing stakeholders to interact in formats that suited their needs, from public sessions and surveys to direct phone calls and face-to-face briefings

- Responsiveness, by tracking recurring issues and ensuring detailed responses were provided in a timely and accessible manner
- Inclusivity, through cultural awareness training and efforts to engage with underrepresented or quieter voices in the community
- Development of community benefit sharing ideas, drawing on both formal brainstorming sessions and informal conversations.

As engagement progressed, the Project team refined its communication approach to better reflect the values, communication styles, and lived experience of the local community. Given that much of the audience comprised farmers and landholders predominantly aged 55 and above (as noted in the community feedback survey) the team focused on being clear, direct, and transparent in both written and verbal communications.

Technical information was still provided but was framed with practical relevance and local context in mind, acknowledging the community's strong connection to land, productivity, and long-term stewardship. This approach reinforced the Applicant's commitment to keeping stakeholders informed and involved, and supported constructive, informed discussions throughout the engagement process.

5.1.2. EIS engagement

Community consultation for the EIS phase of the Project recommenced in November 2024 and continued through to the EIS submission to the DPHI in November 2025. Throughout this period, the Applicant actively engaged with a broad range of stakeholders, including directly impacted landowners (non-associated receivers), targeted stakeholders, and members of the broader community.

The Project team conducted:

- 121 letters sent to residents within 4km of the Project site
- Briefing letter sent to WWCC
- Briefing letter sent to Member for Riverina and Member for Wagga Wagga
- 71 stakeholder emails
- Fact sheet to delivered via email
- Frequently asked questions document delivered via email
- Three newsletters emailed to the stakeholder email list, directly responding to key concerns
- Three campaign emails sent (to a 22-person mailing list) providing Project updates
- 19 phone conversations
- 56 community feedback survey responses
- One in-person meetings
- One online meeting
- Five SIA interviews facilitated
- One full-day cultural awareness tour and training opportunity undertaken by the Applicant
- 186 users visited the Project website as of 28 August 2025.

Two community information sessions were also hosted at the Mangoplah Hall:

- Tuesday 1 April 2025 from 3:00pm – 7:00pm
- Wednesday 2 April 2025 from 7:30am – 11:30am.

Together, these sessions attracted approximately 70 attendees, with the purpose of providing stakeholders and community members an opportunity to:

- Learn more about the Project and the SSD and EIS process

- Ask questions directly of the Project team
- Share feedback and concerns
- Explore ideas for potential community benefit-sharing initiatives.

The evening session was attended by a coordinated and vocal group of participants, many of whom appeared to have attended with the intention of demonstrating collective opposition to the Project. While the session remained largely respectful, the tone was heated at times, and several discussions became emotionally charged, likely reflecting the depth of concern and passion held by local residents.

Rather than engaging in individual or small group conversations, many attendees participated in open group discussions, often with multiple voices contributing at once. As a result, the opportunity for in-depth, one-on-one dialogue between individuals and the Project team was more limited during this session. Nevertheless, the Applicant acknowledges the significance of this collective engagement, as it demonstrated both the strength of local sentiment and the community's desire to be heard and considered in the planning process.

The morning session offered more opportunities for conversations, with smaller numbers of attendees engaging in more focused discussions with members of the Project team. This enabled more detailed exploration of individual perspectives, questions, and contributed ideas for local benefit sharing.

Together, both sessions provided valuable insight into community attitudes, capturing a spectrum of views and reinforcing the importance of ongoing, transparent, and responsive consultation.

The EIS engagement period was marked by strong, passionate feedback, particularly from residents in close proximity to the proposed site. Many participants voiced deep concerns and strong opposition, reflecting a high level of interest and emotional investment in the future of their community and the overall agricultural landscape.

Key issues raised:

- Environmental impacts (including fire risk, pollution, flooding)
- Visual and noise concerns
- Access restrictions and local road disruption
- Property devaluation, mental health concerns, and insurance impacts
- Uncertainty around decommissioning and long-term site management
- Perceived imbalance of risk and reward for nearby landowners, with one stakeholder asking, "outside of community benefits, how does this benefit the neighbours? There is no benefit."
- Loss of agricultural land and farming continuity
- Lack of confidence in the consultation process and the regulatory framework.

Opportunities identified:

- Local job creation and training pathways
- Cultural heritage preservation
- Infrastructure upgrades (roads)
- Partnerships with educational institutions
- Community benefit initiatives and investment
- Environmental rehabilitation and stewardship.

These issues and opportunities were revisited consistently across all engagement formats, discussing these key issues and opportunities in greater depth, contributing to a more nuanced understanding of the Project's potential impacts and benefits. The feedback received during this phase helped shape the SIA and informed potential refinements to the Project design and proposed mitigation measures.

5.1.3. Response to EIS engagement

In response to community feedback, the Project has gone beyond initial commitments by making a series of refinements to reduce potential impacts, strengthen transparency, and demonstrate genuine responsiveness. These measures include:

- The Landscape Character and Visual Impact Assessment (LCVIA) was expanded to include additional photomontages from property viewpoints, rather than limiting the assessment to dwellings.
- A commitment was made to establish western screening, even though the visual impact in that area was assessed as low impact.
- Detailed project updates were provided to the community to directly address concerns.
- Nearby receivers were given access to specialist reports prior to the EIS being made publicly available.
- Communication lines were kept open, with the Applicant taking a proactive approach by responding directly to nearby residents via phone and email.

At the same time, the Applicant acknowledges that many in the community continue to oppose the Project, primarily on the grounds of site suitability. This report seeks to reflect that feedback openly and to summarise both the issues raised and the steps taken in response, recognising the value of community input in shaping the Project.

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5.2. Summary of consultation findings

5.2.1. Overall sentiment

Engagement throughout the EIS phase revealed a mixed community sentiment, but tended to be negative overall, particularly among those living in close proximity to the Project site.

While some nearby receivers were open to dialogue and sought to understand Project implications, a significant proportion expressed strong reservations or opposition, citing concerns around the change of land use, personal impacts (property value and insurance), visual impact, fire risk, and trust in development processes. From the broader Wagga Wagga community and more distant Mangoplah residents, sentiment tended to be more moderate, with lower levels of direct concern observed.

The Applicant acknowledges that this Project is being progressed within a region already experiencing a high concentration of renewable energy developments, including nearby proposed projects such as the Maxwell Downs Solar Farm and the approved Burke's Creek Solar Farm.

Many community members who engaged during the EIS process had already participated in other consultation efforts, resulting in a noticeable sense of frustration and scepticism and a feeling that engagement was merely a "box-ticking exercise." This sentiment carried over into engagement on this Project, despite efforts to distinguish its design, impacts, and benefits.

Compounding this sentiment was the assumption held by some stakeholders that the approval of this Project could pave the way for future solar farm developments in the area. While such future development is speculative and outside the scope of this Project, the lack of clarity about long-term land use has contributed to growing anxiety about cumulative impacts, particularly for those with bordering properties to the Project site, and strong ties to the rural landscape and agricultural identity of the region.

The Applicant recognised this dynamic early in the EIS engagement process and approached consultation with sensitivity to the broader development context, acknowledging that much of the concern was not solely Project-specific, but rather a reflection of ongoing regional change, development fatigue, and a desire for greater transparency and certainty.

This sentiment was also echoed by local state and federal Members of Parliament, who acknowledged that the volume and overlap of engagement processes across the region was becoming tiresome for their constituents, and risked undermining confidence in consultation more broadly. MPs expressed concern about the toll this was taking on communities regarding project sentiment, while also highlighting the importance of transparent and consistent communication.

Despite these challenges, elected representatives engaged respectfully and openly with the Applicant throughout the EIS period. They also expressed a wish to remain informed about the Project so that they could accurately respond to community enquiries and support the distribution of information where needed.

Despite a generally cautious or critical tone from some stakeholders, the engagement process also revealed small levels of support and constructive dialogue, particularly from members of the wider community who saw value in the Project's potential to deliver local economic benefits, training opportunities, and long-term regional investment.

5.2.2. Summary of key issues and opportunities

The Project team responded to community questions and feedback throughout the entire EIS engagement period. Section 3.6 of the SSD Guidelines for undertaking engagement (DPHI, 2024) recommends that applicants categorise key concerns into specific groups for consistency. It is important to note that not all categories are included in the table below, as this depends on the outcomes of the engagement.

The categories outlined in the guidelines include:

- The strategic context, including valued natural and built features that may be affected by the project
- The design of the project and any alternatives considered
- Relevant statutory issues
- Community engagement (e.g. the level and quality of engagement during the EIS preparation and future engagement if the project is approved)
- Economic, environmental, and social impacts of the project
- Justification and evaluation of the project (e.g. alignment with Government plans, policies, or guidelines; overall project merit)
- Issues outside the project's scope (e.g. broader policy matters or unrelated concerns).

5.2.3. Future engagement, pending Project approval

The following future engagement activities are recommended for the Project as it progresses, after public exhibition of the EIS, to the ' Response to submissions' stage and, pending project approval, through to construction and operation (Table 5-1). See Section 6.12 (SIA) of the EIS report for further engagement needs, impacts and benefits.

Table 5-1 Planned future engagement activities

Group	Response to submissions	Post approval	Construction	Operation
Stakeholders	Non-associated receivers, wider Mangoplah community, WWCC, Member for Riverina, Member for Wagga Wagga, Rotary Club of Wagga, Wagga Men's Shed, Wagga Lions Club, Apex Club, Wagga Chamber of Commerce, CSU, TAFE, local First Nations community, Wagga Wagga LALC, and local Mangoplah businesses.	Non-associated receivers, wider Mangoplah community, WWCC, Member for Riverina, Member for Wagga Wagga, Rotary Club of Wagga, Wagga Men's Shed, Wagga Lions Club, Apex Club, Wagga Chamber of Commerce, CSU, TAFE, local First Nations community, Wagga Wagga LALC, and local Mangoplah businesses.	Non-associated receivers, wider Mangoplah community, WWCC, Member for Riverina, Member for Wagga Wagga, Rotary Club of Wagga, Wagga Men's Shed, Wagga Lions Club, Apex Club, Wagga Chamber of Commerce, CSU, TAFE, local First Nations community, Wagga Wagga LALC, and local Mangoplah businesses.	Non-associated receivers, wider Mangoplah community, WWCC, Member for Riverina, Member for Wagga Wagga, Rotary Club of Wagga, Wagga Men's Shed, Wagga Lions Club, Apex Club, Wagga Chamber of Commerce, CSU, TAFE, local First Nations community, Wagga Wagga LALC, and local Mangoplah businesses.
Key actions	• Applicant to review and consider all submissions made during the public exhibition of the EIS. • Applicant to prepare a detailed Response to Submissions (RtS) report addressing the issues raised by stakeholders, agencies, and the	• Applicant to provide updates to interested non-associated receivers on the results of visual impact assessments and noise impact assessments conducted. • Applicant to deliver update of EIS outcome to	• Applicant to engage with near non-associated receivers and the wider Wagga community about planned traffic arrangements, construction activities and impact mitigations. • Applicant to provide	• Applicant to continue to engage with near non-associated receivers with key details regarding operation details of the site. • Applicant to continue to engage with the local community and key

Group	Response to submissions	Post approval	Construction	Operation
	community. • Applicant to provide targeted updates to interested stakeholders (non-associated receivers, WWCC, Bundyi Cultural Tours, ESI Supply Group, local state and federal representatives, wider First Nations groups, and community organisations) outlining how key issues raised in submissions have been addressed in the RtS. • Applicant to maintain ongoing availability (via email, phone, and meetings) to clarify technical aspects of the RtS for stakeholders who request further explanation. • Applicant to continue dialogue with WWCC, the local First Nations community, and industry groups regarding the Project's benefit-sharing arrangements, and to integrate feedback where feasible. • Applicant to communicate	interested stakeholder groups such as non-associated receivers (who have opted into future communications), WWCC, Bundyi Cultural Tours, ESI Supply Group, and local state and federal representatives. • Applicant to continue to engage with the local community and key community groups to highlight key milestones pre-construction. • Applicant to continue discussions with WWCC around the development of a CBS including negotiations on a formal figure and a governance structure. • Applicant to continue engagement with ESI Supply Group and other identified First Nations groups regarding local industry participation opportunities pre-construction.	detailed engagement with non-associated receivers and the wider community about visual impact mitigations, including proactive planting of screening vegetation. • Applicant to provide updates via letters (up to 2 km radius), email updates and public notices regarding construction activities, employment opportunities and expected impacts (traffic, noise, dust). • Delivery of updates to interested stakeholder groups such as non-associated receivers, WWCC, Bundyi Cultural Tours, ESI Supply Group and local state and federal representatives. • Updates to be provided to stakeholders who have opted into future communications. • Facilitate events for local suppliers or employees to	community groups to highlight key milestones during operation. • Applicant to collaborate with local schools and education/skills providers to provide education opportunities through presentations etc. • Applicant to engage via email and posted letters to residents within a 2 km radius should any large maintenance work be carried out during operation and mitigate any impacts that may arise. • Continue to foster strong relationships with the community via the establishment of community partnerships and industry participation. • Continue to establish the Applicant as an active, responsible member of the wider community. • Proactively communicate the decommissioning strategy (including

Group	Response to submissions	Post approval	Construction	Operation
	to the wider Mangoplah and Wagga Wagga community the next steps in the approvals process, including anticipated timeframes.		allow for local participation during the construction phase of the Project. • First Nations representative from Bundyi Tours to be invited to undertake heritage induction for construction phase.	damaged components, where relevant) to interested stakeholder groups and the wider community.
Consistency with 'Undertaking Engagement Guidelines for State Significant Projects' (DPHI, 2024)	• Engagement during the RtS phase will demonstrate transparency, by clearly explaining how community and stakeholder concerns have been considered. • The RtS process will allow for two-way engagement, not only informing stakeholders but also responding to queries, ensuring alignment with the guideline's principles of "responding and closing the loop."	• Continue to engage with the community, WWCC and government agencies during the pre-construction, construction, operation and decommissioning of the project (and/or rehabilitation of the site) in line with the conditions of approval. • The community is able to track the progress of the Project and raise any post-approval concerns with the Applicant and/or contractor.	• Proactive, transparent, and collaborative engagement, spanning from informing on construction activities to involving and collaborating through benefit-sharing opportunities and other community partnership opportunities. • Applicant will also continue to gather ideas from the local community regarding opportunities to work with local businesses and/or suppliers and minimise construction impacts.	• Applicant will continue to actively engage during the operation and decommissioning stage of the Project in line with the conditions of approval. • Applicant will also continue to foster strong relationships with key stakeholders and further liaise with WWCC regarding the implementation of benefit sharing within the local community through the requested CBS program or VPA.
Monitoring of effectiveness for	• The Applicant will track the number and type of issues raised in submissions and assess how effectively	• The evaluation of community participation will be continuously monitored, reviewed, and adapted	• The Applicant will continue to liaise with stakeholders and monitor community sentiment to resolve key	• The Applicant will continue to proactively engage through the operation and decommissioning stage to

Group	Response to submissions	Post approval	Construction	Operation
community participation	responses have been communicated back to the community. • Engagement effectiveness will be monitored through stakeholder feedback following the RTS release, with adjustments made where additional clarification is required. • Commitment to continuous improvement of engagement methods between RtS and final determination of approval.	post-approvals to ensure ongoing transparency and involvement in the project. • The Applicant will continue to gather community feedback through to assess the community's experiences and perceptions, identifying areas for improvement. • Engagement approaches will remain flexible and will be reassessed throughout the post-approval phase based on feedback, which may include modifying meeting formats, diversifying communication channels, or addressing key community concerns.	issues and opportunities. • Explain to stakeholders at post-approval how community views were considered when reaching decisions and how they helped to inform the Project. • Applicant will utilise local knowledge and expertise with suppliers and contractors where possible. • Applicant will ensure they use appropriate engagement techniques when targeting specific groups. • The Project website will continue to update information on the progress of the Project, and to make information easily accessible to stakeholders.	ensure the local community and interested stakeholder groups are well-informed on key elements of the Project. • Proactive engagement will make it easy for the community to access information. • A Project website will continue to facilitate information on the Project, to make information easily accessible for stakeholders and community members.

5.3. Aboriginal community engagement

The consultation with Aboriginal stakeholders for this Project was undertaken in accordance with Section 60 of the *National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2019* and following the process outlined in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP).

The full list of consultation steps, including those groups and individuals who were contacted, and a consultation log is provided in Appendix A of the Aboriginal Cultural Heritage Assessment (ACHA) (Appendix F.2).

Six Aboriginal groups registered their interest in the ACHA for the Project. Notification of the Registered Aboriginal Parties (RAPs) for the Project was provided to Heritage NSW and Wagga Wagga LALC on 20 November 2024. As a result of this notification Wagga Wagga LALC also registered and updated notification was given to Heritage NSW that there were seven RAPs for the Project on 22 November 2024.

The RAPs for the Project are:

- Bundyi Aboriginal Cultural Knowledge Group;
- Sonione Wakabut Rogers;
- Southern West Yiradyuri Clans, Land, Water and Sky Country Aboriginal Corporation;
- Kalthi Consultancy;
- Yurwang Gundana Consultancy Cultural Heritage Services;
- A&K Cultural Heritage; and
- Wagga Wagga LALC.

On 5 December 2024, an *Assessment Methodology* document for the Project was sent to all RAPs (all by email). This document provided details of the background to the proposal, a summary of previous archaeological surveys, and the proposed heritage assessment methodology for the proposal. The document invited comments regarding the proposed methodology and sought any information regarding known Aboriginal cultural significance values associated with the Project Site and/or any Aboriginal objects contained therein. A minimum of 28 days was allowed for a response to the document. The closing date for comments was the 10 January 2025 with additional time included due to the Christmas holidays.

None of the registered parties raised any objections to the methodology and many expressed an interest in participating in fieldwork.

The *Assessment Methodology* outlined in Stage 2 included a written request to provide any information that may be relevant to the cultural heritage assessment of the Project Site. It was noted that sensitive information would be treated as confidential. No response regarding cultural information was received in response to the methodology however comments were made regarding the treatment of any cultural materials located.

Comments received were that artefacts were preferred not to be removed from the area and if required from testing these should be repatriated to an appropriate area as soon as possible.

Bundyi Aboriginal Cultural Knowledge Group provided comments as part of the Social Impact Assessment and requested these be included in the ACHA. These comments included that:

- SREA should have a cultural awareness program for all workers about Wiradjuri country and cultural heritage within and around the site and their responsibilities regarding cultural heritage.

- Identified that the area of trees south of the BESS site and the area of trees adjacent to the access road near Holbrook Road had potential for scarred trees to be present and that the access road would need to be surveyed with a 10-15m buffer on either side.
- There was also concern expressed about the siting of batteries within the BESS site and potential if something goes wrong for run off getting to Burkes Creek north of the BESS site and the Billabong (Paper Bark Creek) to the west of the BESS site and that this would be detrimental to these important waterways (it is noted that this will be address in the EIS and hydrology report for the Project).
- It was also noted that the area would have been resource rich and used by Aboriginal people with native and culturally important animal species and habitats likely to be present in the area.

The survey fieldwork was carried out on 17 February 2025 by two archaeologists from NGH and two Aboriginal RAPs. The Aboriginal community representatives who participated in the fieldwork were:

- Representative #1 from Bundyi Aboriginal Cultural Knowledge Group; and
- Representative #2 from the Wagga Wagga LALC.

A draft version of this *Aboriginal Cultural Heritage Assessment Report* for the Project was forwarded to the RAPs inviting comment on the results, the significance assessment and the recommendations post completion of the testing program. A minimum of 28 days was allowed for responses to the document. Two responses were received, with both responses incorporated into the ACHA.

No other comments were received from the other RAPs for the Project, and the ACHA was finalised, and appended to the EIS as Appendix F.2.

5.4. Agency engagement

5.4.1. Agency consultation

As part of preparing the EIS for the SSD development application, the SEARs require that the relevant State or Government authorities, infrastructure and service providers, community groups, affected landowners be consulted.

Table 5-2 summaries the consultation undertaken to date with the various agencies. The SEARS, including a cross-reference table showing where each specific matter is provided in the EIS, is included in Appendix A.

Table 5-2 Agency consultation summary

Issue raised by agency	Detail
Department of Planning, Housing and Infrastructure (DPHI)	
Project update	A pre-lodgement meeting was held with DPHI on 27 August 2025, to discuss progress of the Project and issued addressed. Reminders were provided by the Department on things to address in the EIS, with concern raised around hydrology and consultation with SES and Council.
Wagga City Council	

Issue raised by agency	Detail
Project update	Face-to-face meeting held with WWCC on 1 April 2025. The meeting focused on providing an update on the Project, an outline of the EIS process, outcomes on technical assessments, discussion of key issues and opportunities, and asking for feedback and expectations regarding benefit sharing and local industry engagement. The following was noted in the meeting: • Minor road upgrades would be required. However, Holbrook Road is not classified as a council-managed road. All road works would require consent. • Early indication of the value of the community benefits. Preference sought for community group rather than administration by Council. Upfront payment preferred. Importance of community input. • Comprehensive communication strategy will be required. • Questions raised whether DPI had requested agricultural assessment. • Early indication given for Council agricultural land policy being drafted.
Voluntary Planning Agreement (VPA) and other Project commitments	Preliminary discussions have occurred between the Applicant and WWCC regarding a potential voluntary planning agreement, in line with the NSW Benefit Sharing Guidelines. WWCC has advised they are not in a position to review further until their internal policy has been developed.
Traffic and access	Amber (traffic specialist) reached out for feedback on road safety and cumulative impacts. The draft Traffic Impact Assessment (TIA) Report was shared with Council in September 2025.
Landholder consent	Landowner consent was received 6 November 2025.
Flooding	Meeting occurred with SES, Cumulus (hydrology specialist), NGH and Applicant to discuss hydrology assessment and emergency access. It was noted that the emergency route from Paper Forest Road was private and has historical issues with flooding, and likely not suitable. This has since been removed from the DA Application. They also noted that Mangoplah can become isolated in flooding events.
Riverina Water	
Water access	Riverina Water contacted with construction and operational water quantities, seeking an in-principal water supply agreement on 18 August 2025.
State Emergency Services	

Issue raised by agency	Detail
Flooding	An online meeting was held with Cumulus, NGH, the Applicant and SES on 24 July 2025, to discuss the hydrology assessment results and potential site access points. SES noted that flood mitigation should address the Probable Maximum Flood and a Flood Emergency Response Plan should be included, noting concerns for the relatively large construction crew. The Flood Emergency Response Plan is included as a Management measure.
Conservation Programs, Heritage and Regulation	
Biodiversity assessment methodology	Meeting held February 2025 to introduce the Project and get confirmation of the survey plan. It was noted that the Project is predominately on exotic cropping land, with minor clearing for road works. There was an opportunity to design the access road to avoid major impacts. CPHR noted that design principles of avoid and minimise should be considered, with full justification of any clearing works detailed within the BDAR. It was also noted a 20m buffer to assess impacts would be suitable to consider direct and indirect impacts. Expert reports for the Pink-tailed Legless Lizard was noted as the preferred methodology to confirm presence or absence. It was also confirmed that there would be some species that were assumed present, and confirmed with survey in the submissions period.
Site visit	CPHR attended the site in April 2025. Concern was raised over minor clearing required for a bend in the road, to meet site distance. It was questioned why the cattle yards could not be relocated instead.
Commonwealth Department of Climate Change, the Environment, Energy and Water	
EPBC referral	A pre-referral meeting was held with DCCEEW in May 2025, where the project and the overall development impact was discussed. The referral was lodged shortly after, and the Project was determined a non-controlled action in July 2025.
DPIE Water and Department of Natural Resources Access Regulator	
N/A	N/A - No works are proposed on waterfront lands. NGH are addressing the remainder of the SEARs and Agency requirements. As such, further consultation

Issue raised by agency	Detail
	is not required.
Department of Primary Industries - Fisheries	
N/A	N/A – NGH have addressed potential impact to fish species and Paper Forest Creek as part of the EIS.
Department of Primary Industries - Agriculture	
N/A	N/A – NGH are addressing all the SEARs and Agency requirements. As such, further consultation is not required.
Transport for NSW	
Traffic assessment	The Development Renewables team were contacted for advice on appropriate growth rates to apply to the State Road network as well as any other relevant matters beyond the issued SEARs and Agency. TfNSW advised a conservative growth rate of 1.5% per annum be applied.
Transgrid	
Grid connection	A formal enquiry was lodged with Transgrid regarding the establishment of the Mangoplah BESS connection. The Applicant received an official response from Transgrid regarding the feasibility of the intended connection and Applicant's intent to construct a new BESS referred to as Mangoplah BESS. Transgrid's department that deals with new connections is their unregulated arm, Lumea; all new connections are directed by Transgrid to liaise with Lumea. Regular meetings, email and phone correspondence between the Applicant and Lumea have been undertaken through the development of the EIS, including connection process and general updates on the Project. The Applicant provided Lumea with a copy of this EIS prior to lodgement.
NSW Heritage	
N/A	Letters outlining the Project and the need to carry out an ACHA were sent to Heritage NSW, as identified under the ACHCRP on 21 June 2024. Notification of the Registered Aboriginal Parties (RAPs) to be involved in the ACHA was sent to Heritage NSW on 20 August 2024.

Issue raised by agency	Detail
Crown Lands	
N/A	An application for transfer of ownership of a number of Crown Roads was made on 6 May 2025.
V/Line (Rail), ARTC	
Haulage	Amber sought feedback via phone on the transport management arrangements for OSOM loads. ARTC advised that requirements would be outlined on receipt of a formal National Heavy Vehicle Register (NHVR) permit application.
Greater Hume Shire (NSW), Maribyrnong, and Geelong City Councils (Victoria)	
OSOM movement	The final TIA was shared with Greater Hume Shire, Maribyrnong and Geelong City Council on 24 September 2025, seeking comment on the OSOM route. Maribyrnong noted they would require consultation with DTP and internally, and are seeking further consultation. It was noted that the Applicant would reach out as the Project progressed. Geelong noted time-based truck controls on Somerville Road, and OSOM movements within the West Gate Tunnel. Otherwise had no further comment. No response was received from Greater Hume Shire.
Department of Transport and Planning (DTP – Victoria)	
OSOM movement	The final TIA was shared with DTP on 24 September 2025, seeking comment on the OSOM route. DTP noted in a response on 3 October, until there is a contract in place with an awarded transport operator DTP does not have capacity to review these requests in detail.

6. Assessment and mitigation of impacts

6.1. Biodiversity

This section summarises the findings of the Biodiversity Assessment Development Report (BDAR) undertaken by NGH Pty Ltd, provided in Appendix F.1. The BDAR was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential biodiversity impacts of the Project and the recommended measures to mitigate and offset them.

6.1.1. Approach

The BDAR was completed by NGH to provide an assessment of the biodiversity values associated with the Project Site and to assess the potential impact the construction and operation of the Project in accordance with the NSW Biodiversity Assessment Methodology (BAM) 2020 (DPIE, 2020a).

In consultation with the NSW Conservation Programs, Heritage and Regulation (CPHR) Group (formerly the Biodiversity Conservation Division), the assessment included: site visits to confirm the extent and condition of landscape features in and around the Project Site, aerial photographic interpretation, detailed field surveys and review of existing vegetation mapping. Detailed survey methods, assumptions and limitations are provided in the appended BDAR. In summary, they included:

- Rapid assessment – September 2024
- BAM floristic plots – September 2024 and April 2025
- Targeted flora surveys – January and September 2025
- Habitat constraints – September 2024
- Targeted field fauna surveys – January, March, April, August and September 2025

Some expert reports are outstanding, and additional surveys are planned for November 2025. Provision of the results have been agreed with the regulator to include in the 'Response to submissions' stage, after the exhibition of the EIS.

Definitions

The BAM is legislated under the Biodiversity Act (BC) Act and as such, terminology is prescribed and sometimes differs from the terms used in the EIS. In this summary, one additional term is noted **Subject Land**. The **Subject Land** describes all areas that may be affected by direct *and indirect impacts* of the Project and is therefore larger than the **Development Footprint,** which considers only direct impacts.

Avoid and minimise

A key requirement of the BAM is to demonstrate 'avoid/minimise' in advance of considering offset options. The Project:

Avoids: impacts to biodiversity thorough site selection, iterative design, and utilising existing non-native cleared land.

Minimises impacts through:

- Utilising areas of poor condition native vegetation and existing areas of disturbance (existing track)

- Applying specific mitigation strategies to reduce residual risks to biodiversity

Key considerations included selecting a BESS site that lacked woodlands, hollow-bearing trees and scattered trees, which are a key habitat features in the locality. This decision was made to avoid disturbing sensitive ecological areas which may also provide habitat for a number of threatened and non-threatened fauna. Instead, the site selected for the BESS infrastructure features cropped agricultural land and an existing access track; the track has higher biodiversity values but the Project will make use of existing areas of disturbance as much as possible.

Furthermore, the Project aimed to utilise an area adjacent to the existing 132kV transmission line, to reduce the need for habitat removal for new transmission lines, thereby minimising impacts on habitat connectivity.

6.1.2. Existing environment

Landscape context

The Project Site falls across the Inland Slopes Interim Biogeographical Regionalisation for Australia (IBRA) subregion. The subregion is characterised by landforms that are composed of steep, hilly and undulating ranges and granite basins. Vegetation occurring in this subregion includes open forests and woodlands (SEED, 2024). Across suitable landscapes, the following vegetation communities occur:

- Blakely's Red Gum on lower slopes, merging west to Yellow Box, Grey Box and White Cypress Pine.
- Red Stringybark is present on upper slopes with Black Cypress Pine, Kurrajong, Red Ironbark, White Gum, White Box, Yellow Box.
- Rough-barked Apple on flats with River Oak occurs on upper tributaries and River Red Gum occurs on lower and larger streams.

The aquatic environment within the Involved Lands is sparse. No wetlands occur within 10km of the Involved Lands. An EPBC Act protected matters search was completed on 7 April 2025 and did not identify any Ramsar wetlands that may be impacted by the Project. Multiple ephemeral streams occur through the subject land including 1st, 2nd and 4th Strahler Order streams; however, it is likely that surface water flow only would be present during periods of heavy rainfall with farm dams capturing additional run-off.

Two main watercourses in the Involved Lands or in close proximity are Paper Forest Creek and Burkes Creek. Paper Forest Creek is the only named waterway within the Subject Land. It is a 5th Strahler Order stream, which crosses the access road corridor through Lot 228 DP754557. It is also mapped as Key Fish Habitat (KFH) under the NSW *Fisheries Management Act 1994* (FM Act) and classified as Biodiversity Values (BV), as biodiverse riparian land (SEED, 2022). Burkes Creek runs along the northern boundary of the northern lot 222 (DP754557), which continues down and travels out of the eastern side of the Involved Lands. It is located approximately 610m north of the Project Site. Riparian woodland vegetation is present along Burkes Creek throughout the Involved Lands.

The Project Site falls across two Mitchell landscapes, being the Wonga Hills and Ranges, and the Brokong Plains. Brokong Plains occurs on Quaternary alluvial plains, with a general elevation of 170m and local relief of <10m. Soils are red-brown texture-contrast. This Mitchell landscape has been extensively cleared and cropped. Vegetation formerly included Grey Box (*Eucalyptus microcarpa*), Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*Eucalyptus blakelyi*) and White Cypress Pine (*Callitris glaucophylla*) woodland to open forest (DECCW, 2002). Wonga Hills and Ranges occurs on Ordovician siltstone, slate, quartzite and phyllite. Landscape morphology includes rolling hills, low rises and ridges, with a general

elevation of 250m to 370m and local relief of 50m. Occurs on stony, thin red and brown texture-contrast soils merging to yellow harsh texture-contrast soils on valley floors. Subsoil contains high salinity levels, with brackish flows in small creeks. Vegetation includes woodlands of Tumbledown Red Gum (*Eucalyptus dealbata*), Red Stringybark (*Eucalyptus macrorhyncha*) and Grey Box (*Eucalyptus microcarpa*) on slopes. Yellow Box (*Eucalyptus melliodora*), White Box (*Eucalyptus albens)* and occasional Blakely's Red Gum (*Eucalyptus blakelyi*) occurs on flats with Kangaroo Grass (*Themeda triandra*) and Plains Grass (*Austrostipa aristiglumis*) (DECCW, 2002).

Plant Community Types (PCT)

Vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCTs. Two PCTs were identified with the Subject Land (Project Site) (refer to Table 6-1 below).

Table 6-1 PCTs identified within the Subject Land and Development Footprint

PCT ID	PCT name	Subject Land area (ha)	Development Footprint area (ha)
277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	7.09	1.85
76	Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	1.46	0.15
	Total Area	8.55	2.00

PCT 76 occurred in two condition states across the Subject Land. These are;

1. **PCT 76 Moderate Condition :** This zone occurs as mid to tall woodland, dominated by Western Grey Box *(Eucalyptus microcarpa).* A mid stratum is absent, with a native-dominated understorey. The average cover of native grasses in this zone is approximately 10-50%. Some livestock grazing and trampling was evident.
2. **PCT 76 Low Condition derived Grassland:** This zone occurs as low condition grassland with evidence of heavy grazing and trampling, however it does contain high native ground cover, averaging 71% cover.

PCT 277 occurred in three condition states across the Subject Land. These are;

1. **PCT 277 Good Condition:** This zone occurs as a tall open woodland, dominated by Blakely's Red Gum (*Eucalyptus blakelyi*) and Yellow Box (*Eucalyptus melliodora*). An absent mid stratum and sparse lower stratum occurs, dominated by native grasses including Red Grass (*Bothriochloa macra*), Common Couch (*Cynodon dactylon*) and Windmill Grass (*Chloris truncata*). Regenerative woodland was apparent throughout this zone with many seedlings present. Some grazing was evident, however lower stratum vegetation was in higher condition than the moderate condition PCT zone. This zone has the highest condition score for PCT 277 and was assigned as good condition.

2. **PCT 277 Moderate Condition:** This zone occurs as an open woodland, dominated by Blakely's Red Gum (*Eucalyptus blakelyi*) and Yellow Box (*Eucalyptus melliodora*). An absent mid stratum and exotic dominated understorey occurs, dominated by exotic grasses including Oats (*Avena spp.*), Ryegrass (*Lolium spp*.), Barley Grass (*Hordeum leporinum*), Small-flowered Mallow (*Malva* parviflora) and Phalaris (*Phalaris aquatica*). The understorey shows a high level of disturbance from grazing, machinery and other agricultural activities.
3. **PCT 277 Low Condition Derived Grassland:** This zone occurs as a derived native grassland with evidence of heavy grazing and trampling, and a high abundance of exotic species. There is no canopy or shrub layer. Native species such as Common Couch (*Cynodon dactylon*), Red Grass (*Bothriochloa macra*), Windmill Grass (*Chloris truncata*) and Wallaby Grass (*Rytidosperma spp.*) are interspersed between exotic grasses such as Paspalum (*Paspalum dilatatum*) and Phalaris (*Phalaris aquatica*).

PCT 277 is associated with two Threatened Ecological Communities (TECs), with both of these TECs present within the Subject Land:

- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions - Critically Endangered (BC Act).
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered (EPBC Act).

Refer to Figure 6-1 through Figure 6-3 for PCTs within the Subject Land.

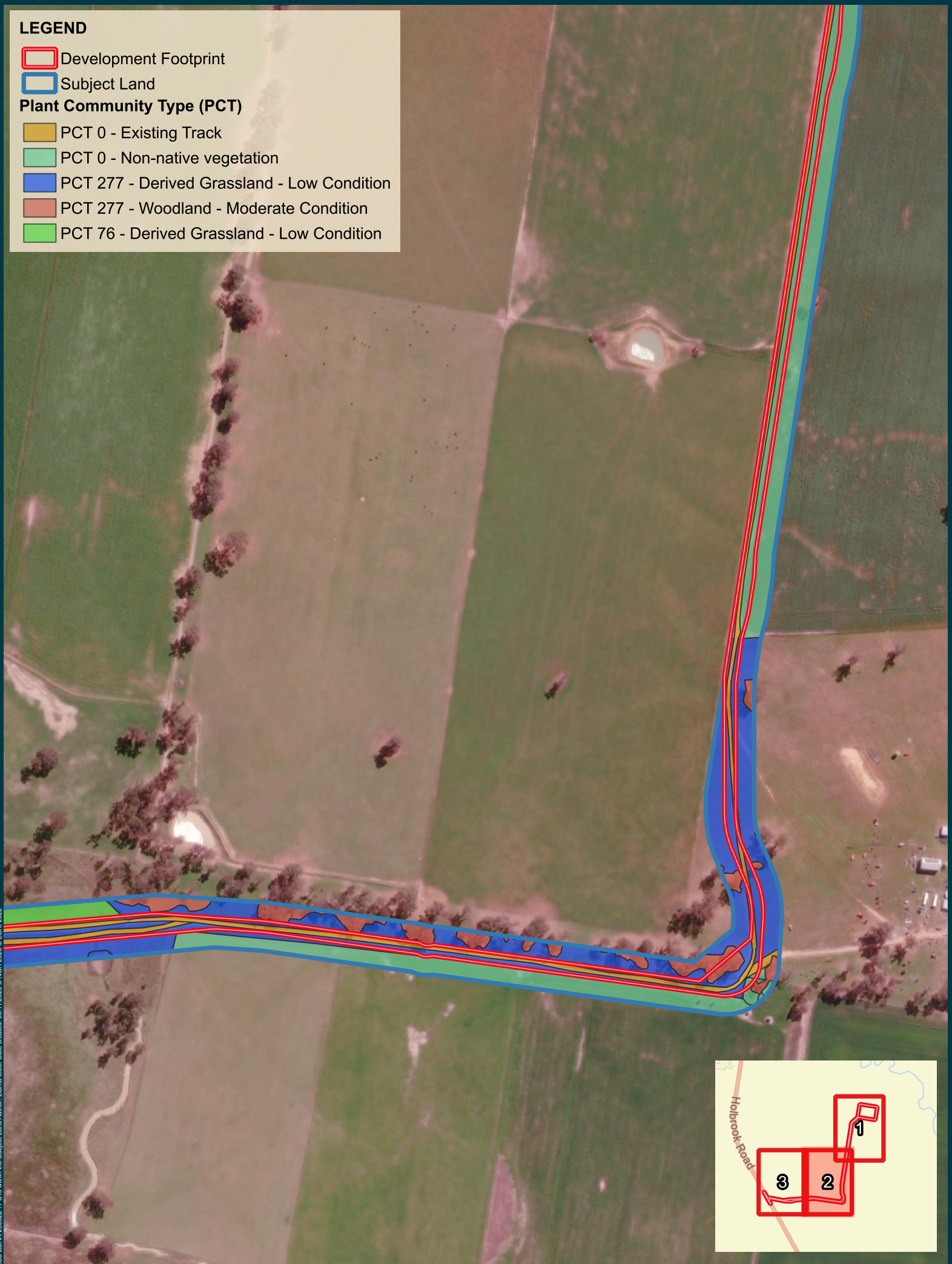
Datum: GDA2020 / MGA Zone 55

0 100 200 m

Mangoplah BESS

Figure 6-1 PCTs within the Subject Land

Map 1 of 3



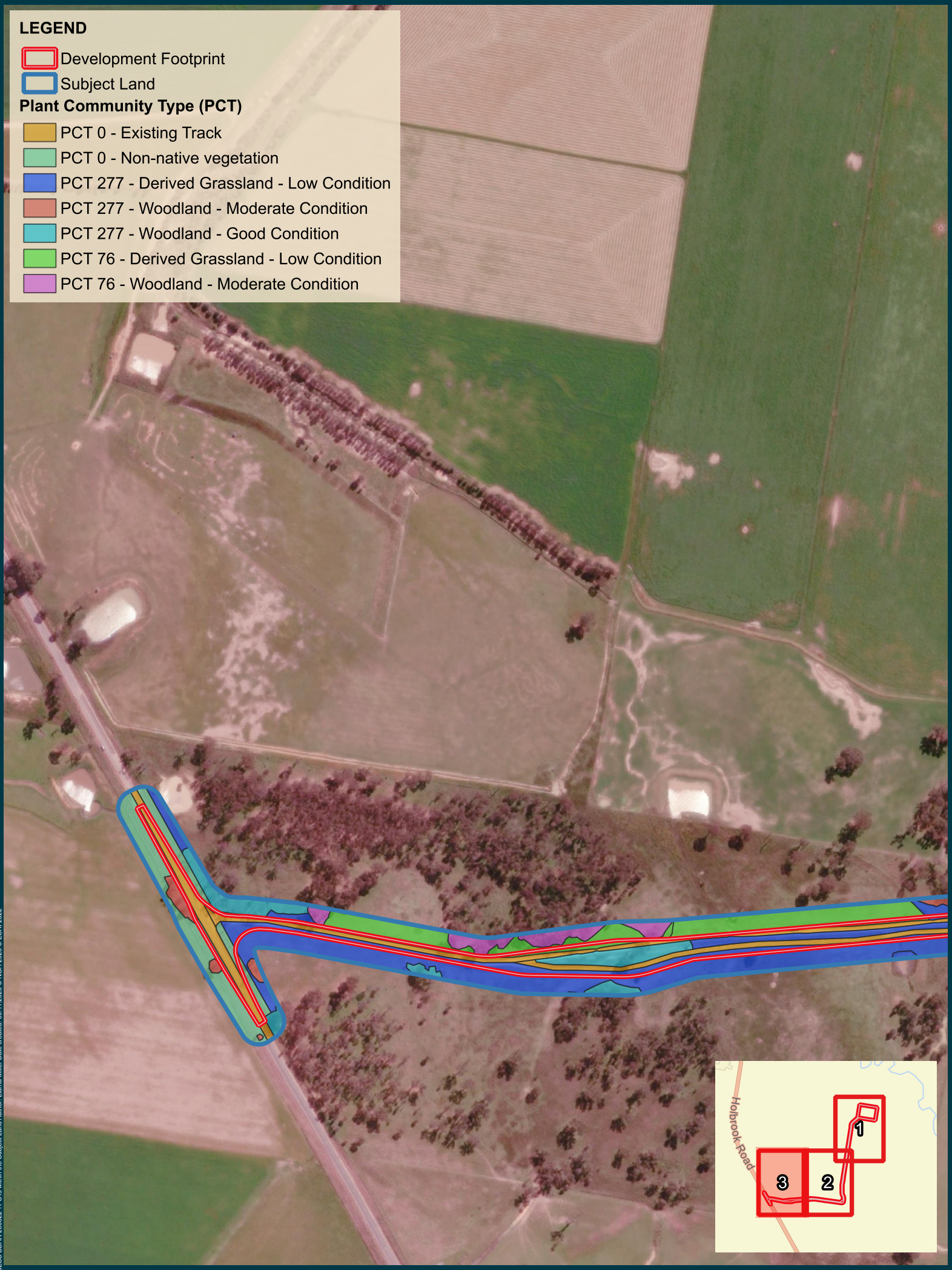
Datum: GDA2020 / MGA Zone 55

0 100 200 m

Mangoplah BESS

Figure 6-2 PCTs within the Subject Land

Map 2 of 3



Datum: GDA2020 / MGA Zone 55

0 100 200 m

Mangoplah BESS

Figure 6-3 PCTs within the Subject Land

Map 3 of 3

Threatened species with identified onsite or assumed to occur

Six fauna species were excluded from assessment due to having no suitable habitat. These species were:

- Regent Honeyeater
- Large-eared Pied Bat
- Swift Parrot
- Booroolong Frog
- Large Bent-winged Bat
- Brush-tailed Rock-wallaby

The following species were identified onsite during surveys:

- Barking Owl (*Ninox connivens*)
- Corben's Long-eared Bat (*Nyctophilus corbeni*)[3]
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*)
- Masked Owl (*Tyto novaehollandiae*)
- Southern Myotis (*Myotis macropus*)
- Squirrel Glider (*Petaurus norfolcensis*)
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)

Five species were 'assumed present' and have been included in this assessment as present, until targeted surveys have been completed during each species' survey period to confirm presence or absence or Expert Report provided. These include the following species:

Flora

- A Spear-grass (*Austrostipa wakoolica*)
- Euphrasia arguta (*Euphrasia arguta*)
- Yass Daisy (*Ammobium craspedioides*).

Fauna

- Golden Sun Moth (*Synemon plana*)
- Striped Legless Lizard (*Delma impar*).

Expert reports

Expert reports have been sought for the following species (Capital Ecology, 2025);

- Striped Legless Lizard (*Delma impar*)
- Golden Sun Moth (*Synemon plana*)
- Pink-tailed Legless Lizard (*Aprasia parapulchella*)

Pink-tailed Legless Lizard was excluded from the assessment as the advice from R. Speirs included that the subject land does not occur in the predictive model footprint (NSW DCCEEW, 2025) (Capital Ecology, 2025) for the species and therefore it does not support suitable habitat (Figure 6-4). No further assessment was required for the Pink-tailed Legless Lizard.

[3] Identified as 'potentially present' in microbat call identification report

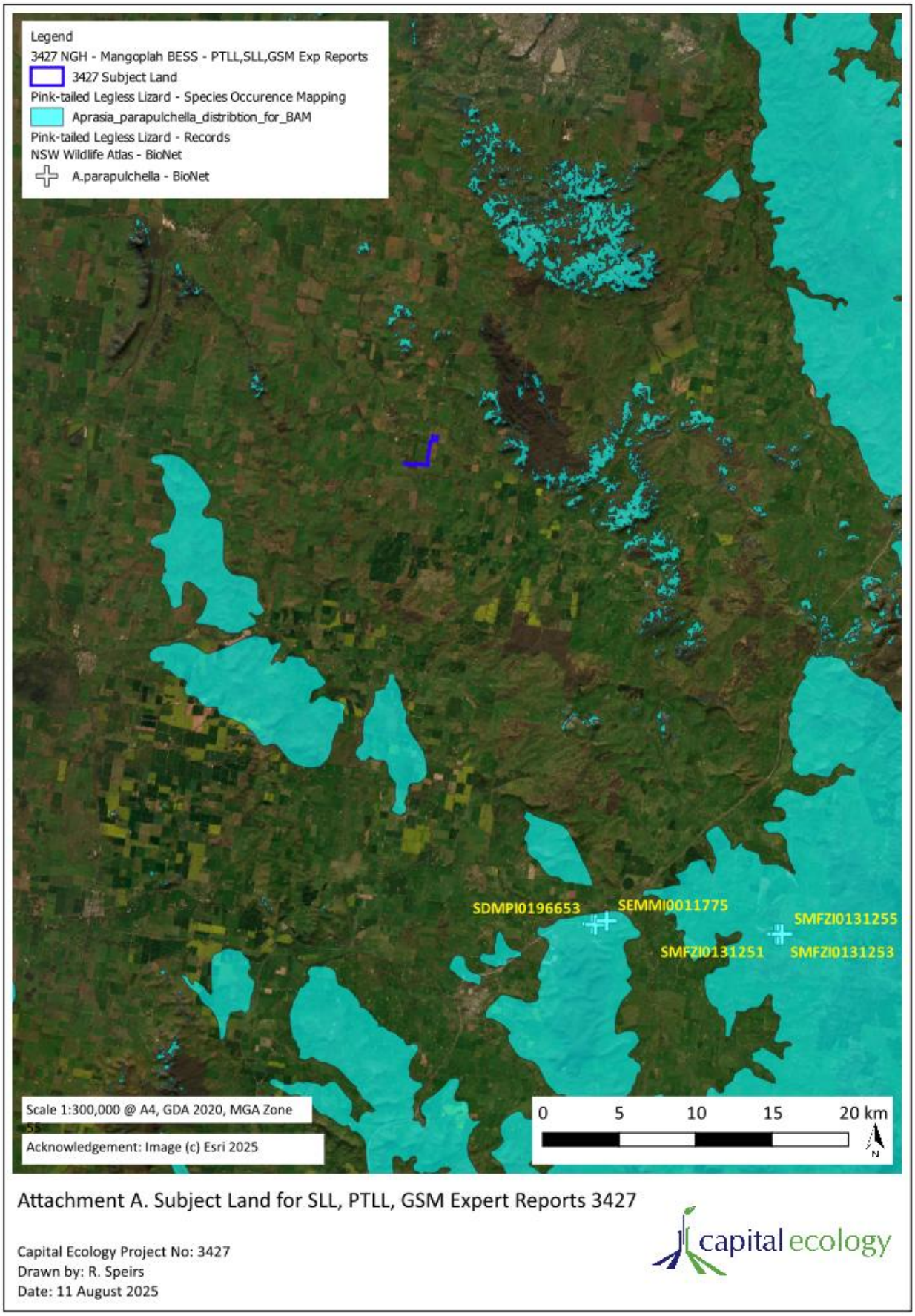


Figure 6-4 Distribution of the Pink-tailed Legless Lizard in proximity to the Subject Land (Capital Ecology, 2025)

It is noted that results of the expert reports for the Golden Sun Moth and Striped Legless Lizard are still pending and will be provided during the Response to Submissions Phase.

6.1.3. Potential impacts

After the consideration to avoid and minimise impacts, the following residual biodiversity impacts are considered relevant to the construction stage of the Project:

Direct impacts

The construction and operational phases of the Project have the potential to impact biodiversity values through habitat clearance (and associated noise and disturbance) and ongoing existence of infrastructure (which may create barriers to movement and generate noise and disturbance).

Direct impacts include:

- Clearing of 2.00ha of native vegetation
- Direct impacts to 9.56ha of suitable flora and fauna habitat for candidate species
- 40 individuals of the Yass Daisy (assumed present)
- Five Hollow-Bearing Trees (HBTs) to be removed.

Indirect impacts

Indirect impacts are those that are not directly related to clearing of native vegetation. Indirect impacts that contribute to key threatening processes from the proposal include soil and water contamination, spread of colonisation of weeds, reduced habitat connectivity, generation of noise, light and dust pollution.

Potential indirect impacts include:

- Creation of barriers to fauna movement
- Impacts of shading on retained native vegetation.
- Noise and light disturbance in proximity of the Development Footprint during construction and operation
- Invasion of key emerging weeds
- Cumulative loss of breeding habitat and competition for remaining resources
- Potential for soil erosion and water contamination within the Project Site
- Increased risk of fire.

Prescribed impacts

Prescribed impacts may affect biodiversity values in addition to, or instead of, impacts from clearing native vegetation. They can be direct and/or indirect impacts. These include:

- Habitat connectivity
- Water quality and hydrological processes
- Vehicle strike.

Summary of mitigations

Mitigation strategies developed to address direct impacts include:

- Impacts to native vegetation, threatened species and threatened species' habitat to be offset under the Biodiversity Offset Scheme (BOS).
- A trained wildlife handler or fauna spotter catcher (FSC) to be on-site during clearing to mitigate potential impacts to displacement, injury, or death of resident fauna during construction.

Considering mitigation strategies for indirect impacts:

- Inadvertent impacts of adjacent habitat or vegetation can be mitigated through clear physical demarcation of the boundary between areas to be retained and areas to be cleared.
- Edge effects can be mitigated through weed control protocols.
- Effects of increased vehicle traffic can be mitigated though implementing reduced vehicle speed limits across the site during construction and operation.
- Increased risk of starvation, exposure, loss of shade and shelter can be mitigated by relocating habitat features such as felled timber to adjacent retained habitat.
- Increased risk of noise and light pollution can be mitigated by limiting noise-producing operational work to standard working hours.
- Movement of weeds and pathogens can be mitigated by a basic vehicle (and machinery) hygiene protocol.
- Cumulative loss of HBT can be mitigated by timing removal to avoid breeding period of key species (owls, arboreal mammals, hollow-dependent birds).
- Trampling of threatened flora species can be mitigated through adequate delineation of the retained / removed vegetation boundary.
- Inhibition of nitrogen fixation and increased soil salinity can be mitigated by ensuring sediment and erosion controls are implemented.
- Wood collection can be mitigated by relocating felled timber to adjacent retained habitat.
- Disturbance to specialist breeding and foraging habitat can be mitigated by clear physical demarcation of boundaries between retained vegetation and cleared vegetation.
- Mobilisation of sediments can be mitigated through application of standard erosion and sediment control practices.
- Increased risk of fire can be mitigated through hazard reduction planning.

Prescribed impact mitigation includes:

- Mitigation of development impacts on human-made structures, non-native vegetation and habitat connectivity through clear physical demarcation of the boundaries between retained vegetation and cleared vegetation.
- Implementation of sediment and erosion controls to mitigate impacts of the development on water quality, water bodies and hydrological processes.
- Enforcement of vehicle speed limits across the site during construction and operation to minimise vehicle strikes on threatened fauna, or fauna part of a Threatened Ecological Community.

Offset obligation

An offset obligation is generated for the Project, due the clearing of native vegetation for the road upgrades and access (generating ecosystem credits) and species habitat (species credits). No offsets are generated for the BESS site itself. The Biodiversity Assessment Method calculates the obligation based on the extent and quality of the vegetation and habitat being removed and sometimes based on the number of individual flora species being removed. The Project proposes to meet the offset obligation by purchase of matching credits from the market or Biodiversity Credit Supply Fund. The third option of establishing as stewardship site to generate the credits required is not considered feasible for this Project, given the relatively small offset obligation. Table 6-2 and Table 6-3 below summarises the offset obligation for ecosystems and species.

Table 6-2 Ecosystem credit obligation

Vegetation zone	PCT	TEC	Impact area (ha)	Current VI score	Credits required
Zone 1 Good	277 - Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*	0.22	54.6	8
Zone 2 Moderate	277 - Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*	0.13	37	3
Zone 3 Low	277 - Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	*White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions*	1.50	35.2	33
Zone 4 Low	76 - Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	*Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia*	0.15	28.3	2
				Total credits	46

Table 6-3 Species credit obligation

Common name	*Scientific name*	Loss of habitat (ha) or individuals	No. of species credits required
Flora			
A Spear-grass*	*Austrostipa wakoolica*	2.00ha	36

Common name	***Scientific name***	**Loss of habitat** (ha) or individuals	**No. of species credits required**
Euphrasia arguta*	*Euphrasia arguta*	2.00ha	56
Yass Daisy*	*Ammobium craspedioides*	40 individuals	80
Fauna			
Barking Owl	*Ninox connivens*	0.23ha	7
Golden Sun Moth*	*Synemon plana*	2.00ha	29
Masked Owl	*Tyto novaehollandiae*	0.23ha	7
Southern Myotis	*Myotis macropus*	1.00ha	18
Squirrel Glider	*Petaurus norfolcensis*	0.05ha	1
Squirrel Glider in the Wagga Wagga Local Government Area	*Petaurus norfolcensis – endangered population*	0.05ha	1
Striped Legless Lizard*	*Delma impar*	2.00ha	29
		Total credits	**264**

*presence assumed

Adaptive management strategy for uncertain impacts

Adaptive management during construction and operation will be receptive to any new and relevant data that may arise through ongoing assessment and monitoring and is key to the successful implementation of the relevant management plans. Construction management plans for biodiversity will have an adaptive management component. This includes measures to respond to impacts that are predicted to have a low risk, if they occur at a higher frequency or severity than expected. Other impacts may occur during construction and can be dealt with adaptively in real time. The known low risk impact is trampling of unexpected threatened flora which may be present but have not been recorded over multiple surveys and seasons.

Serious and irreversible impacts

Serious and Irreversible Impact (SAII) *entities* are entities considered unable to withstand any further loss and for which offsets may not be achievable or appropriate. The BDAR evaluates these entities in more detail. The criteria used to determine if a *development* will have serious and irreversible impacts include impacts that:

a) Will cause a further decline of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to be in a rapid rate of decline, or
b) Will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very small population size, or
c) Impact on the habitat of a species or ecological community that is currently observed, estimated, inferred, or reasonably suspected to have a very limited geographic distribution, or
d) Impact on a species or ecological community that is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.

One TEC occurring within the Development Footprint is classified as a SAII entity, in addition to one threatened flora species, as indicated in Table 6-4 below.

Table 6-4 Entities at risk of an SAII

SAII Entity	Reason for inclusion in assessment
Threatened Ecological Communities	
White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions.	Included in current list of entities at risk of an SAII and is likely to be impacted by the proposal
Flora	
Euphrasia arguta *Euphrasia arguta*	Included in current list of entities at risk of an SAII and is likely to be impacted by the proposal

Threatened Ecological Community

The majority of the TEC to be impacted is comprised of a Derived Grassland in low condition. This grassland is a mix of native and exotic species and heavily disturbed from livestock grazing and agricultural activities. The higher condition Box-Gum Woodland have mostly been avoided by Project design. The vegetation integrity scores for each of the zones are shown in the following table.

Table 6-5 Vegetation Integrity Score for the SAII TEC

Vegetation zone ID	PCT/Zone	Composition condition score	Structure condition score	Function condition score	Vegetation Integrity Score	HBTs present?
1	277 Good	49.5	86	38.2	**54.6**	Yes
2	277 Moderate	23.9	43.1	57.6	**39**	Yes
3	277 Low	54.1	55.3	14.6	**35.2**	No

Euphrasia arguta (Euphrasia arguta)

Approximately 2ha of potential habitat would be directly impacted by the Development Footprint as a result of assumed presence. This was calculated utilising GIS, satellite imagery and data collecting during field investigations.

The following actions have been undertaken to avoid and minimise direct and indirect impacts (including mitigation measures):

- Clear physical demarcation of clearing extent
- Weed control and hygiene protocol to prevent the spread of pathogens and weeds
- Offset unavoidable clearing impacts.

Offsets required under the EPBC Act

With the implementation of mitigation measures, the Project is unlikely to lead to a significant impact for any entity listed under this act. A referral (EPBC2025/10220) under the EPBC Act to the Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW) was undertaken to obtain certainty. The project was determined 'not a controlled action' by the DCCEEW. As such no further assessment or approval under this act is required.

6.1.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on local and regional biodiversity is considered to be manageable.

Safeguards and mitigation measures relating to biodiversity is outlined in Table 6-6 below.

Table 6-6 Biodiversity mitigation measures

Mitigation number	Mitigation measure	Project Stage

B01	A Biodiversity Management Plan (BMP) would be prepared prior to construction to include all recommendations of the BDAR. It will include but not be limited to:
	• Unexpected Threatened Species Finds Procedure will include:
	  ○ Stop work procedures, where relevant
	  ○ Further surveys to delineate the population
	  ○ Assessment of Significance to characterise the risk and/or liaison with appropriate agencies.
	• Implementation of hygiene protocols for plant and equipment entering and exiting the construction site.
	• Management of wastewater to the receiving environment
	• Clear physical demarcation of the boundary between areas to be retained and areas slated for clearing
	• Waste Management protocols
		All Stages

Mitigation number	Mitigation measure	Project Stage
	• Weed and pathogen management plan and protocols • Clearing limits (refer Appendix F.1) • Trained ecologist on site during clearing events	
B02	As part of the overall Environmental Management System (EMS) to ensure protection of waterways: • Preparation of a Stormwater Management Plan (SWMP) and Erosion Sediment Control Plan (ESCP) in accordance with the 'Blue book' (Landcom, 2004).	Prior to construction
B03	Adaptive management strategy to prevent trampling of unexpected threatened flora. • All plans will be progressively reviewed and updated throughout all stages • All adaptive management strategy plans including the BMP will form part of an overall Environmental management strategy.	All Stages
B04	Retire the offsets as calculated by the BDAR in accordance with the Biodiversity Offsets Scheme	Prior to construction

6.2. Aboriginal heritage

This section summarises the findings of the Aboriginal Cultural Heritage Assessment (ACHA) undertaken by NGH Pty Ltd, provided in Appendix F.2. The ACHA was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential Aboriginal Heritage impacts of the Project and the recommended measures to mitigate them.

6.2.1. Approach

The ACHA report was prepared in accordance with the following guidelines:

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

It includes desktop research and field surveys.

Consultation with Aboriginal stakeholders was undertaken in accordance with clause 60 of the *National Parks and Wildlife Amendment Regulation 2019* following the consultation steps outlined in Aboriginal cultural Heritage Consultation requirements for Proponents (DECCW , 2010a).

As a result of this process, seven Aboriginal groups registered their interest in the Project. These Registered Aboriginal Parties (RAPs) included:

- Bundyi Aboriginal Cultural Knowledge Group
- Sonione Wakabut Rogers
- Southern West Yiradyuri Clans, Land, Water and Sky Country Aboriginal Corporation
- Kalthi Consultancy
- Yurwang Gundana Consultancy Cultural Heritage Services
- A&K Cultural Heritage
- Wagga Wagga Local Aboriginal Land Council.

6.2.2. Existing environment

Archaeological context

The Project Site is within an area identified as part of the Wiradjuri language group. This is an assemblage of many small clans and bands speaking a number of similar dialects (Horton 1994; Tindale 1974; MacDonald 1983).

The Wiradjuri language group was the largest in NSW prior to European settlement. The borders were however, not static; expanding and contracting over time to the movements of smaller family or clan groups through periods of drought and abundance.

The Aboriginal heritage Information Management System (AHIMS) provides a database of previously recorded Aboriginal heritage sites in NSW although it is not conclusive evidence of the presence or absence of Aboriginal heritage sites. On 4 September 2024, a search of the AHIMS database was undertaken over an area of approximately 13km^2 centred on the Project Site. The AHIMS Client Service ID was 927212.

There were 64 Aboriginal sites and no declared Aboriginal Places recorded within the search area. There are no AHIMS recorded sites within the Project Site and no previously recorded AHIMS sites within 500m of the Project Site. The nearest recorded site is approximately 3 km to the northeast.

The results of the AHIMS database search are summarised in Table 6-7.

Table 6-7 Breakdown of previously recorded Aboriginal sites in the region.

Site type	Number	%
Artefact	38	59.3
Modified Tree	23	35.9
Water Hole	1	1.6
Aboriginal Ceremony and Dreaming	1	1.6
Aboriginal Resource and Gathering, Aboriginal Ceremony and Dreaming, Grinding Groove	1	1.6
Total	**64**	**100**

The most likely site type would be artefact scatters, isolated finds, or culturally modified trees (where old growth trees remain). It is also possible that areas of Potential Archaeological Deposits (PADs) will be identified within the Project Site. It is noted that there is minimal potential for scarred trees to be identified within the proposed development footprint for the Project due to previous extensive tree clearance however, any isolated remnant old growth native trees present have the potential to contain evidence of Aboriginal cultural modification.

Additional searches

Other heritage register searches were also undertaken to identify any Aboriginal heritage items or places in proximity to the Project Site. The following resources were used as part of this assessment:

- The NSW State Heritage Inventory (SHI), this includes items on the State Heritage Register and items listed by state agencies and local government, to identify any items currently listed within or adjacent to the Project Site.
- The Australian Heritage Database, this includes items on the National and Commonwealth Heritage Lists, to identify any items that are currently listed within or adjacent to the Project Site.

The results of the NSW SHI database search indicated there are five previously recorded Aboriginal Places listed under the NPW Act within the Wagga Wagga City LGA and one within the Lockhart LGA. None of these sites are located within or adjacent to the Project Site. The closest—The Rock Nature Reserve (Gazette No. 57)—is located more than 22km to the northwest (in the Lockhart LGA).

The results of the Australian Heritage Database search indicated that there are no items listed within or in close proximity to the Project Site.

No other known previously recorded heritage sites are located within or adjacent to the Project Site.

Archaeological investigation summary

The fieldwork was undertaken by the team of two archaeologists and two representatives of the Registered Aboriginal Parties (RAPs) for the Project, over a single day on February 17, 2025.

Five new Aboriginal sites were identified during the survey, four within the Project Site and one (a scarred tree) 45m north of the Project Site. These sites were all located either within or in proximity to the existing vehicle access road. No Aboriginal sites were identified within the proposed BESS site. No areas of PAD were identified within the Project Site. The details of these sites are provided in Table 6-8 and Figure 6-5.

Table 6-8 Aboriginal cultural heritage sites identified during the site survey

AHIMS ID	Site Name	Site type	Location	Description
56-1-0777	MBESS AS1	Artefact scatter	Within existing north-south vehicle access track	Five quartz flakes and flake fragments (Artefact # 1-5 in Table 4-3 of the ACHA (Appendix F.2)
56-1-0778	MBESS AS2	Artefact Scatter	Within existing north-south vehicle access track	Quartz flaked piece and distal flake (Artefact #7 and 8 in Table 4-3 of the ACHA
56-1-0779	MBESS IF1	Isolated find	Within existing north-south vehicle access track	Single white quartz flake (Artefact #6 in Table 4-3 of the ACHA
56-1-0781	MBESS IF2	Isolated find	Within existing north-south vehicle access track	Single white quartz flake (Artefact # 9 in Table 4-3 of the ACHA
56-1-0780	MBESS CMT1	Scarred Tree	Outside of Project Site, approx. 45m north of existing east west vehicle access track	Living grey box, single oval scar with regrowth, west facing, insect damage scar: 2.2m length x 0.48m width by 0.23m depth, scar height 0.1m off ground. Table 4-3 of the ACHA

The lack of sites identified within the BESS area itself is not unexpected given the current and previous land use and the overall low surface visibility however given the exposures present it is considered that this is also likely to be reflective of the sparse and dispersed potential for stone artefacts to occur within the Project Site.

Based on the land use history of the development footprint, and an appraisal of the results from the field survey, it was noted that there is negligible potential for the presence of intact subsurface deposits with high densities of objects within the Project Site.

Following survey, a copy of the draft ACHA report was provided to Registered Aboriginal Parties (RAPs) for review as well as specifically inviting comment on the results, the significance assessment and the recommendations.

A comprehensive account of the consultation steps undertaken to comply with the ACHCRP, as well as a summary of the actions completed by NGH, and responses received from RAPs are provided in Appendix F.2.

6.2.3. Potential impacts

The low-density and isolated nature of the quartz stone artefact Aboriginal sites recorded across the Project Site provides little research value apart from what has already been gained from the information obtained

during this assessment. This information relates more to the presence of the sites and in the further development of Aboriginal site modelling for the local area, which has been achieved by the recording undertaken as part of this assessment. While all four of the sites with stone artefacts that were recorded during this assessment are noted to have total loss of scientific value by the proposed works, there are likely to be a number of similar sites in the local area and therefore the impact to the overall local archaeological record in the region is low. This is especially evident when considering that these sites are all within disturbed contexts along an existing access track. Furthermore, it is also noted that that the modified tree (MBESS CMT1) which was recorded is located outside the Project Site and will be avoided by the proposed works.

Given the proposed impacts to the four Aboriginal sites with stone artefacts identified during this assessment within the Project Site (MBESS AS1, MBESS AS2, MBESS IF1 and MBESS IF2), the assessment of harm overall for the Project is assessed as low.

Unexpected finds

Although the pedestrian survey undertaken for this Project covered the entire Project Site, it is possible that unrecorded Aboriginal heritage objects may be identified during construction, operation, maintenance, upgrading and decommissioning works for this BESS in the future. These would be expected to occur as isolated stone artefacts and/or low-density artefact scatters.

All Aboriginal heritage objects are protected under Part 6 of the NPW Act, though in SSD, consent may be issued that allows for conditional harm to Aboriginal objects. However, there are some circumstances where despite undertaking appropriate heritage assessment prior to the commencement of works, Aboriginal cultural heritage items are encountered that were not anticipated that may be of scientific and/or cultural significance. Therefore, it is possible that unexpected heritage items may be identified during construction, operation and maintenance works. If an unexpected find of an Aboriginal object and remains are discovered during construction, then an Unexpected Finds Protocol would be followed. The protocol is detailed in the ACHA and includes a procedure for Unexpected human skeletal remains for unexpected Aboriginal objects (Mitigation measure AH8).

Datum: GDA2020 / MGA Zone 55

NGH

0 0.5 1 km

Mangoplah BESS

Figure 6-5 Aboriginal Heritage recorded sites

6.2.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on Aboriginal cultural heritage is considered to be manageable.

Safeguards and mitigation measures relating to Aboriginal heritage is outlined in Table 6-9 below.

Table 6-9 Aboriginal heritage mitigation measures

Mitigation number	Mitigation measure	Project Stage
AH1	The Environment Management System (EMS) would incorporate safeguards and mitigation relevant to Aboriginal heritage, including an unexpected finds protocol for Aboriginal objects (refer Appendix B1, of Appendix F.2 Aboriginal heritage should also be included in any induction for the Project.	All stages
AH2	The works must avoid the modified tree site MBESS CMT1 which is located approximately 45m north of the Project Site. A minimum 10m buffer is required to ensure no inadvertent harm occurs to this Aboriginal site. As this site is outside the Project Site and on private property no long-term management or monitoring of this site is required as part of the Project.	All stages
AH3	If complete avoidance to any of the valid Aboriginal sites with stone artefacts recorded within the Project Site (MBESS AS1, MBESS AS2, MBESS IF1 and MBESS IF2) is not possible, a reasonable attempt to relocate and collect the surface stone artefacts as part of a surface collection salvage program must occur within the approved development footprint at each of these recorded locations. Until surface collection salvage has occurred a minimum 5m buffer must be observed around MBESS AS1, MBESS AS2, MBESS IF1 and MBESS IF2 for construction activities.	Prior to construction
AH4	The collection of the surface stone artefacts within the approved Development Footprint should be undertaken by an archaeologist with representatives of the RAPs, as selected by the Applicant. Once the stone artefacts have been salvaged from within the Development Footprint these artefacts should be relocated to one of the proposed reburial locations and the reburial must be consistent with Requirement 26 of *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*	Prior to construction

Mitigation number	Mitigation measure	Project Stage
	and/or the wishes of the RAPs. The relocation area must not be subject to any future ground disturbance and must be registered on the AHIMS database.	
AH5	An Aboriginal Site Impact Recording Form (ASIRF) must be completed and submitted to AHIMS following harm for each site collected or destroyed from salvage and/or construction works.	All stages
AH6	The Applicant should prepare a Cultural Heritage Management Plan (CHMP) to detail the address the potential for finding additional Aboriginal artefacts and objects during the construction of the Project. The CHMP should include at a minimum the following items: • Address salvage requirements including a methodology for surface collection (provided in Appendix C of Appendix F.2) for Aboriginal heritage within the development footprint • Ongoing consultation requirements • An unexpected finds procedure to manage any objects suspected to be Aboriginal in origin during the construction, maintenance, operational and decommissioning works (Appendix D of Appendix F.2) • Detail the protection of Aboriginal heritage outside the development footprint (MBESS CMT1) and Include requirements for heritage to be included as part of the site inductions and note that all employees • Contractors and utility staff working on site will receive Aboriginal Cultural Heritage Awareness Training in the form of an induction before they begin work on site. Preparation of the CHMP should be undertaken in consultation with the RAPs.	Prior to construction
AH7	If unexpected Aboriginal objects are identified during works the relocation of the objects should be undertaken by a qualified archaeologist with a representative of the RAPs, as selected by the Proponent/Project Owner, and be consistent with Requirement 26 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*. The relocation area must be within the Subject Lots in an area that will not be disturbed into the future. If an alternative relocation area outside the Subject Lots for the Project is required due to unforeseeable reasons, additional consultation with the RAPs must occur.	All stages

Mitigation number	Mitigation measure	Project Stage
AH8	In the unlikely event that human remains are discovered during the development works, all work must cease in the immediate vicinity and the unexpected find protocol followed. The local NSW police must be notified. Further assessment would be undertaken to determine if the remains were ancestral Aboriginal or not. In the event that any remains are determined to be ancestral Aboriginal in origin Heritage NSW must be notified.	All stages
AH9	Further archaeological assessment would be required if the proposed development activity extends beyond the areas assessed. This would include consultation with the RAPs and may include further field survey.	All stages

6.3. Access and traffic

This section summarises the findings of the Traffic Impact Assessment (TIA) undertaken by Amber Organisation Pty Ltd on behalf of the Applicants, provided in Appendix F.3. The TIA was prepared to respond to the Project SEARs (Appendix A) and assess the construction, operational and decommissioning traffic impacts, and the access arrangements of the Project. and the measures required to mitigate them.

6.3.1. Approach

The traffic assessment has been undertaken in accordance with the *TfNSW Guide to Traffic Impact Assessment* (TfNSW, 2025) and relevant Austroads Guidelines. It:

- Details of both light and heavy vehicle traffic volumes and proposed transport routes during construction, operation and decommissioning
- Assesses the potential traffic impacts of the Project on road network function and safety
- Assesses the capacity of the exiting road network to accommodate the type and volume of traffic generated by the Project, including OSOM vehicles
- Details of measures to mitigate and/or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control dust generated by traffic volumes
- Details of access roads and how these connect to existing road network and ongoing operational maintenance.

Table 6-10 defines the traffic assessment terminology that has been used as part of the assessment.

Table 6-10 Traffic Assessment Definitions (Source: Amber, 2025)

Terminology	Definition
Vehicle Trip	A trip is defined as a one-way vehicular movement from one point to another excluding the return journey. Therefore, a return trip to and from the site is counted as two trips.
Vehicles per Day (vpd)	The volume of traffic (number of trips) occurring within a 24-hour period. For traffic volumes associated with the Project, this value is generally an even number to reflect the return trip associated with each vehicle.
Vehicles per Hour (vph)	The volume of traffic (number of trips) occurring within a one-hour period.
Heavy Vehicle	A vehicle with a Gross Vehicle Mass or Aggregate Trailer Mass of more than 4.5 tonnes as defined in the Heavy Vehicle National Law.
General Access Vehicle	General Access Vehicles don't require a permit or notice to access road networks; these vehicles have as-of-right access to the network unless signposted otherwise (e.g. a bridge tonnage restriction).

Terminology	Definition
Restricted Access Vehicle	Restricted Access Vehicles include Class 1, 2 or 3 vehicles that operate under a notice or permit and vehicles operating under higher mass limits that have restrictions on the parts of the road network they can access
Oversize and/or Overmass (OSOM) Vehicle	OSOM vehicles are defined as Class 1 vehicles under the Heavy Vehicle National Law. A vehicle or vehicle combination is considered to be OSOM if it exceeds any general access mass or dimension limits.
High Risk Oversize/Overmass Vehicle (requiring escort)	OSOM vehicles exceeding certain criteria for length, height, rear overhang, forward projection, width or total combination weight. These vehicles are subject to Transport Management Plans (TMPs) which provide a comprehensive planning and execution focus to ensure that these movements are carried out in a safe and responsible manner with reduced impact on other road users and road infrastructure. These vehicles also typically require pilot vehicle escort.

6.3.2. Existing traffic environment

The Hume Highway is a sealed 4 lane dual carriageway (two lanes in each direction) that is maintained by Transport for NSW (TfNSW). The Hume Highway is one of Australia's most significant major highways and links the two state capitals of Sydney and Melbourne. The Hume Highway is an approved route for High Mass Limit (HML) B double vehicles and approved for B-triples and AB triples. The road supports a variety of vehicles, from B-doubles, caravan and tourist traffic, and standard freight deliveries between towns and interstate.

Holbrook Road is classified as a regional road, managed by Wagga Wagga City Council, that runs in a general north-south alignment between Red Hill Road in the north to its continuation as Holbrook Wagga Road in the south. It has a typical carriageway width of 6.6m which accommodates one lane of vehicle traffic in each direction. The posted speed limit is100km/hr near the site.

Traffic volumes

Amber commissioned a tube count on Holbrook Road at the proposed site access to determine the existing traffic volume. The tube count was undertaken from 1 March 2025 to 8 March 2025. The findings of the survey indicated Holbrook Road currently experiences a moderate level of daily traffic in the order of 1,006 vehicles per day which is split relatively evenly between northbound and southbound vehicles (refer to Table 6-11 below). There are marginally more vehicles travelling south over north in the morning, and the reverse applies to the afternoon.

Table 6-11 Holbrook Road Traffic Volumes - Proposed Site Access (Source, Amber 2025)

	Weekday Traffic (vpd)	Weekday AM Peak - 8:00 (vph)	Weekday PM Peak - 16:00 (vph)	85th Percentile Speed	Heavy Vehicle Percentage
Northbound	475	38	46	110.4 km/hr	25.2%
Southbound	531	48	41	107.1 km/hr	
Both Directions	1,006	86	87	108.9 km/hr	

Overall, the data indicates Holbrook Road currently accommodates a relatively low level of traffic for its road classification and is able to accommodate an increase in vehicle traffic.

Public transport

There are no public transport services provided within the vicinity of the site.

There are two private bus services provided along Holbrook Road within the vicinity of the site. Both services are provided once per day.

Restricted vehicle access

The NHVR Restricted Access Vehicle Map for the surrounding area shows that the surrounding State Road network is B-Double approved routes. Holbrook Road is an approved route which is subject to the following travel condition:

> *Travel is only permitted where the destination of the driver lies within the length of road that is between the Greater Hume Local Government Area boundary and the intersection with Red Hill Road, or, in the event of a declared emergency - travel is permitted in conjunction with a detour route that is organised by the road authority.*

The surrounding State Road network are B-Double approved routes. Accordingly, the site has access to the B-Double approved road network via Holbrook Road.

Class 1 OSOM Vehicles

The NHVR Over Size Over Mass (OSOM) Load Carrying Vehicles Network map for the surrounding area indicates that the site has access to the Class 1 OSOM approved road network via Hume Highway. Holbrook Road is unrated and would require approval from Wagga Wagga City Council and Greater Hume Council for Class 1 OSOM vehicles to operate along these roads.

The Project Site has access to the Class 1 OSOM approved road network via Hume Highway. Holbrook Road is unrated and would require approval from Wagga Wagga City Council and Greater Hume Council for Class 1 OSOM vehicles to operate along these roads.

Special Purpose Vehicles (SPVs)

Vehicles built for a purpose other than carrying goods such as a mobile crane, a concrete pump or drill rig are defined as Special purpose Vehicles (SPVs).

Figure 6-6 shows that shows that Hume Highway is approved with travel conditions near the site for SPV Level 3 vehicles The travel condition is as follows:

> *Vehicles exceeding 2.5 metres wide or 22 metres long are not permitted to travel between sunrise and sunset during public holiday periods (including 23 December in one year to 3 January of the following year inclusive).*

Figure 6-6 NVHR SPV Level 3 Network (Source, Amber 2025).

Crash history

The crash database provides the location and severity of all injury and fatal crashes for the five-year period from 2019 to 2023. The search area included the following roads:

- Holbrook Road between Burke Street and Paper Forest Road
- All associated intersections

Two fatal off road to the right on bend crashes occurred within the review period. The crashes occurred approximately 3.6km apart on Holbrook Road and are both approximately 1.5km north and south of the proposed access point (respectively) which is on a straight section of the road.

The crash type is not unexpected on single lane rural roads and does not appear to be reflective of a specific road safety issue at the proposed site access location given the isolated nature of the crashes.

6.3.3. Potential impacts

Traffic assessment

The potential impacts on local traffic and state roads as a result of the Project could include:

- Damage to the road assets both state and local
- Delays for local traffic
- Increased risks to road users

Potential impacts are most relevant to peak construction, when Project traffic volumes would be at their highest, but operational impacts are also considered where relevant in the evaluation below.

Construction phase

Traffic generation

It is assumed that the peak hour for construction traffic will occur at the start and end of the day when workers are transported to/from the Project Site. Most workers will typically arrive on-site between 6:00am and 7:00 am and depart between 5:00pm to 7:00pm. The construction traffic volumes for the Project have been provided by the Applicant. It is anticipated that during peak construction the Project would generate up to 120 light vehicle trips and 64 heavy vehicle trips per day (refer back to Table 3-2 for estimated traffic volumes expected to be generated during the construction period of the Project).

Non-High Risk OSOM Vehicles

There is a mix of non-high risk OSOM vehicles required for the construction. It is anticipated that the vehicles would comply with the Class 1 exemption notices and would be able to operate on the approved NSW Special Purpose Vehicle Network. The vehicles would access the site directly from Holbrook Road which is rated to accommodate complying vehicles.

Many of these vehicles would not create daily trips in and out of the Project Site. It is expected that there will influxes of arrivals and departures from the site depending on the phase of construction. Once arrived, they would remain until not required, before being removed from the site. The trips would be generated outside of peak site access hours.

Vehicle types and any necessary permits would be confirmed and obtained (as needed) once the construction methodology is determined.

High-Risk OSOM Vehicles

The Applicant has advised that three High Risk OSOM vehicles may be required for the delivery of the largest plant and equipment. These vehicles may exceed the Class 1 mass and/or dimension requirements and are subject to separate permit applications and regulations, including use of a vehicle escort.

The three high risk OSOM vehicles include:

- Two vehicles to transport the main transformer and spare transformer
- One vehicle to transport the modular building resulting in the vehicle being classed as oversize in one direction only for both construction and decommissioning.

High Risk OSOM vehicles will contribute the smallest percentage of vehicles accessing the Project Site during the construction period and are subject to separate permit applications and regulations.

These vehicles are expected to travel outside of the peak periods and would be subject to the road upgrades and mitigation measures in line with the Transport Management Plan (TMP). It is expected that the access routes as assessed from the Port of Melbourne or the Port of Geelong. The OSOM vehicle would be provided with escort and pilot vehicles in accordance with relevant authority requirements.

Traffic distribution

It is anticipated that the majority of the workforce for the construction of the Project would be located in Wagga Wagga as well as range of other towns to the south of the site including Holbrook. During the morning peak, all vehicle trips would be toward the site and in the evening peak all vehicle trips would be away from the site. The majority of heavy vehicle trips would be distributed throughout the day and would be split evenly between inbound and outbound trips.

Accordingly, the following distribution for the AM peak hour has been adopted:

- Light vehicles: 50% from the north, 50% from the south;
- Heavy Vehicles delivering materials: 80% from the north, 20% from the south; and
- Heavy Vehicles delivering plant and large project components: 100% from the south.

Based on the traffic distribution above the estimated vehicle trips generated by the site during the peak hours are shown in Figure 6-7.

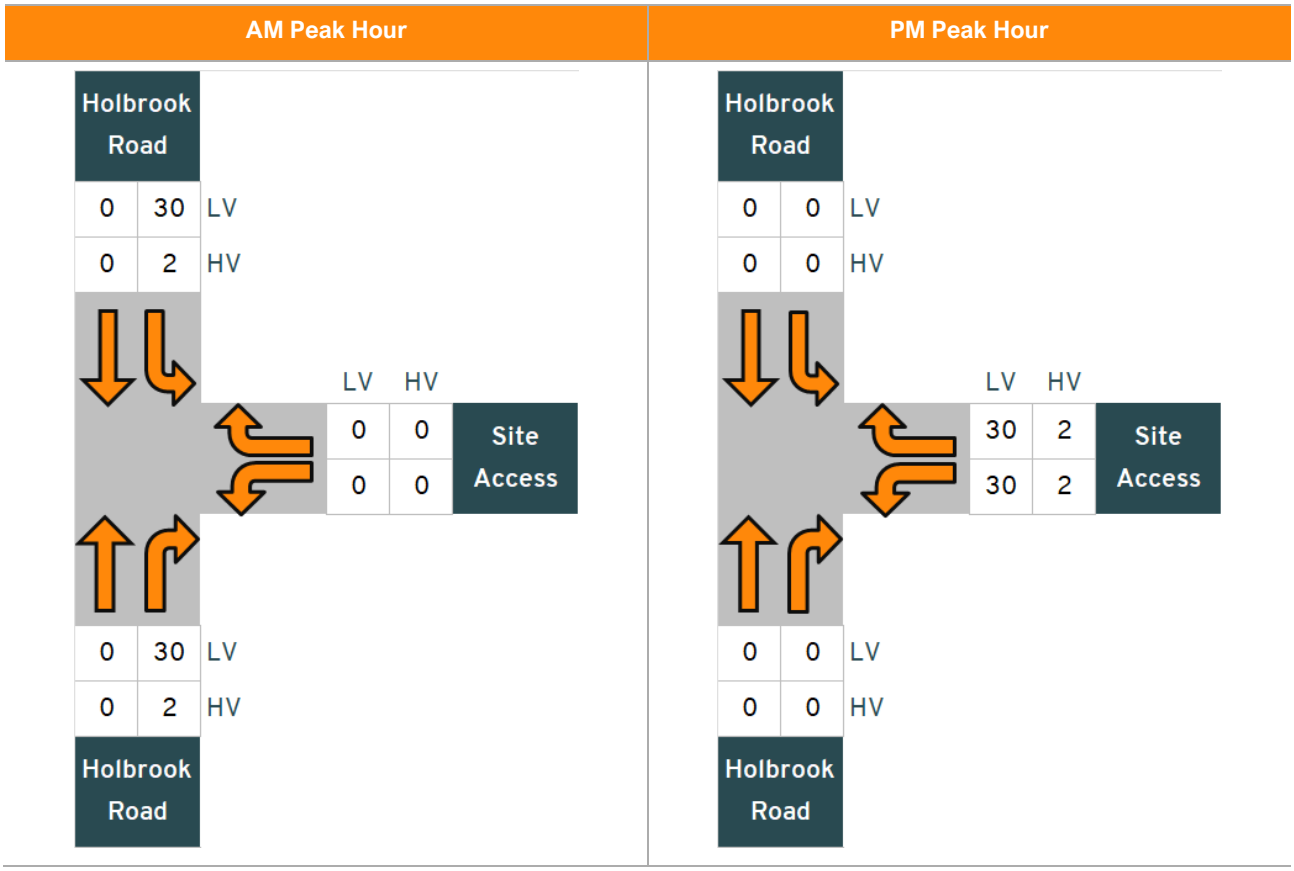


Figure 6-7 Expected peak hour Project traffic volumes during peak construction (Source, Amber 2025)

Cumulative traffic impacts

Potential cumulative impacts and nearby major projects are covered in more detail in Section 7.3 of this EIS. Regarding potential cumulative traffic impacts, the TIA has considered that the following Projects may generate additional vehicle traffic within and around Wagga Wagga:

- Wagga Wagga Lithium-Ion Battery Recycling Facility (Exhibition)
- HumeLink (Approved)
- Inland Rail – Albury to Illabo - Bomen Yard Clearances (Approved)
- Project EnergyConnect (Approved)
- Gregadoo Solar Farm (Approved)
- Livingstone Solar Farm
- Uranquinty Compressor Station (Prepare Mod Report)
- Morven Solar Farm (Prepare EIS)
- Culcairn Solar Farm (Under construction)
- Jindera BESS (Prepare EIS).

The vehicles generated by these projects would be distributed on the surrounding road network and are expected to have a minimal cumulative impact on the operation of the road network. None of the assessed projects are expected to utilise Holbrook Road as part of their designated routes for construction traffic. Accordingly, any cumulative traffic impacts with surrounding projects are expected to be minimal.

Traffic assessment

All traffic travelling to/from the Project Site would travel via Holbrook Road. An assessment of the mid-block operation of the road has been carried out to determine the ability of the road network to accommodate the traffic expected to be generated during the peak construction period.

Traffic modelling was undertaken for the construction peak hours (both morning and afternoon) to determine the site access' level of service. The expected traffic volumes along Holbrook Road have been determined for the morning peak hour (6:00-7:00am) and evening peak hour (5:00pm-6:00pm) during the peak construction period. The peak construction project traffic volumes are shown in Figure 6-8.

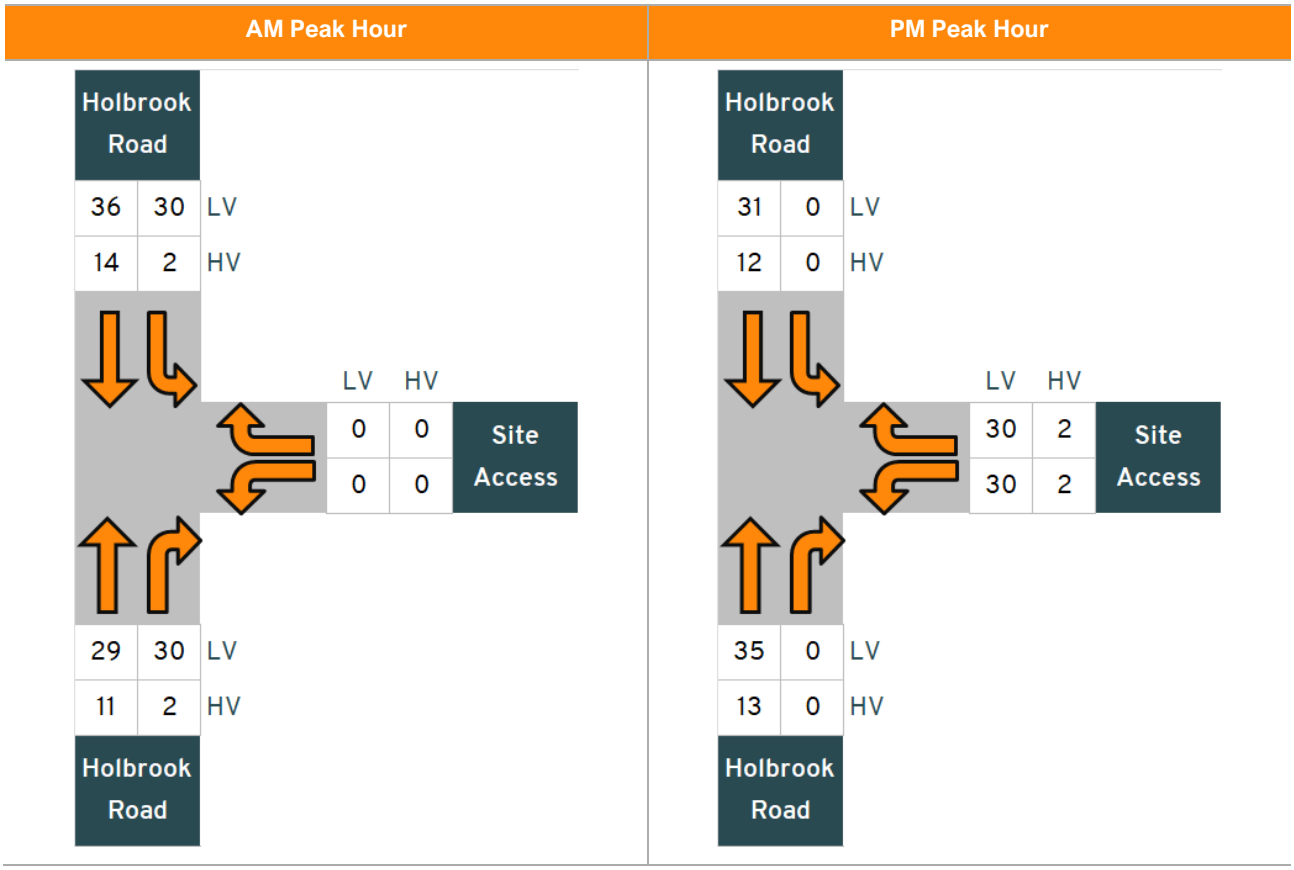


Figure 6-8 Peak construction traffic volumes (Source, Amber 2025)

The traffic volumes accommodated on Holbrook Road during the peak hours are shown within Table 6-12 below, which is been based on the surveyed traffic volumes presented within Section 6.3.2 (existing volumes) and the anticipated traffic volumes of the proposal presented within Figure 6-8 above (expected volumes).

Table 6-12 Expected peak hour traffic volumes during construction (Source, Amber 2025)

Road	AM Peak			PM Peak		
	Existing Volume	Expected Volume	Level of Service	Existing Volume	Expected Volume	Level of Service
Holbrook Road	86	154	A	87	155	A

Therefore, during the peak hours of construction Holbrook Road would accommodate approximately 155 vehicles per hour during peak construction which is well within the capacity of the road network, and the road is expected to continue to operate with a good level of service.

Accordingly, the road network is able to readily accommodate the traffic generated by the development during the average construction and operational periods.

Site access turn treatments

An assessment has been undertaken for the site access from Holbrook Road in order to ensure vehicles are able to safely leave the Regional Road network in accordance with the *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings* (Austroads, 2020). The requirement to provide turn facilities at the intersection is primarily generated during the morning peak hour when the workforce access the site, which occurs from 6:00am to 7:00am. A design of the site access is included in Appendix E of the TIA (Appendix F.3).

The assessment of the road network peak hour scenario shows that the intersection would still generate a requirement for a Basic Left Turn (BAL) and a Basic Right Turn (BAR) treatment (Figure 6-9 and Table 6-13). Accordingly, the provision of a BAL and a BAR treatment at the intersection is considered suitable.

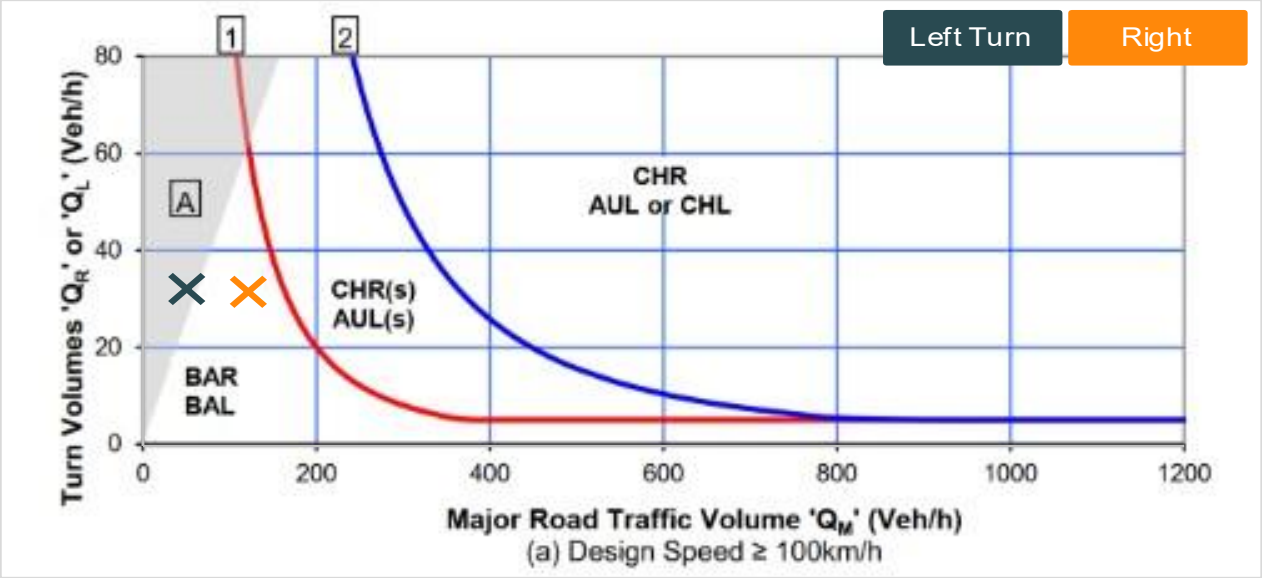


Figure 6-9 Figure 3.25 of Austroads Guide to Traffic Management Part 6 for Road Network Peak Hour

Table 6-13 Turning Volumes for Road Network Peak Hour Turn Treatment Calculations (Source, Amber 2025)

Turning Treatment	Traffic Volume (vph)		Requirement
	Turn Volume	Major Road	
Right Turn	32	122	BAR
Left Turn	32	50	BAL

Swept path assessment

A swept path assessment has also been undertaken to confirm the site access can accommodate heavy vehicles using the Autodesk Vehicle Tracking software. The assessment is provided in the strategic design included in Appendix E of the TIA, and demonstrates the access has been suitably designed to cater for the Project traffic expected to access the site as follows:

- 26 metre B-Doubles from both directions; and
- High risk OSOM Vehicles from the south.

The site access has been designed to ensure that simultaneous movements can occur with B-Double vehicles accessing and egressing the site at the same time. Accordingly, it is concluded that the site access has been suitably designed and is able to accommodate the vehicles expected to access the site.

Site distance

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (Austroads, 2010) specifies the safe intersection sight distance (SISD) required for various design speeds. Given Holbrook

Road has a speed limit of 100km/hr a design speed of 110km/hr has been adopted which requires an SISD of 300m based on a reaction time of 2.5 seconds.

The available sight distance at the intersection exceeds the requirements of the Austroads Guide given the relatively flat and straight alignment of the road network.

Access route

The Applicant advised that BESS components are expected to be delivered Port of Geelong or Port of Melbourne. Table 6-14 summarises the heavy vehicle assessment findings (refer to Appendix F.3).

Table 6-14 Construction heavy vehicle route assessment findings

Port of origin	Vehicle type	Special provisions / considerations
Port of Melbourne	B-Double	The route measures approximately 426km in length and all roads approved for 26 metre B-Double access as outlined in the NHVR Network Map. Holbrook Road is approved with conditions as sated in Section 6.3.2.
	OSOM	The proposed OSOM route between Port of Melbourne and the Project Site has a total length of 441km. The vehicle is able to access the site with suitable traffic management measures.
Port of Geelong	OSOM	The proposed OSOM route between Port of Geelong and the site has a total length of 491km. The vehicle is able to access the site with suitable traffic management measures.
Port of Melbourne **Port of Geelong**	General Access Vehicles (GAV)	All heavy vehicle Project traffic up to and including semitrailers would be classified GAV which have as-of-right access to the road network unless signposted otherwise. These vehicles would travel along a direct route between Port of Melbourne and the Project Site.

High-risk OSOM vehicle route assessment

The haulage route has been assessed and has been deemed suitable for the transport of OSOM vehicles, Escorts and spotters will be required for the entire route and would be required to control traffic and ensure the vehicle and load are clear of infrastructure. Written approval will be sought from the relevant rail authorities for all level crossings as part of the TMP. The OSOM haulage route is shown in Figure 6-10 below.

It is expected that vehicle loading will be within the allowable limit for all bridges, culverts and other structures on the State road network.

The assessment shows that the minimum clearance for underpasses of 5.1m is provided along the entire route. The available height clearance is appropriate to accommodate the required OSOM vehicles.

It is recommended that any OSOM movements be timed so they do not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network, which can be undertaken as part of the permit application.

Figure 6-10 OSOM Haulage Route (Source: Amber, 2025)

Operational phase

The Project is expected to be operated by two maintenance personnel and occasional deliveries resulting in a traffic generation of up to eight vehicle movements per day which would result in a negligible change to the traffic environment.

Decommissioning phase

Traffic generation during decommissioning would be similar to traffic generation during the average construction period. A comprehensive traffic management plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities.

6.3.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on road assets and road safety is considered to be manageable.

Safeguards and mitigation measures relating to potential access and traffic impacts are outlined in Table 6-96-15 below.

Table 6-96-15 Access and traffic mitigation measures

Mitigation number	Mitigation measure	Project Stage
TA1	A Traffic Management Plan will be developed to minimise the impact of construction traffic and would include: • Neighbours of the Project to be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access • Heavy vehicles will avoid travel during peak bus operating times to limit the interaction of larger vehicles and vulnerable road users • Requirement for site specific TMP's that include appropriate safety signage manage traffic and guide road users including regulatory signs that dictate rules and restrictions, warning signs alerting to potential hazards, guide signs for navigation, and temporary signs for events or road works. • Any OSOM vehicle trips be timed so they do not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network, which can be undertaken as part of the permit application.	Prior to construction
TA2	Implement a community information and awareness program to inform the community of traffic disruptions. This would include; • Press releases in local newspapers. • Specific emails, newsletters and individual letter drops to neighbouring residents along the access route to the Project. • Provision of a website providing details of the status of works and contact details for complaints or enquiries. • Provide key contact personnel and contact details, including out of hours contact information to residents, schools, public activities and business operating alongside the local route. • Neighbours of the Project would be consulted and	All stages

Mitigation number	Mitigation measure	Project Stage
	notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.	
TA3	On-site mitigation measures would be included in the TMP and would include • On-site speed restrictions • Dust suppression • Loading and unloading would occur within the work area, not on streets or roads • All vehicles associated with the Project would park onsite • Carparking and loading areas to be designed in accordance with the relevant Australian standards.	All stages
TA4	Driver Protocols would be included in the TMP and would include • All vehicles would enter and exit the site in a forward direction • Heavy vehicles will avoid peak school bus times • Safety initiatives to minimise risk and disruption to residential and or school bus zones would be implemented • Vehicles would only utilise designated transport routes • Construction vehicle movements are to abide by finalised heavy vehicles schedules as agreed and permitted by the relevant authorities. • All permits for working within the road reserve must be received from the relevant authority prior to works commencing.	All stages
TA5	Schedule of road upgrades would be included in the TMP and would • Construction of BAR/BAL at site access prior to construction commencing	All stages

6.4. Hazards – Preliminary Hazard Analysis

This section summarises the findings of the Preliminary Hazards Analysis (PHA) undertaken by Pando Consulting on behalf of the Applicant, and the Preliminary Risk Screening completed by NGH Pty Ltd, provided in Appendix F.4. The PHA was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential risks and consequences arising from the Project and the recommended measures to mitigate them.

6.4.1. Approach

The PHA was been prepared in in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (DoP, 2011a) and Multi-Level Risk Assessment (DoP, 2011b). The PHA considers all recent standards and codes and verifies separation distances to on-site and off-site receptors to prevent fire propagation.

The PHA also assesses compliance with Hazardous Industry Advisory Paper No. 4 'Risk Criteria for Land Use Safety Planning (DoP, 2011c) including the key design parameters. The PHA provides a basis for an informed judgment to be made on the acceptability of the Project.

The PHA includes:

- Identification of the nature and scale of all hazards at the proposed development, and the selection of representative incident scenarios
- Analysis of the consequences of these incidents on people, property, and the biophysical environment
- Evaluation of the likelihood of such events occurring and the adequacy of safeguards
- Calculation of the resulting risk levels of the facility
- Comparison of these risk levels with established risk criteria and identification of opportunities for risk reduction.

A schematic of the hazard analysis process is included below in Figure 6-11.

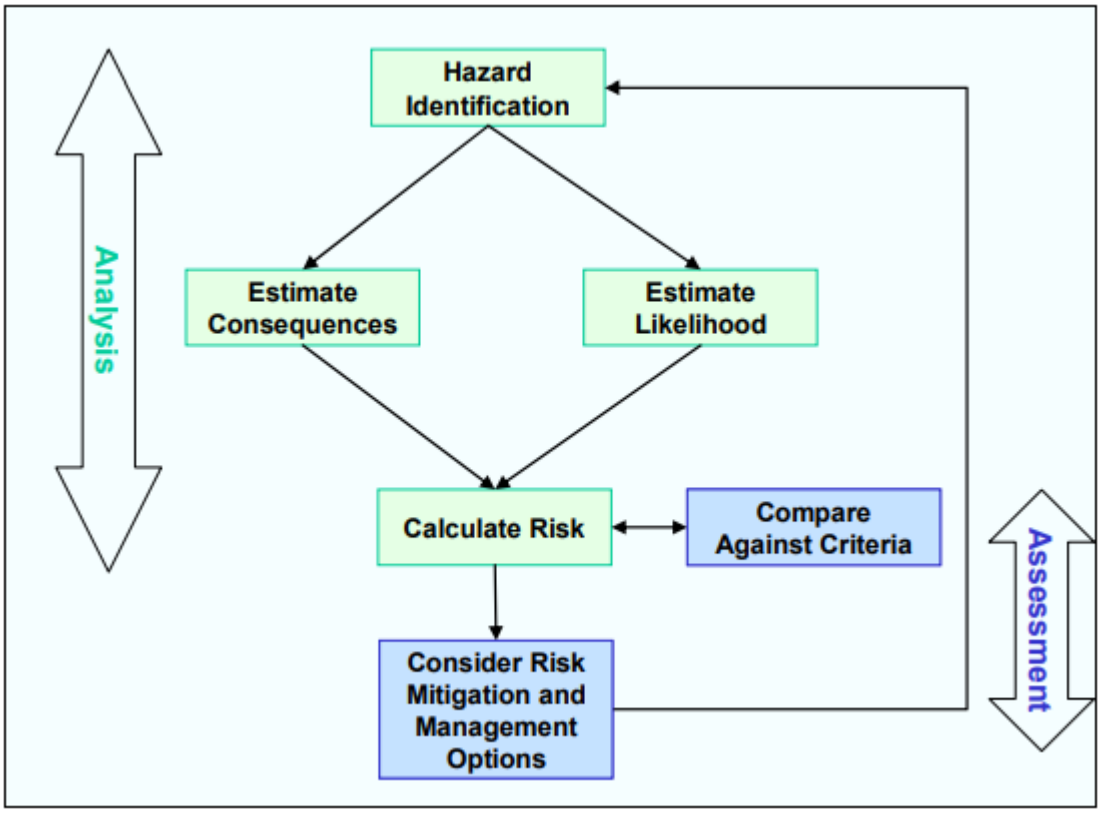


Figure 6-11 Basic methodology for hazard analysis (Source: HIPAP 6)

Preliminary Risk Screening

The SEPP 33 screening procedure (used in the absence of a screening process under the new Resilience and Hazards SEPP) is based on the quantity of dangerous goods stored or transported, the frequency of transportation movements and, in some cases, the distance of the materials from the site boundary. The application guidelines for SEPP 33 (DoP, 2011a) require goods to be classified according to the Australian Code for the Transport of Dangerous Goods by Road and Rail Code (ADG Code).

The ADG Code lists the following classes of dangerous goods:

- Class 1 Explosives
- Class 2 Gases
- Class 3 Flammable liquids
- Class 4 Flammable solids
- Class 5 Oxidising substances and organic peroxides
- Class 6 Toxic and infectious substances
- Class 7 Radioactive material
- Class 8 Corrosive substances
- Class 9 Miscellaneous dangerous substances and articles, including environmentally hazardous substances.

A development which exceeds screening thresholds in the guidelines would be considered potentially hazardous. For quantities below the given thresholds, the SEPP indicates that there is unlikely to be a significant off-site risk, in the absence of other risk factors.

The dangerous goods that would require transportation and storage during construction and operation of the Project are identified in Table 6-16 with ADG Code classification, relevant quantity and transportation thresholds, and storage arrangements threshold and the arrangements of these dangerous goods for the Project against the thresholds. Further details regarding transport quantities for the Project are provided in Section 6.3. All other Classes are not required by the Project and therefore are not considered further in this screening.

In terms of the class, transportation and storage of dangerous goods, the Project would not exceed SEPP 33 thresholds and therefore would not be considered potentially hazardous in accordance with the SEPP 33 guidelines.

Table 6-16 Dangerous good and SEPP thresholds relevant to the Project

Hazardous material	Storage threshold	Transport threshold		Onsite storage arrangements for Project		Transport arrangements for Project		Exceeds SEPP 33 thresholds?
		Movements	Quantities	Storage location	Quantities	Movements	Quantities	
Class 2.1 Flammable gases								
LPG	10 tonnes or 16m^3 (above ground)	>500 cumulative >30/week	100kg	Cylinders at operations storage building. 17m from site boundary	2x 45kg = 90 kg	Delivered to site as required.	<100 kg	No
Class 2.2 Non-flammable, non-toxic gases (further detailed in section below table)								
Refrigerant	NA	N/A	N/A	BESS refrigeration/chiller units stored in equipment and packages.	NA - Non-flammable, non-toxic gases not considered to be potentially hazardous with respect to off-site risk.	NA	NA	No
Class 3 Flammable liquids								

Hazardous material	Storage threshold	Transport threshold		Onsite storage arrangements for Project		Transport arrangements for Project		Exceeds SEPP 33 thresholds?
		Movements	Quantities	Storage location	Quantities	Movements	Quantities	
Miscellaneous flammable liquids in small containers (Packaging Group I)	Applying SEPP33 Figure 8 graph if greater than 2 tonne	>500 cumulative >30/week	1 tonne	Stored in operations building 17m from site boundary	<20L	<50 annual <3 peak weekly	<1 tonne	No
Class 9 Miscellaneous dangerous substances and articles								
Li-ion batteries	NA	>1000 cumulative >60/week	No limit	Energy Storage Facility buildings in a secure compound.	NA	Upper limit Heavy Vehicle (HV) 44 vehicles per day (vpd)	N/A	No
Coolant	N/A	>1000 cumulative >60/week	No limit	BESS coolant stored in equipment and packages	NA	Upper limit HV 44 vpd	NA	No

Preliminary Hazard Analysis (PHA)

The PHA assessed the events associated with the proposed operation of the BESS (i.e. excluding construction) and is focused on the risk to surrounding land uses to assess if the Project is appropriate for the location. The Project Site boundary was used to define and determine off-site impact based on potential to impact sensitive receivers.

Hazard identification

Hazard identification includes the systematic identification of possible hazards, both on-site and off-site including:

- BESS activities and infrastructure
- Type of equipment
- Hazardous materials present
- Natural events such as floods, cyclones, earthquakes, or lightning strikes
- Hazardous events on neighbouring sites.

The identified hazards and events are described in Table 6-17.

Table 6-17 Identified hazards and events

Hazard	Event
Electrical	Exposure to voltage
Arc flash	Release of energy
Electric and Magnetic Fields (EMF)	Exposure to EMF
Fire	Bushfire encroachment or Project fire
Chemical	Release of hazardous materials
Reaction	Battery thermal runaway
External factors	Vandalism, flooding

Electric and magnetic fields

Electric and magnetic fields (EMF) 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. EMF are also produced wherever electricity or electrical equipment is in use, meaning people are exposed to them as part of daily life.

The surrounding environment includes existing sources of Extremely Low Frequency (ELF) EMF (i.e., 50 hertz (Hz) including the existing 132kV transmission line that transects the Project Site. The Project would introduce additional sources of EMF including BESS enclosures, transformers and connection infrastructure to the 132kV transmission line.

Due to the rapid attenuation of EMF with distance and the inclusion of BESS enclosures, it is anticipated that EMF will decrease significantly beyond the immediate vicinity of the Project. The EMF levels are expected to

be well below the International Commission on Non-Ionising Radiation Protection (ICNIRP) Guideline (ICNIRP, 2020) reference levels at the nearest receiver.

Additionally, the ICNIRP Guidelines literature review determined that the epidemiological and biological data concerning chronic conditions were carefully reviewed and it was concluded that there is no compelling evidence that they are causally related to low-frequency EMF exposure.

Bushfire

NSW Rural Fire Service Planning for Bush Fire Protection 2019 (PBP) provides development standards for designing and building on bushfire prone land (BFPL) in NSW. The PFP provides a step-by-step guide to determine if PBP applies and how to implement the requirements. The PHA has assessed the potential hazards and risks associated with bushfires, including the risks that a BESS would cause a bushfire are considered. The outcomes are appended as Appendix F.4.

A standalone Bushfire Assessment Report (BFAR) was prepared for this EIS and is detailed in Section 6.5 below.

Recommendations following Victorian Big Battery Fire

The Tesla MP2XL supersedes the model of Tesla Megapack which was the subject of the Victorian Big Battery Fire in 2021. Learning from the Victorian Big Battery Fire contributory factors, the Tesla MP2XL includes improvements in commissioning procedures, fault protection devices, and thermal roof design, including:

- A new commissioning procedure which improves the inspection of the coolant system, avoids using the keylock switch, reduces the telemetry setup connection time for new Megapacks from 24 hours to 1 hour, and avoids the keylock switch unless the unit is actively being serviced
- Firmware improvements including additional alarms to possible coolant leaks, electrical safety protection which remain active regardless of keylock position, and active monitoring and controls for the Pyro-fuse's power supply circuit
- Thermally insulated steel vent shields are now installed in the newly designed thermal roof, which can protect the plastic overpressure vents from direct flame impingement or hot gas intrusion inside the unit.

Following an investigation into the Victorian Big Battery Fire, recommendations were provided in technical findings.

The Applicant has responded and committed to actions that will address the recommendations, these are described in Table 6-18 below.

Table 6-18 Recommendations of the Victorian Big Battery Fire Technical findings.

Statement of Technical Findings – lessons learned and preventing a recurrence	Applicants' commitment
Each Megapack cooling system is to be fully functionally and pressure tested when installed on site before it is put into service.	Following installation, the Applicant will commission any liquid chillers and cooling pipes to check they are fully functional and undertake subsequent pressure tests.

Statement of Technical Findings – lessons learned and preventing a recurrence	Applicants' commitment
Each megapack cooling system in its entirety is to be physically inspected for leaks after it has been functionally, and pressure tested on site.	The Applicant will undertake physical inspections of any liquid chillers following commissioning and pressure testing.
The Supervisory Control and Data Acquisition (SCADA) system has been modified such that it now 'maps' in one hour and this is to be verified before poser flow is enabled to ensure real – time data is available to operators.	The updated SCADA will be used and verified in accordance with this recommendation.
A new 'battery module isolation loss' alarm has been added to the firmware; this modification also automatically removes the battery module from service until the alarm is investigated.	The MP2XL units will include a battery module isolation loss alarm that automatically removes the battery module from service until the alarm is investigated.
Changes have been made to the procedure for the usage of the key lock for Megapacks during commissioning and operation to ensure the telemetry system is operational.	The procedure for the usage of the key lock for MP2XL during commissioning and operation will ensure the telemetry system is operational.
The high voltage controller (HVC) that operates the pyrotechnic fuse remains in service when the key lock is isolated.	DC fuses remain in service for protection purposes no matter if the key lock is isolated or not.

6.4.2. Potential impacts

The PHA was conducted to assess whether the risk levels associated with the BESS impede the approval of the Project. The PHA findings did not identify any significant offsite consequences or society risks. Based on the risk assessment, it was determined that the risk profile for the Project is considered tolerable under the principle of As Low as Reasonably Practicable (ALARP).

A total of 17 risk events were identified. The breakdown of these events according to their risk ratings is as follows:

- 13 medium-risk events
- 4 low-risk events.

Most of the medium-risk events are related to fire incidents resulting from various causes, such as the release of flammable materials, battery thermal runaway, transformer fire, and bushfires. The analysis identified proposed prevention controls to reduce the likelihood of these fire events, as well as mitigation controls to contain fires and minimize the potential for escalation (e.g., Bushfire Emergency Management and Operations Plan). These mitigation measures are detailed in Section 6.4.3 below.

Considering the identified controls, the highest likelihood for these events was rated as very unlikely, indicating that while such incidents have been heard of in the industry, they are not expected to occur.

Minimal offsite impacts are anticipated. The risk assessment concluded that there is negligible potential for offsite fatality or injury identified, thus meeting the land use planning criteria.

Consideration in the event of a battery fire

In recent years, concern has been growing within communities in proximity to BESS developments, as well as wider NSW. In regard to hazards and air quality, concern has been raised to the potential release of toxic pollutants from battery containers in the event of a battery fire, and the potential impacts on human health and safety of the nearby community and first responders.

At this stage, there have been 81-88 recorded incidents of BESS failures worldwide since 2011 (EPRI, 2024). Industry efforts to improve BESS safety have rapidly developed over recent years with a sharp decrease in failure rate.

A review of available literature from recent notable events, both in Australia and overseas, was undertaken to determine the implications in the event of a battery fire on ambient air quality. It was concluded that impacts to air quality from a BESS fire are unlikely to significantly affect the health and safety of the nearby community and first responders.

Cumulative impacts

As the Project does not pose a significant off-site risk, other approved or constructed projects, and projects currently in the planning phase, within the candidate REZ, would not pose a significant off-site risk and there is an absence of credible mechanisms for interaction between them, the cumulative risk of projects (specifically other BESS') in the Candidate REZ is considered negligible.

6.4.3. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall potential risks and consequences arising from the Project is considered to be manageable.

Safeguards and mitigation measures relating to hazards are outlined in Table 6-19 below.

Table 6-19 Hazards mitigation measures

Mitigation number	Mitigation measure	Project Stage
HZ1	The results of the PHA should be incorporated as inputs into other safety studies, such as: • Fire safety study (FSS) • Emergency response plan • Bush Fire Emergency Management and Operations Plan.	All stages
HZ2	APZs to be maintained in accordance with Appendix 4 of PBP for the life of the Project	All stages

Mitigation number	Mitigation measure	Project Stage
HZ3	The detailed design of the BESS will comply with the requirements of Sections 3.2 of the PHA, including separation distances, UL9540A test reports and OEM recommendations.	Design
HZ4	Dangerous or hazardous materials shall be stored and handled in accordance with AS1940-2004: The storage and handling of flammable and combustible liquids.	Construction Decommissioning
HZ5	All recommendations from the Victorian Big Battery Fire Statement of Technical Findings – Victorian Government 2021 will be implemented.	Design

6.5. Hazards – Bushfire

This section summarises the findings of the Bushfire Assessment Report (BFAR) undertaken by EMBER Consulting on behalf of the Applicant, provided in Appendix F.5. The BFAR was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential bushfire impacts of the Project and the recommended measures to mitigate them.

6.5.1. Approach

The Project is located on land designated bushfire-prone by WWCC and the NSW Rural Fire Service (RFS). As such, it is subject to Section 4.14 of the EP&A Act and the provisions of the NSW RFS document *Planning for Bushfire Protection 2019* (PBP).

The aim of the PBP is to protect human life and minimise impact on property from the threat of bushfire, while considering the development potential, site characteristics and protection of the environment.

The BFAR was prepared through a desktop assessment and study of the Project Site, and in-person site surveys.

6.5.2. Existing environment

The topography of the area associated with the Project is considered predominantly flat, with landforms to the west of the Project Site sloping gently in that direction in the order of 0° to 2° degrees downslope. There are several vegetation types present across the Project Site. The proposed siting of the BESS is on predominantly cleared land, with few scattered trees outside the Development Footprint. Woody native vegetation is present to the south of the proposed BESS siting, along the internal access road and the proposed site access point.

The Involved Lands and adjacent land are mapped as containing areas of Category 1 and Category 3 vegetation identified as bushfire prone land by WWCC and NSW RFS (refer to Figure 6-12). BFPL assessments are based on allocation of the vegetation into broad categories. During the site survey conducted, these vegetation categories were verified, and the bushfire-prone land map was found to be a reasonably accurate representation of the identified hazard across this Project Site.

Categories that are relevant to the Project Site are:

- Category 1: which includes areas of forest, woodland, heath, forested wetland and timber plantation. Highest risk category
- Category 3: which includes grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands. Moderate risk category

Bushfire history

Fire history provides a clear picture of the actual vulnerability of the site. Figure of the BFAR (Appendix F.5) displays recorded wildfires and prescribed burns since 1902 across NSW, shows the Involved Lands fire history and approximate extent of bushfires impacting the area surrounding the Involved Lands. This indicates that the Involved Lands and Project Site have not been subject to wildfires in the past 25 years.

The most recent and notable bushfire event to impact the area was the Wandoo wildfire during the 2005-2006 bushfire season. This bushfire did not impact the Involved Lands but burnt an area of approximately

9,425ha, causing extensive damage to the landscape and wildlife. There have been several other smaller bushfires in the proximity of the Project Site, including an unnamed wildfire to the east of the Involved Lands on the southwest edge of the Livingstone State Conservation Area during the 1990-91 bushfire season and another to the northeast on the northwest edge of the Livingstone National Park. These bushfires did not impact the Involved Lands.

The apparent greatest threat from bushfire on the Project comes from the heavily vegetated regions of the Livingstone National Park and State Conservation Area approximately 2.5km east of the Involved Lands and Rest Hill Nature Reserve approximately 12km to the southeast.

Guidelines

NSW RFS Planning for Bushfire Protection 2019

According to the PFB (NSW RFS, 2019), an acceptable level of protection from bush fire is achieved for developments through a combination of strategies which:

- Control the types of development permissible in bush fire prone areas
- Minimise the impact of radiant heat and direct flame contact by separating development from bush fire hazards
- Minimise the vulnerability of buildings to ignition and fire spread from flames, radiation and embers
- Enable appropriate access and egress for the public and firefighters
- Provide adequate water supplies for bush fire suppression operations
- Focus on property preparedness, including emergency planning and property maintenance requirements
- Facilitate the maintenance of APZ), fire trails, access for firefighting and on-site equipment for fire suppression.

The PBP guidelines provide six key Bush Fire Protection Measures (BPMs) for developments:

- APZ and setbacks
- Landscaping
- Access
- Water Supplies
- Utilities
- Emergency Management

Regarding Section 8.3.5 of the PBP, BESS projects are not identified. However, the standard set for solar and wind have been adopted. The following measures to be incorporated into the design and operation of the Project:

- BESS design would incorporate appropriate fire detection and protection, including an appropriately located fire water tank
- A minimum 10m APZ for the structures and associated buildings/infrastructure (for the Project, an 11m wide APZ will be applied).
- The APZ must be maintained to the standard of an inner protection area (IPA) for the life of the development (to the specifications identified in Appendix 4 of PBP).

The PBP also requires a Bush Fire Emergency Management and Operations Plan (BFEMOP), covering:

- Work that should not be carried out during total fire bans.
- Detailed measures to prevent or mitigate fires igniting.

- Notification to the local RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate
- Appropriate bush fire emergency management planning and availability of fire-suppression equipment, access and water.

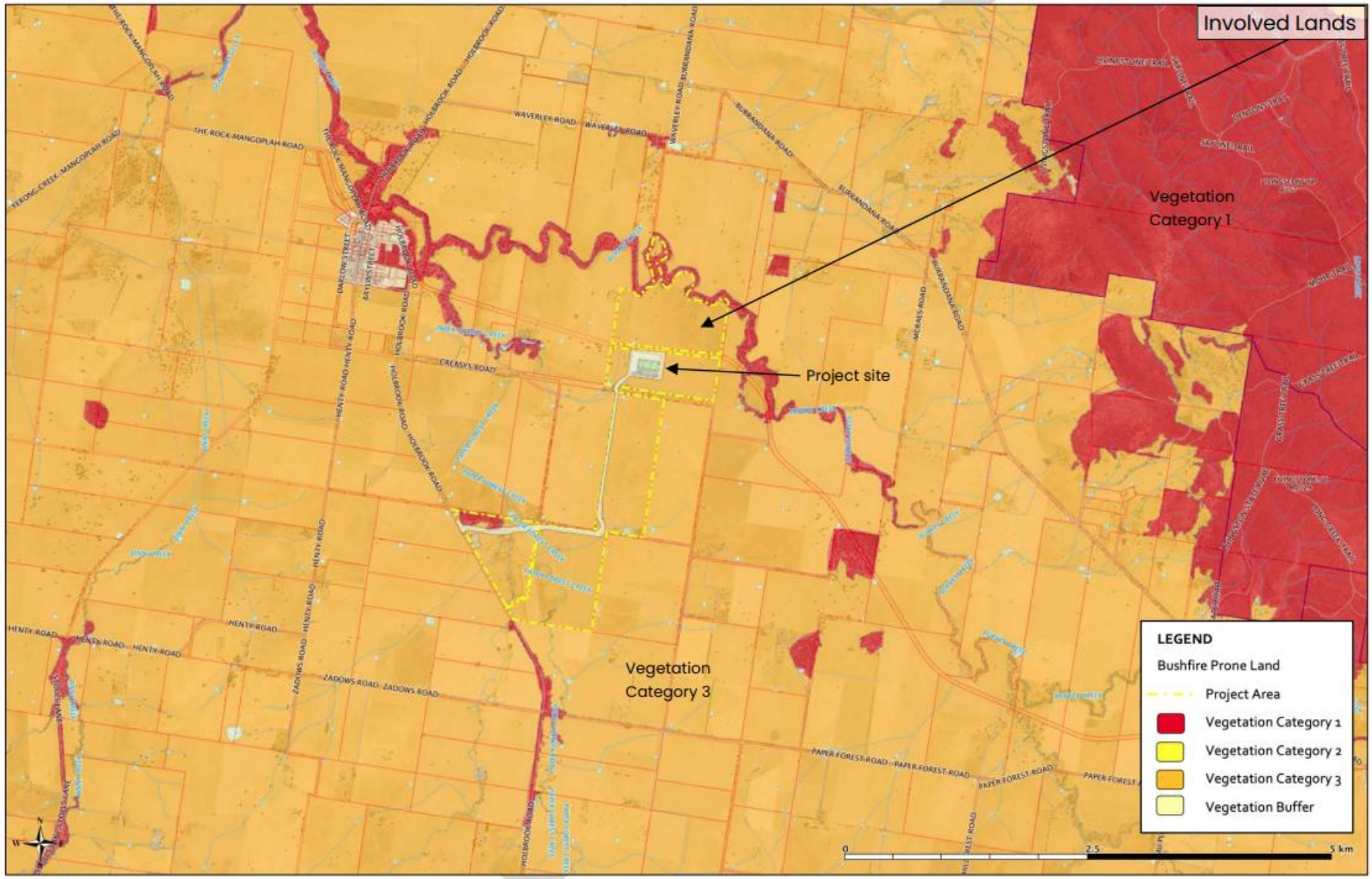


Figure 6-12 Involved Lands bushfire prone land map (FPAA FireMaps, 2025) (Source, Ember 2025)

6.5.3. Potential impacts

Construction and decommissioning phase

Potential fire ignition sources during construction and decommissioning stages of the Project include:

- Earthworks and slashing machinery causing sparks
- Hot works activities such as welding, soldering, grinding and use of a blow torch
- Sparks and contact ignition from vehicles in long combustible vegetation
- Smoking and careless disposal of cigarettes
- Use of petrol-powered tools
- Operating plant fitted with power hydraulics on land containing combustible material
- Electrical faults during testing and commissioning
- Storage of chemicals and hazardous materials.

The BESS Development Footprint proposed in on low slope, low-grade exotic grassland fuel environment. Bush fire risks during construction and decommissioning would be managed through the standard mitigation measures recommended in this EIS. Existing access roads and informal farm roads, as well as proposed APZ, and BESS internal service roads would provide RFS and emergency service access throughout the Project Site.

Operational phase

The key risk identified and discussed below is in relation to the operation of LFP batteries.

Fire risks

LFP battery modules are comprised of prismatic LFP battery cells, that have seals designed for a 10 to 20-year service life. They are more stable than lithium-ion batteries (LiB) and all identified hazards associated with the operation of the BESS have been rated as Very Unlikely to Extremely Unlikely (refer to the PHA, Appendix F.4) if the appropriate controls and mitigation measures are adhered to.

LFP batteries are considered superior for BESS compared to traditional lithium-ion batteries because they offer enhanced safety, longer lifespan, and better thermal stability. LFP batteries are less prone to overheating and thermal runaway, reducing the risk of fires. They also endure more charge-discharge cycles with minimal capacity degradation, providing a more cost-effective solution over time.

Fire causes

Most of the medium risk events identified above in Section 6.4 are related to fire, which include bushfires. The PHA and BFAR identified proposed prevention controls to reduce the likelihood of these fire events, as well as mitigation controls to contain fires and minimize the potential for thermal runaway. Considering the identified controls, the highest likelihood for these events was rated as very unlikely, indicating that while such incidents have been heard of in the industry, they are not expected to occur.

Bushfire protection and prevention measures

In response to the bushfire threat analysis, a suite of bushfire protection and prevention measures are proposed to satisfy the broad aims and objectives of PBP (2019) and specific considerations detailed in Chapter 8, Section 8.3.9 Hazardous Industry PBP (2019) (refer to Table 6-20 below).

Asset Protection Zones (APZ) and setbacks

Section 8.3.5 of the PBP guidelines provides minimum APZ requirements for solar farm developments located in designated bush fire prone land. These APZ prescriptions would be applied to the BESS infrastructure to provide defendable space and to manage heat intensities at the infrastructure interface.

In accordance with Section 8.3.5 of PBP, an APZ of a minimum width of 10m would be provided around all buildings, substation and BESS.

Given the heat-sensitive nature of the Project, slope and surrounding vegetation, an APZ of 11m has been recommended and applied to the Project. This will ensure the Project is not exposed to radiant heat flux levels exceeding 29kW/m², offering a higher level of protection. Adequate separation distances of 4m between back-to-back pairs of BESS units would be applied, to minimise the spread of fire from the Project Site.

The 11m APZ setback requirement would also be applied to any woody vegetation plantings undertaken around the perimeter of the BESS. All the APZs would be managed as an Inner Protection Area (IPA), to the specifications of Appendix 4 of PBP.

Landscaping

All vegetation within the areas identified as the APZ surrounding the BESS siting, substation and associated infrastructure (the entire Project Site) is to be managed for the life of the Project per the requirements of Asset Protection Zone Standards - Appendix 4 of PBP (2019).

Where practicable, the landscape design for areas identified as APZ surrounding the BESS siting, substation and associated infrastructure is to incorporate non-combustible mulch (stone or aggregate) managed for the life of the Project to eliminate the growth of vegetation or storage of combustibles near this infrastructure.

Access

Access specifications would comply with Table 7.4a of the PBP guidelines, including:

- A minimum carriageway width of 4m
- Minimum vertical clearance of 4m
- Capacity for passing using reversing bays and/or passing bays every 200m suitable for fire tankers
- Property access roads are two-wheel drive, all-weather roads
- Property access must provide a suitable turning area in accordance with Appendix 3 (of PBP).

The turn radius and swept path clearance on access roads would be more than suitable for Category 1 Tankers (Medium Rigid Vehicle).

The access road of Holbrook Road is subject to minor flooding from Paper Forest Creek, with flood depths reaching up to 700mm over the access road. The access road will be upgraded as required from the intersection of Holbrook Road to the BESS facility entrance point.

Water supplies

The current design and layout of the Mangoplah BESS are being finalised and will include an approximate 100 kilolitre (kL) static water supply (non-combustible tank/s) within the APZ or at the entrance point of the BESS facility, substation, and associated infrastructure. All fittings and specifications for water supplies would be per Table 7.4a of PBP (2019). The final volume of the tanks onsite would be confirmed in consultation with the relevant agencies as part of the detailed design process.

Emergency Management Planning

A Bushfire Emergency Management and Operations Plan (BFEMOP) would be prepared and identify all relevant risks and mitigation measures associated with the construction and operation of the Project.

This should include:

- Detailed measures to prevent or mitigate fires igniting
- Work that should not be carried out during total fire bans
- Availability of fire-suppression equipment, access and water
- Storage and maintenance of fuels and other flammable materials
- Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, to be carried out during a bushfire fire danger period to ensure weather conditions are appropriate
- Appropriate bush fire emergency management planning

Findings of the BFAR

Given the Project Site is greenfield with large open spaces, there is an excellent opportunity to provide a range of bushfire protection measures that address the bushfire threat and requirements of the PBP (2019).

The proposed APZ dimensions will ensure the critical components of the Project and associated infrastructure are not exposed to radiant heat levels exceeding 29 kW/m².

Access to the Project Site will be well provided, with the main entrance point and access road off Holbrook Road southwest of the Project Site being upgraded to provide safe vehicular site access to/from the site, including a perimeter road surrounding the BESS facility where practicable.

A significant volume of firefighting water supplies will be provided to the Project, exceeding the requirements of PBP (2019).

Preparation of a BFEMOP during the construction and operational phases are recommended.

Based on the bushfire assessment and the recommendations contained in this report, the Project will be capable of:

- affording structures protection from exposure to a bushfire,
- provide for a defendable space,
- provide appropriate separation between a hazard and structures to prevent the likely spread of fire,
- ensure that appropriate operational access and egress for
- emergency service personnel is available,
- provide for ongoing management and maintenance of BPMs and
- ensure that utility services are adequate to meet the needs of firefighters.

Therefore, the Project is deemed capable of complying with the specific and broad objectives of PBP through providing a range of bushfire protection measures that address the potential bushfire threat and requirements of PBP.

6.5.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on bushfire hazard is considered to be manageable.

Safeguards and mitigation measures relating to bushfire hazard are outlined in Table 6-20 below.

Table 6-20 Bushfire hazard mitigation measures

Mitigation number	Safeguards and mitigation measures	Project stage
BF1	Dangerous or hazardous materials shall be stored and handled in accordance with AS1940-2004: *The storage and handling of flammable and combustible liquids*.	Construction Operation Decommissioning
BF2	Develop a Bushfire Emergency Management and Operations Plan in consultation with NSWRFS and FRNSW to include but not be limited to: • Detailed measures to prevent or mitigate fires igniting • Construction work that should not be carried out during total fire bans • Availability of fire-suppression equipment, access and water • Storage and maintenance of fuels and other flammable materials • Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate • Appropriate bush fire emergency management planning. • Provide a defendable space ○ An APZ of minimum 11m will be maintained between remnant or planted woody vegetation and the BESS and ancillary infrastructure. • Manage grass height within the APZ at or below 5cm throughout fire season (October to April) • Average grass height outside the APZ will be maintained at 10cm or below throughout the fires season. • Non-combustible 100kL water storage tank/s should be installed adjoining the main internal access road, or nearby the BESS, for fire-fighting and other non-potable water uses. The final location/s and volume of water tanks will be determined in agreement with NSW RFS and FRNSW recommendations • Provided a contact point for the BESS to the NSW RFS and FRNSW during construction and operation.	Construction Operation Decommissioning

Mitigation number	Safeguards and mitigation measures	Project stage
	• Protocols to manage activities in bushfire danger weather, including Total Fire Ban days, will be developed. • Preparation of a specific Battery Fire Response Plan, under the general BFEMOP, in consultation with fire authorities, fire suppression experts and in reference to relevant standards and guidelines.	
BF3	Appropriate fire-fighting equipment will be held on site to respond to any fires that may occur at the site during construction. This equipment will include fire extinguishers, a 1000 litre water cart (fitted with suitable hosing, fittings and diesel firefighting pump) retained on site on a precautionary basis. Finalised equipment lists would be detailed in Work Method Statements.	Construction
BF4	Following commissioning of the BESS, the local NSW RFS and Fire and Rescue brigades will be invited to an information and orientation day covering access, infrastructure, firefighting resources on-site, fire control strategies and risks/hazards at the site	Operation
BF5	The access track will comply with the requirements of property access roads in accordance with Table 5.3b of the PBP. All access and egress tracks on the site would be maintained and kept free of parked vehicles to enable rapid response for firefighting crews and to avoid entrapment of staff in the case of bush fire emergencies.	Construction Operation Decommissioning
BF6	A Hot Works Permit system shall be applied to ensure that adequate safety measures are in place. Fire extinguishers would be present during all hot works. Where practicable hot works would be carried out in specific safe areas (such as the Construction Compound temporary workshop areas).	Construction Operation Decommissioning
BF7	Prior to operation of the BESS, an Emergency Response Plan (ERP) will be prepared in consultation with the RFS and FRNSW. This plan must include but not be limited to: • Specifically addresses foreseeable onsite and off-site fire events and other emergency incidents. • Risk control measures would include the level of	All stages

Mitigation number	Safeguards and mitigation measures	Project stage
	personal protective clothing required to be worn, the minimum level of respiratory protection required, decontamination procedures, minimum evacuation zone distances and a safe method of shutting down and isolating the system (either in its entirety or partially, as determined by risk assessment). • Outline other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the site. • Two copies of the ERP are stored in a prominent 'Emergency Information Cabinet' which is located in a position directly adjacent to the site's main entry point. Once constructed and prior to operation, the operator of the facility will contact the relevant local emergency management committee.	
BF8	BESS design would consider the following: • Locating the BESS as far as practicable from any sensitive receptors or large stands of vegetation. • Installing reliable automated monitoring (voltage and temperature), alarm and shutdown response systems. • Installing reliable integrated fire detection systems • Ensuring the battery containers are not vulnerable to external heat effects in the event of a bush fire. • Designing appropriate separation and isolation between battery containers and between batteries and other infrastructure, including gravel surfacing around the facility for a minimum 11m in accordance with APZ. • Compliance with all relevant guidelines and standards. • Facilitation of first responder training in the management of LFP battery fires at the site for local brigades.	Design

6.6. Landscape and visual amenity

This section summarises the findings of the Landscape Character and Visual Impact Assessment (LCVIA) undertaken by Moir Studio on behalf of the Applicant, provided in Appendix F.6. The LCVIA was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential landscape character and visual amenity impacts of the Project and the recommended measures to mitigate them.

6.6.1. Approach

The assessment was undertaken using DPHI's Large Scale Solar Guideline Technical Supplement (DPHI, 2022). Despite this project not being a solar farm, the guideline provides the best reference in terms of for assessment for landscape character and visual amenity. The assessment methodology is as follows:

- Objective assessment of the relative aesthetic value of the landscape; defined as visual quality and expressed as high, moderate, low or very low. This assessment generally relates to variety, uniqueness, prominence and naturalness of the landform, vegetation and water forms within each character type.
- Determination of the landscape sensitivity and its ability to absorb different types of development on the basis of physical and environmental character.
- An assessment of viewer sensitivity to change. This includes how different groups of people view the landscape (for example, a resident as opposed to a tourist), and how many people are viewing the Project and from how far away.
- Identification of Landscape Character Zones
- Assess Landscape Character Impact
- Assess the Zone of Visual Influence, which has been prepared based on the maximum height of the BESS modules of 3m.
- Viewpoint analysis to identify areas likely to be affected by development of the site and a photographic survey using a digital camera and a handheld global positioning system unit to record position and altitude.
- Preparation of photomontages depicting the Project from key viewpoints.
- Assessment of visual impacts. Suggestions are made for suitable development patterns that would maintain the area's visual quality.

Appendix F.6 provides a more detailed explanation of the study methods. The LCVIA focuses on impacts within and in proximity to a 2km buffer from the Project site, this is defined as the Study Area for the purposes of this assessment. The Study Area is shown in Figure 6-13.

The LCVIA has considered the impacts of the Project as described in Section 3 of the EIS.

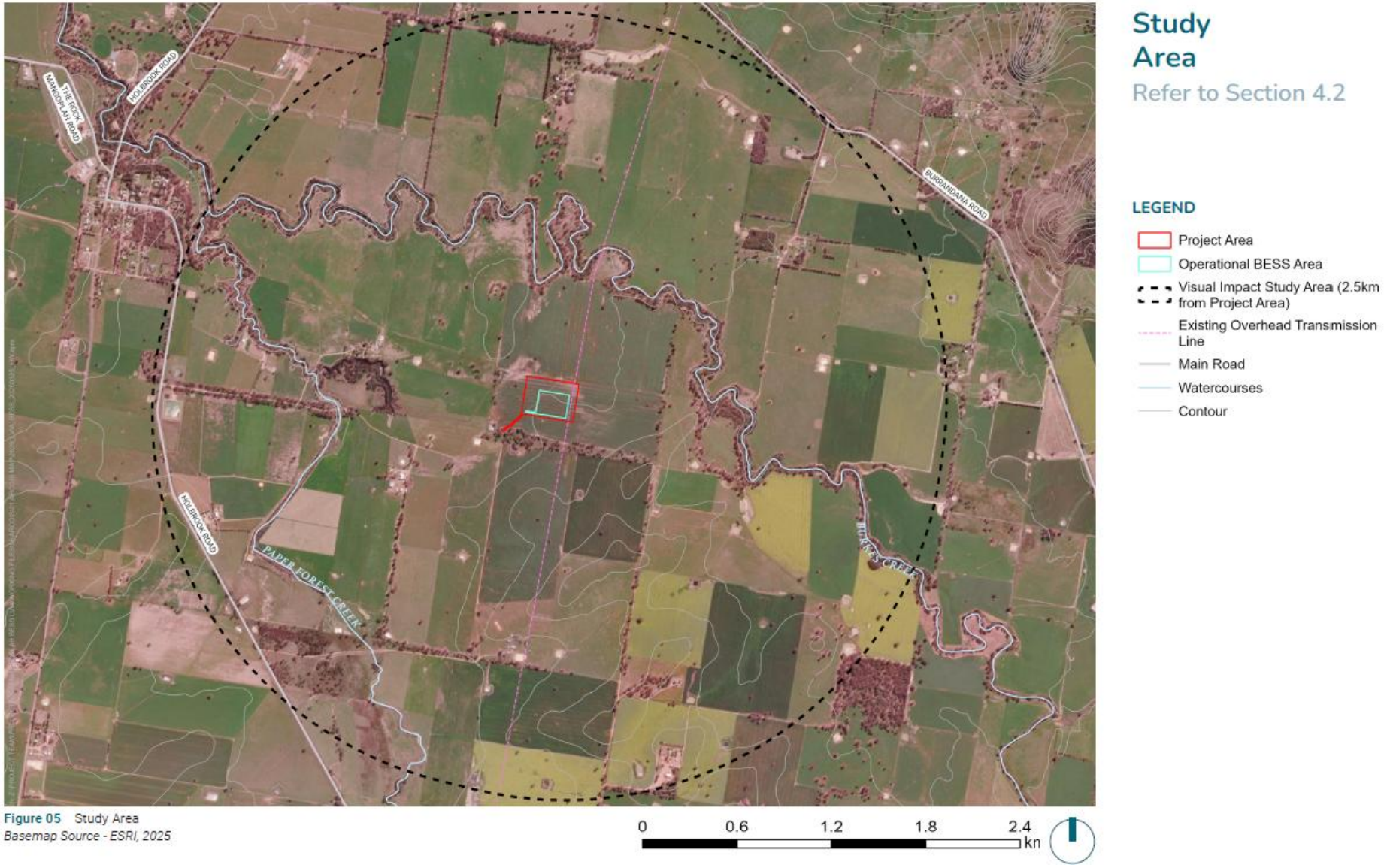


Figure 05 Study Area
Basemap Source - ESRI, 2025

Figure 6-13 LCVIA Study Area (Source, Moir Studio 2025)

6.6.2. Existing environment

Landscape character

The LCVIA establishes the landscape and visual conditions through descriptions, mapping and photographic representation to capture the sense of place. The intent is to provide a baseline against which the potential visual impacts of the Project can be assessed.

Bioregion context

The Project Area is located within the NSW South-Western Slopes Interim Biogeographical Regionalisation for Australia (IBRA). This region is an extensive area of foothills and isolated ranges comprising the lower inland slopes of the Great Dividing Range. Landscape characteristics include steep, hilly and undulating ranges and granite basins. Occasional basalt caps, confined river valleys with terrace remnants.

Land zoning and land use

Land use and land zone factor into the landscape character. The land is classified as RU1 and occupies the majority of the Study Area and the entirety of the Project Site. The landscape within the Project Area and immediate surrounds comprise of agricultural practices including grazing native vegetation, cropping and residential and farm infrastructure. Rural residential properties are dotted throughout the agricultural lands.

Key landscape features

Key landscape characteristics of the Project include:

- Topographical character: consists of gently undulating landforms with open pastures cleared for cropping and grazing. Remnant vegetation is scattered across pastures and is found in more dense patches along creek lines including Burkes Creek to the north of The Project Area. Terrain within the Project Area is flat at an elevation of 270m (ASL) and is typical to the Study Area consisting of cleared land for cropping.
- Hydrological character: Several man-made farm dams connecting to ephemeral creeks are dotted across the surrounding farmland, to aid in agricultural practices. Within the 2.5km Study Area, the identified water bodies are Burkes Creek and Paper Forest Creek.
- Vegetation character: Predominantly scattered vegetation within cleared pastoral land and remnant native vegetation located along riparian corridors, roadways and fence lines present within the Study Area. The most notable vegetation class within the Study Area is the Inland Riverine Forests, located along the Burkes Creek riparian corridor. Common species within this class includes River Red Gum, River Oak and Blakely's Red Gum. There is minimal vegetation within the Project Area, associated lots contain scattered remnant vegetation between pastures and along creek lines and roadways.

Landscape character zones (LCZs)

Landscape character zones divide the landscape based on common distinguishing visual characteristic including landforms, major land cover patterns (combinations of vegetation, waterbodies, landforms and land use). The Moir LCVIA categorised the Study Area into two LCZs:

- LCZ01 Vegetated Watercourse – characterised by riparian corridors of perennial and ephemeral waterways, the land consists of Forested Wetlands formations in the Inland Riverine Forests vegetation class.

- LCZ02 Agricultural Pastures & Rural Properties – characterised by flat to gently undulating areas of cleared pastures. The land has been modified for agricultural production, specifically for grazing and cropping, with low-density rural residential properties dispersed throughout.

The visual sensitivity of each LCZ has been assessed using the scenic quality frame of reference, from the DPHI's Large Scale Solar Guideline Technical Supplement (DPHI, 2022).

Determining scenic quality

Scenic quality reflects the overall and relative scenic, cultural, or aesthetic value of the landscape within the viewshed. This assessment is based on the presence or absence of key landscape features that influence community perceptions of scenic quality, ranging from very low to high. The baseline analysis and landscape character assessment have been used to inform the classification of scenic quality values. A scenic quality rating has been applied to each LCZ based on the Scenic Quality Frame of Reference and the visual reference for scenic quality values provided in the Technical Supplement (DPHI, 2022).

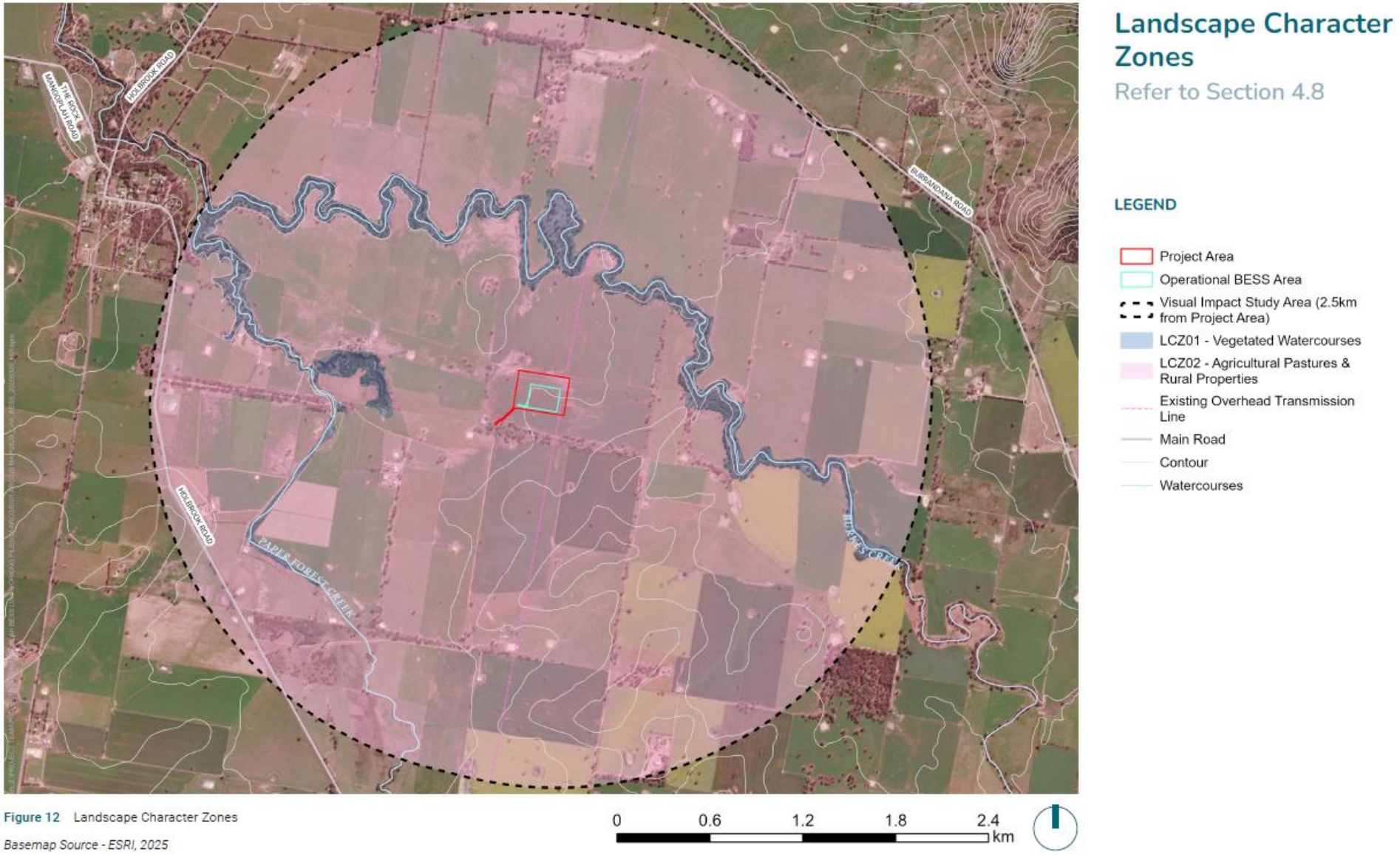


Figure 12 Landscape Character Zones

Basemap Source - ESRI, 2025

Figure 6-14 Landscape Character Zones (Source, Moir Studio 2025)

6.6.3. Potential impacts

Zone of visual influence

A Zone of Visual Influence (ZVI) map was prepared to understand the theoretical visibility of the proposed infrastructure at an early stage of the Project's assessment. It represents the area over which a development can theoretically be seen and is based purely on topography. The ZVI analysis does not take into account distance or the influence of vegetation or built structures in screening views, and as such provides a worst-case scenario. The ZVI is useful as preliminary tool because it is accurate in identifying residences and viewpoints *that would not see* the infrastructure due to topography. Further assessment is required to establish if those with a theoretical view of the Project would be impacted, given actual distance from the Project and existing intervening structures or vegetation.

The summary of findings of the ZVI are:

- The majority of Holbrook Road has a potential theoretical view toward the Project.
- Areas to the south and southeast have no visibility of the Project due to topography.
- 10 non-associated dwellings are located within 2.5km of the Project Area, of these, 7 non-associated dwellings have a *theoretical* line of sight to the Project.

The ZVI has been used to identify areas of potential high visibility, which informs the on-site fieldwork and viewpoint analysis to identify locations that require further detailed analysis.

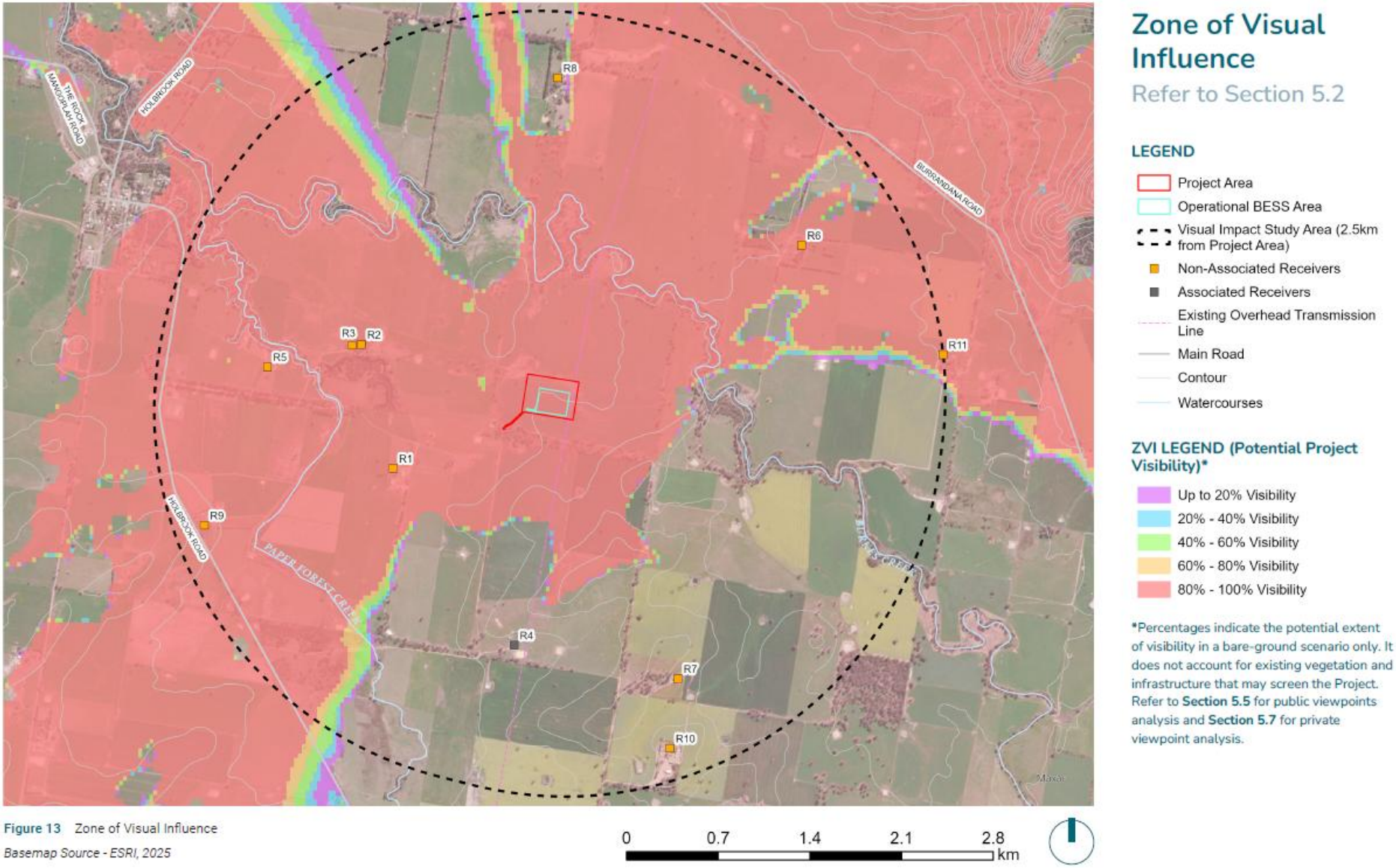


Figure 13 Zone of Visual Influence

Basemap Source - ESRI, 2025

Figure 6-15 Zone of Visual Influence and theoretical visibility (Source, Moir Studio 2025)

Viewpoint analysis and landscape character

The viewpoint analysis considers the likely visual impacts of the Project on the existing landscape character and visual amenity by selecting prominent sites, otherwise referred to as viewpoints. Panoramic photographs are taken from each viewpoint using a process that resembles the view from the human eye.

Five viewpoints were selected from publicly accessible locations to represent a range of views surrounding the Project Area. The viewpoint analysis determined that the Project would result in a *VERY LOW* visual impact on the existing landscape character.

Visual impact of nearby receivers

Ten non-associated receivers were identified within 2.5km of the Project with seven of those receivers having a theoretical line of sight to the Project, as determined by the ZVI, and requiring further consideration. Of the seven:

- Three non-associated receivers were identified as having a *LOW* visual impact rating due to their proximity to the Project, and presence of some intervening vegetation partially obscuring views of the Project.
- Four non-associated receivers were identified has having *VERY LOW* visual impact rating, where the Project would not be visible.

Further assessment was carried out for three non-associated dwellings neighbouring the Project Area, in accordance with the community consultation requirements for the Project. This level of assessment is not a requirement of the Large Scale Solar Guideline Technical Supplement, and only resulted from consultation efforts between nearby receivers that raised visual concerns. This included site visits conducted in March 2025, where private viewpoints were selected and captured following consultation with the landholder. The results of the further assessment determined that views from these private viewpoints would be minimal and fragmented, with a visual impact rating of *NIL* to *VERY LOW* if screen planting is implemented.

Lots with dwelling entitlements

The visual assessment is required to consider constructed or approved dwellings. However, lots that have dwelling entitlements are also considered. As of May 2025, there are no dwelling entitlements/lodgements or approvals for additional dwellings within the 2.5km Study Area.

Cumulative visual impacts

The occurrence of large-scale energy storage projects within a region has the potential to alter the perception of overall landscape character irrespective of being viewed in a single viewshed, as these projects could become part of the existing landscape.

Due to the size and scale of the Project, cumulative visual impact was assessed 2.5km of the Project Area. There are two infrastructure projects associated with large scale energy production and reticulation:

- 330kV Wagga 330 to Walla Walla Transgrid overhead transmission line
- 132kV Wagga 330 to Australian Newsprint Mills Transgrid overhead transmission line

The results of the public and private viewpoint assessment of the Project show the visual impacts from the Project are limited to private viewpoints and private agricultural land immediately surrounding the Project.

The desktop ZVI was verified during the site assessment. There was no opportunity for a montage from a public location due to both distance and intervening vegetation. There are zero views from Holbrook Road.

Due to the low scale of the Project, low accessibility from public viewpoint locations and intervening vegetation, the cumulative visual impacts are confined to the immediate surrounds and are therefore considered low.

Photomontages

A photomontage is a visualisation based on the superimposition of the Project onto a viewpoint photograph for the purpose of creating a realistic representation of proposed or potential changes to a view. Often with the photomontage, a 3D model is used, called a wireframe.

A wireframe is a computer-generated image based on a digital terrain model, that indicates the 3D shape of the landscape in combination with additional elements. Wireframe diagrams can be seen as a worst-case scenario as they do not take into account factors such as vegetation and structures and only take into account the topography. Wireframe diagrams have been utilised in this LCVIA to verify photomontages.

Due to intervening topography, vegetation and/or infrastructure, there were no opportunities for photomontages from key viewpoints to represent the potential Project visual impact. Two panoramas looking toward the Project from receivers R1 and R2 were selected to represent general visibility of the Project for the closest non associated receivers. Viewpoints selected for the preparation of the panoramas are generally those determined to have greatest potential visual magnitude change and impact in comparison to other viewpoints analysed.

PM01 was selected to represent a view of nearby non-associated residences (Figure 6-16). PM02 was selected to represent a view of a nearby non-associated residences from an alternative direction (Figure 6-17). The location of these receivers is shown on Figure 6-14.

Figure 6-16 PM01 nearby residence panorama (Source, Moir Studio 2025)

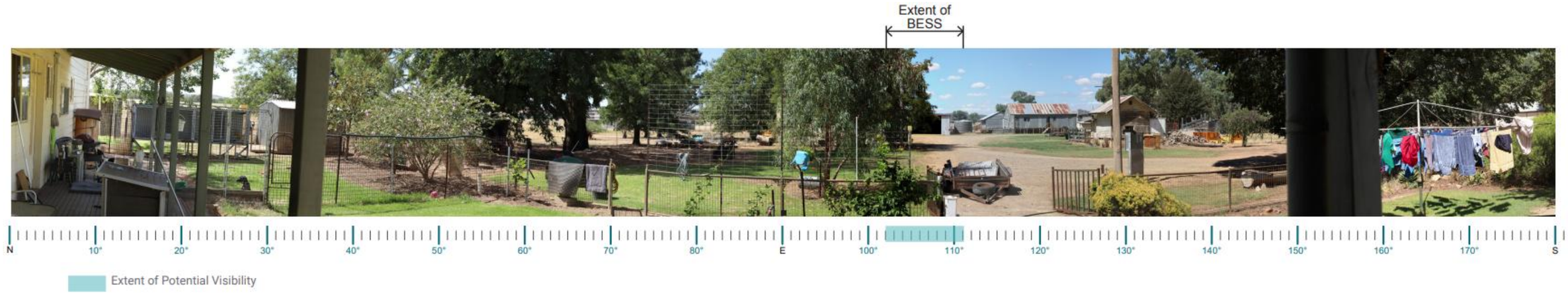


Figure 6-17 PM02 nearby residence panorama (Source, Moir Studio 2025)

Night lighting

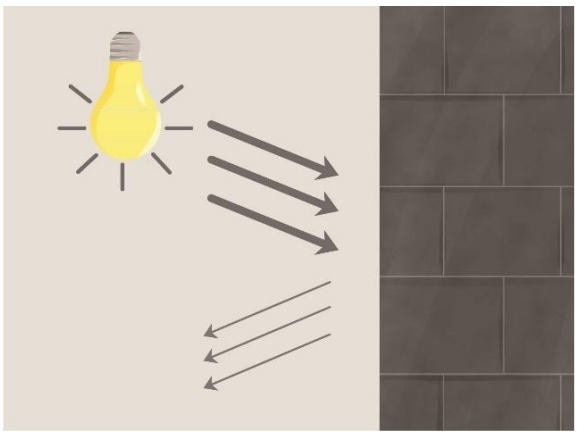
It is likely that there would be limited visual impacts resulting from night lighting of ancillary structures due to the light design recommendations below that would be implemented. Any night lighting would be designed with reference to the following recommendations that have been developed with reference to *The Dark Sky Planning Guidelines* (DPHI, 2025) and the *Australian Government Department of the Environment and Energy, National Light Pollution Guidelines for Wildlife* (DCCEEW, 2020).

1. Control the level of lighting

- Only use lighting for areas that require lighting i.e., paths, building entry points
- Reduce the duration of lighting
- Switch off lighting when not required
- Consider the use of sensors to activate lighting and timers to switch off lighting.

2. Lighting design

- Use the lowest intensity required for the job
- Use energy efficient bulbs and warm colours
- Direct light downwards to eliminate
- Ensure lights are not directed at reflective surfaces
- Use non-reflective dark coloured surfaces to reduced reflection of lighting (refer Figure 6-18)
- Keep lights close to the ground and/or directed downwards (refer Figure 6-18)
- Use light shield fittings to avoid light spill (refer Figure 6-20).



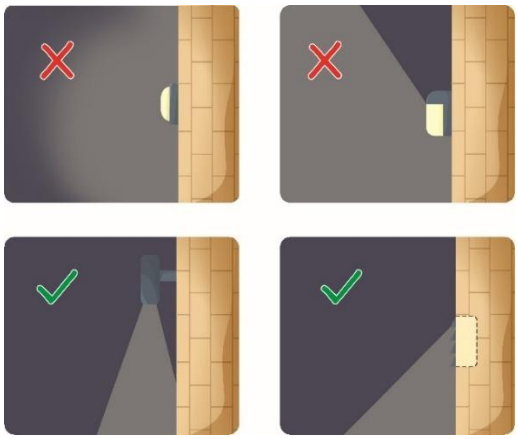


Figure 6-18 Surface reflectivity (DCCEEW, 2020) Figure 6-19 Downward lighting (DCCEEW, 2020)

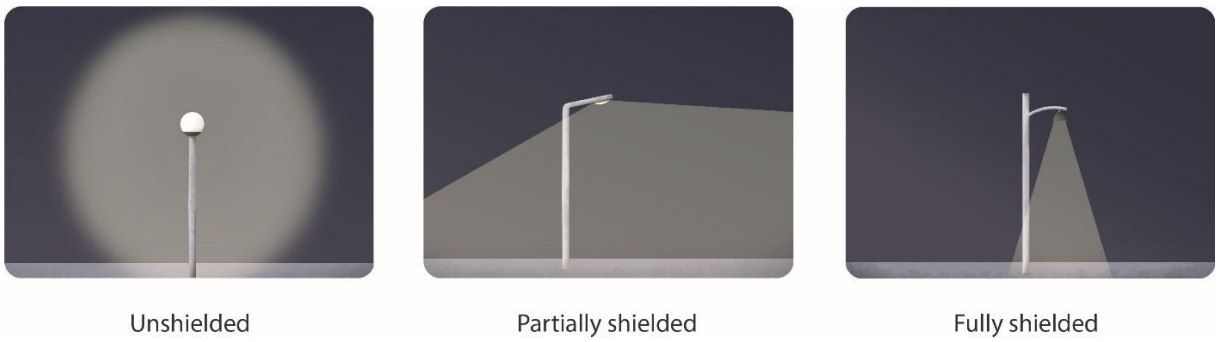
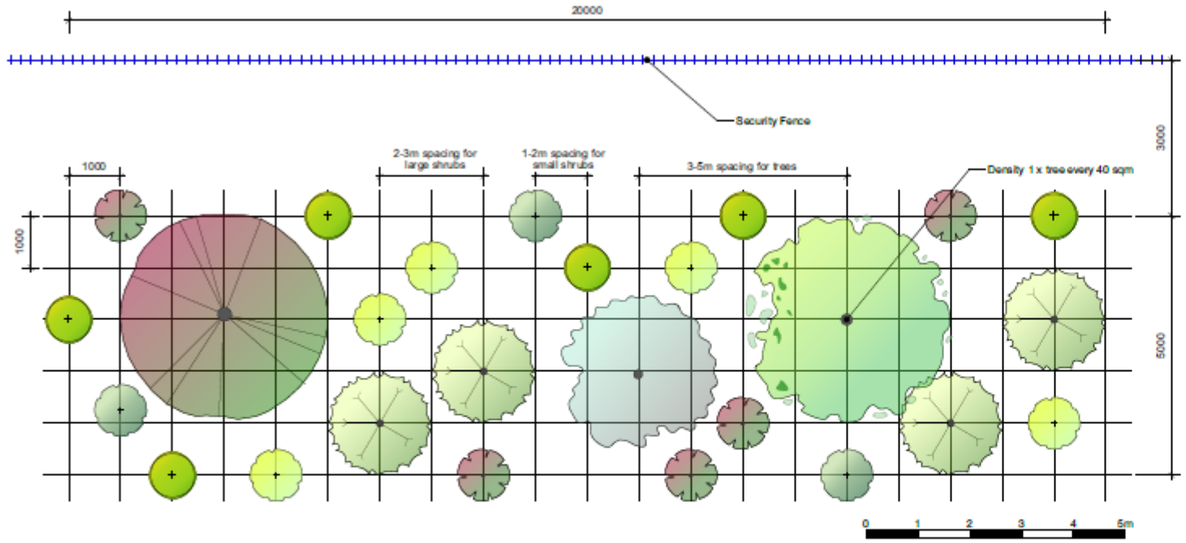


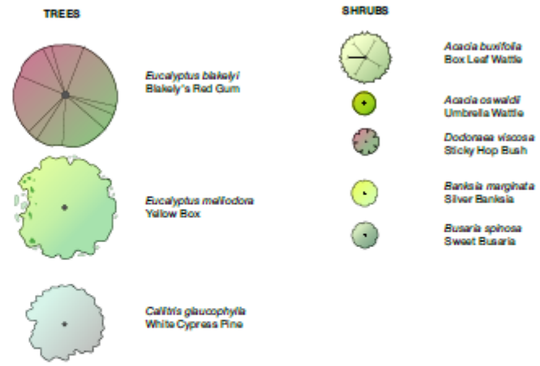
Figure 6-20 Light shielding (DCCEEW, 2020)

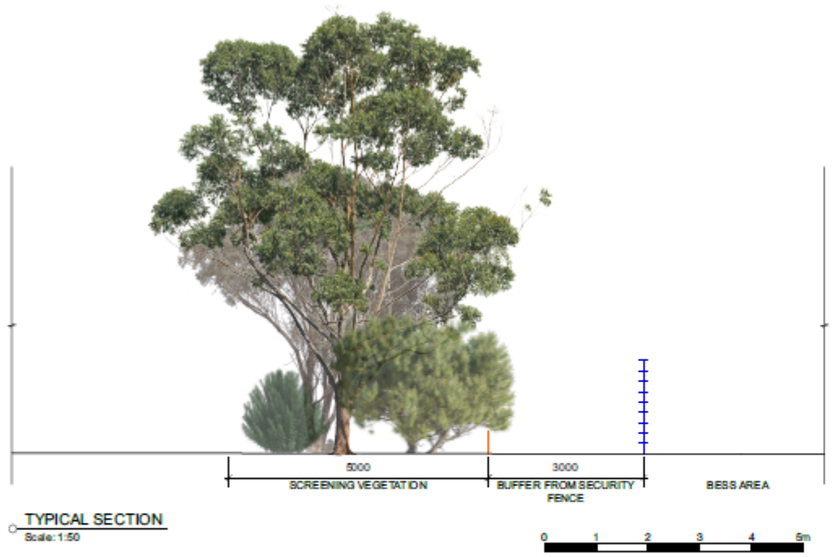
6.6.4. Draft landscape plan

To further minimise views to the Project, a draft landscape plan has been developed by Moir Studio, that incorporates native vegetation local to the area in line with the relevant PCT. The Landscape Plan can be seen below in Figure 6-21 and Figure 6-22.

Figure 6-21 Draft landscape plan (Source, Moir Studio 2025)







Planting Schedule					
Code	**Botanical Name**	**Common Name**	**Pot Size**	**Mature Height**	**Mature Spread**
Trees					
CAL gla	*Callitris glaucophylla*	White Cypress Pine	200mm	25 - 30m	3.5 - 6m
EUC bla	*Eucalyptus blakelyi*	Blackely's Red Gum	200mm	20 - 25m	7m
EUC mel	*Eucalyptus melliodora*	Yellow Box	200mm	10 - 15m	8 - 10m
Shrubs					
ACA bux	*Acacia buxifolia*	Box-leaf Wattle	150mm	10 - 12m	5 - 7m
ACA osw	*Acacia oswaldii*	Umbrella Wattle	150mm	1 - 3m	1 - 2m
BAN mar	*Banksia marginata*	Silver Banksia	150mm	2 - 3m	2 - 3m
BUR spi	*Bursaria spinosa*	Sweet Bursaria	150mm	3 - 4m	1.5 - 2.5m
DOD spa	*Dodonaea viscosa spp.*	Sticky Hop Bush	150mm	1.5 - 2m	1 - 1.5m

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ARCHITECT: N/A
ENGINEER: N/A
CLIENT: NGH
NOTE: DRAWING PURPOSES FOR APPROVAL ONLY. NOT FOR CONSTRUCTION.

No: A | DATE: 13/5/2025 | REVISION: FOR APPROVAL | BY: RS

PROJECT: Mangoplah Battery Energy Storage Sysyem (BESS) Landscape Plan
LOT 222 - DP754557, 4178 Holbrook Road, Mangoplah NSW 2652
Status: DRAFT

North

DETAILED PLANTING PLAN
SCALE: AS NOTED
ORIGINAL DRAWING AT A1.
Drawn By: RS
Checked By: AR Approved By: AR
Project No. 2629
Drawing No. LDD601 Rev A

Figure 6-22 Planting matrix (Source, Moir Studio 2025)

6.6.5. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on landscape character and visual amenity is considered to be manageable.

Safeguards and mitigation measures relating to landscape and visual amenity are outlined in Table 6-21 below.

Table 6-21 Landscape and visual amenity mitigation measures

Mitigation number	Mitigation measure	Project Stage
VA1	Building design • Consider use of materials that integrate with the surrounding landscape • Where practicable use suitable colours and finishes for project infrastructure to minimise visual impacts	Design
VA2	Dark Sky Planning guidelines and national light Pollution Guidelines for Wildlife will be considered during detailed design Cut off and direct light fittings (or similar technologies would be used where appropriate to minimise glare and light spill onto private property.	Design
VA3	Landscaping will be installed in accordance with the conceptual landscape plan, including screen planting along the west of the BESS facility. The final location and extent of landscaping will be determined during detailed design. During detailed design would consider the key principals: • Planting should remain in keeping with existing landscape character • Species selection is to be typical of the area • Planting layout should avoid screening views of the broader landscape • Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation • Allow native vegetation to regrow over any areas of disturbance	Design

6.7. Noise and vibration

This section summarises the finding of the Construction & Operation Noise and Vibration Assessment (CONVA) undertaken by Renzo Tonin and Associates on behalf of the Applicant, provided in Appendix F.7. The CONVA was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential noise and vibration impacts of the Project and the recommended measures to mitigate them.

6.7.1. Approach

Noise and vibration impacts were assessed in accordance with a number of policies, guidelines and standards, including:

- NSW 'Interim Construction Noise Guideline (DECC, 2009)
- NSW 'Noise Policy for Industry (NPfI) (NSW EPA, 2011)
- Assessing Vibration: A Technical Guideline' (DEC, 2006)
- NSW 'Road Noise Policy' (NSW DECCW, 2011).

6.7.2. Existing noise environment

Background noise varies over the course of any 24-hour period, typically from a minimum at 3am in the morning to a maximum during morning and afternoon traffic peak hours. Therefore, the NPfI requires that the level of background and ambient noise be assessed separately for the daytime, evening and night-time periods. The NPfI defines these periods as follows:

- **Day** is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays and Public Holidays.
- **Evening** is defined as 6:00pm to 10:00pm, Monday to Sunday and Public holidays
- **Night** is defined as 10:00pm to 7:00am, Monday to Saturday and 10:00pm to 8:00am Sundays and Public Holidays.

The identified receivers surrounding the Project Site are all classified as rural under NPfI guidelines. Based on the NPfI and for conservative assessment, the minimum assumed Rating Background Levels (RBLs) are adopted for all receiver locations. Therefore, the applicable RBLs used for this assessment are presented in Table 6-22 below.

Table 6-22 Applicable RBL, dB(A)

Time of day	Minimum RBLs dB(A)	Applicable RBL, dB(A)
Day	35	35
Evening	30	30
Night	30	30[4]

[4] In accordance with Table 2.1 of the NSW NPfI

6.7.3. Potential impacts

Construction noise assessment

Noise emissions were predicted by Renzo Tonin by modelling the noise sources, receiver locations, topographical features of the intervening area, and possible noise control treatments using the CadnaA (version 2023) noise modelling computer program. The program calculates the contribution of each noise source at each specified receiver and allows for the prediction of the total noise from a site.

The noise prediction models take into account:

- Location of noise sources and receiver locations
- Height of sources and receivers
- Separation distances between sources and receivers
- Ground type between sources and receivers (soft)
- Attenuation from barriers (natural and purpose built).

Noise levels at any receiver resulting from construction would depend on the above and the type and duration of construction being undertaken. Furthermore, noise levels at receivers would vary substantially over the total construction program due to the transient nature and large range of plant and equipment that could be used.

The predicted noise levels modelled represent a worst-case scenario, where all plant and equipment are operating for each corresponding construction stage. This worst-case scenario would not be typical and is unlikely to occur in practice.

Table 6-23 and Table 6-24 below detail the predicted construction noise level for the construction of the BESS and associated infrastructure and construction of the access road, with R4 being the associated receiver.

Table 6-23 Predicted L_{Aeq},15min Construction Noise Levels During Construction of BESS, dB(A) (Source, Renzo Tonin 2025)

Plant Item	Plant Description	Predicted Leq,15 min Construction Noise Levels						
		R1	R2	R4*	R6	R7	R8	R10
Noise Management Level		*45*	*45*	*45*	*45*	*45*	*45*	*45*
1	Crane	<20-31	<20-28	<20-25	<20-23	<20-22	<20-21	<20
2	Drum roller	<20-30	<20-27	<20-24	<20-22	<20-21	<20-20	<20
3	Padfoot roller	<20-30	<20-27	<20-24	<20-22	<20-21	<20-20	<20
4	Wheeled loader	<20-30	<20-27	<20-24	<20-22	<20-21	<20-20	<20
5	Dump truck	<20-29	<20-26	<20-23	<20-21	<20-20	<20	<20
6	30t Excavator	<20-28	<20-25	<20-22	<20-20	<20	<20	<20
7	Grader	<20-28	<20-25	<20-22	<20-20	<20	<20	<20
8	Chain trencher	<20-25	<20-22	<20	<20	<20	<20	<20

Plant Item	Plant Description	Predicted Leq,15 min Construction Noise Levels						
		R1	R2	R4*	R6	R7	R8	R10
9	Water truck	<20-25	<20-22	<20	<20	<20	<20	<20
10	Telehandler	<20	<20	<20	<20	<20	<20	<20
11	Forklift	<20	<20	<20	<20	<20	<20	<20
Up to 3 (noisiest) plant operating concurrently		<20-35	<20-32	<20-29	<20-27	<20-26	<20-25	<20-22

Table 6-24 Predicted L_{Aeq},15min Construction Noise Levels During Construction of Access Road, dB(A) (Source, Renzo Tonin 2025)

Plant Item	Plant Description	Predicted Leq,15 min Construction Noise Levels						
		R1	R2	R4*	R6	R7	R8	R10
Noise Management Level		*45*	*45*	*45*	*45*	*45*	*45*	*45*
1	Crane	<20-34	<20-29	<20-45	<20-21	<20-27	<20-20	<20
2	Drum roller	<20-33	<20-28	<20-44	<20-20	<20-26	<20	<20
3	Padfoot roller	<20-33	<20-28	<20-44	<20-20	<20-26	<20	<20
4	Wheeled loader	<20-33	<20-28	<20-44	<20-20	<20-26	<20	<20
5	Dump truck	<20-32	<20-27	<20-43	<20	<20-25	<20	<20
6	30t Excavator	<20-31	<20-26	<20-42	<20	<20-24	<20	<20
7	Grader	<20-31	<20-26	<20-42	<20	<20-24	<20	<20
8	Chain trencher	<20-28	<20-23	<20-39	<20	<20-21	<20	<20
9	Water truck	<20-28	<20-23	<20-39	<20	<20-21	<20	<20
10	Telehandler	<20-22	<20	<20-33	<20	<20	<20	<20
11	Forklift	<20	<20	<20-25	<20	<20	<20	<20
Up to 3 (noisiest) plant operating concurrently		<20-38	<20-33	<20-49	<20-25	<20-31	<20-24	<20-20

Results indicate that the predicted construction noise levels from the construction of the BESS comply with the construction NML at all receivers.

Accordingly, the predicted construction noise levels from the construction of the access road comply with the construction NML at all non-associated receivers. The construction NML would be exceeded when the construction works are conducted at the closest proximity to associated receiver R4 when the three noisiest plant items are operating concurrently. As receiver R4 is an involved/associated receiver, exceedances can be managed.

The exceedances predicted are based on the plant and equipment operating at a location closest to the corresponding receiver location and/or the three loudest plant and equipment operating concurrently. This scenario would not typically occur on site.

Construction noise levels at all receivers during the construction of the BESS and the access road are predicted to be below the highly noise affected level of 75 dB(A).

Operational noise assessment

Noise impact from the general operation of the Project is assessed against the NPfI. The assessment procedure in terms of the NPfI has two components:

- Controlling intrusive noise impacts in the short-term for residences; and
- Maintaining noise level amenity for residences and other land uses.

In accordance with the NPfI, noise impact should be assessed against the project noise trigger level which is the lower value of the project intrusiveness noise levels and project amenity noise levels.

For the assessment of the Project, the noise from the transformers are considered to be tonal in nature. In accordance with Table C Fact Sheet C of the NPfI, where the character of the noise in question is assessed as particularly annoying (i.e. if it has an inherently tonal, low frequency, impulsive or intermittent characteristic), then an adjustment of 5 dB(A) for each annoyance aspect, up to a total of 10 dB(A), is to be added to the predicted value to penalise the noise for its potential increase in annoyance. Therefore, a 5 dB(A) penalty has been applied to the predicted noise contributions from the transformers.

Noise emissions were predicted by modelling the noise sources, receiver locations, topographical features of the intervening area, and possible noise control treatments using the CadnaA (version 2025) noise modelling computer program. The program calculates the contribution of each noise source at each specified receptor point and allows for the prediction of the total noise from a site.

The noise prediction models take into account:

- Location of noise sources and receiver locations
- Height of sources and receivers
- Separation distances between sources and receivers
- Ground type between sources and receivers (soft)
- Attenuation from barriers (natural and purpose built).

Furthermore, in accordance with Fact Sheet D, Table D.1 of the NPfI noise predictions were prepared for the following standard and noise-enhancing meteorological conditions (refer to Table 6-25):

1. Standard meteorological conditions – 0.5m/s wind velocity at 10m from ground level between each noise source and each noise receiver. Wind direction was based on wind travelling from the source to the receiver.
2. Slight to gentle breeze – 3m/s wind velocity at 10m from ground level between each noise source and each noise receiver (as per NPfI default wind conditions). Wind direction was based on wind travelling from the source to the receiver.
3. Moderate temperature inversion – applicable for noise predictions during night-time periods only. F-class temperature inversion with 2m/s wind velocity at 10m from ground level between each noise source and each noise receiver.

Table 6-25 Predicted L_{Aeq},15min Operational Noise Levels at Sensitive Receivers, dB(A) (Source, Renzo Tonin 2025)

Receiver Location	Predicted Operational Noise Levels								Comply? (Yes/No)
	Project Noise Trigger Levels			Day[5]			Evening & Night[6]		
	Day	Evening	Night	Calm & Isothermal Conditions	Slight to Gentle Breeze	Calm & Isothermal Conditions	Slight to Gentle Breeze	Moderate Temperature Inversion[7]	
R1	*40*	*35*	*35*	24	25	20	21	21	Yes
R2	*40*	*35*	*35*	22	23	<20	<20	<20	Yes
R4*	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
R6	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
R7	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
R8	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
R10	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes

[5] Based on Tesla Megapack units operating at 100% Battery Fan Duty & 60% Power Electronics Fan Duty during the day

[6] Based on Tesla Megapack units operating at 50% Battery Fan Duty & ~30% Power Electronics Fan Duty during the evening and night periods

[7] Applicable for the night time period only

Results presented in Table 6-25 indicate that the worst-case (over a 24hr period) operational noise levels comply with the project trigger noise levels (PTNL) for all for all receivers for all time periods.

Therefore, no further noise mitigation measures are required to reduce operational noise impacts.

Sleep disturbance assessment

To assess the likelihood of sleep disturbance, the potential of maximum noise level events from the operational Project during the night-time period has been considered. In accordance with the NPfI, a detailed maximum noise level event assessment should be undertaken where the subject development night-time noise levels at a residential location exceed:

- $L_{Aeq.15min}$ dB(A) or the prevailing RBL plus 5dB, whichever is the greater,
- L_{AFmax} dB(A) or the prevailing RBL plus 15dB, whichever is the greater.

The assessment found that during the night-time period, only mechanical plant will be operating. Noise emissions from these plant items are considered to be continuous with no potential for high peak noise level events. Therefore, the Lamax noise levels experienced at the identified receivers will be similar to the predicted $L_{Aeq.15min}$ noise levels. It is expected that both the $L_{Aeq.15min}$ and L_{AFmax} will be well below the nominated sleep disturbance criteria of 40 dB(A) and 52 dB(A), respectively for all non-associated residential receivers.

Vibration assessment

Vibration generation activities would occur only during the construction phase of the Project. There are no vibration generation activities expected during the operational phase. Assessment for construction vibration impact on structural damage and human comfort is assessed in accordance with EPA requirements. The nearest receivers are 225m or more from the Project Site and as it is a large distance from the Project, structural damage to buildings from vibration is not expected.

The assessment indicates there is a very low risk of structural damage and/or adverse comments from potential vibration impacts for all receivers.

No mitigation measures are required for potential vibration impacts.

Road traffic noise assessment

Access to the BESS facility and the associated access road will be from Holbrook Road which is classified as an arterial road.

For existing residences affected by additional traffic on existing arterial roads generated by land use developments, the following Road Noise Policy (RNP) road traffic noise criteria would apply.

- **Day time** (7am – 10pm): $L_{Aeq.(15hour)}$ 60 dB(A)
- **Night** (10pm – 7am): $L_{Aeq.(9hour)}$ 55dB(A)

As construction works are to occur only during the day-time period, only the traffic noise criterion for the day period was assessed against.

Predicted road traffic noise

Results of the road traffic noise predictions that road traffic noise level contributions from the vehicle movements associated with the construction works are within the applicable noise criteria. Traffic noise

contribution from the construction vehicles is at least 2 dB(A) less than traffic noise criterion and would not adversely contribute to existing traffic noise levels along surrounding roads.

Cumulative noise impacts

Cumulative noise impacts for the Project have been considered against other nearby Projects, if an overlap with the construction phase was likely to occur.

The closest project listed on the Major Projects Portal, as of August 2025, is approximately 10km from the Project Site.

As such, there are no cumulative noise impacts predicted as a result of the Project.

6.7.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on noise and vibration amenity is considered to be manageable.

Safeguards and mitigation measures relating to noise and vibration impacts are outlined in Table 6-26 below.

Table 6-26 Noise and vibration mitigation measures

Mitigation number	Mitigation measure	Project Stage
NV1	Establish a complaints procedure including signage and other means to advertise the contact number regarding complaints. Respond to complaints in a timely manner and keep relevant parties informed of progress.	All stages
NV2	For construction works conducted within close proximity to the dwelling/building of Receiver R4, potential noise exceedances to this receiver would be managed by implementing time restrictions and/or providing periods of repose for residents, where feasible and reasonable.	During construction
NV3	The following noise management measures should be considered as part of a Noise Management Plan. • Plant and equipment should be properly maintained • Avoid any unnecessary noise when carrying out manual operations and when operating plant • Any equipment not in use for extended periods during construction work should be switched off. • Good relations with people living and working in the vicinity of a construction site should be established at the beginning of a project and be maintained throughout the project • Keep people informed of progress and take complaints	Prior to and during construction

Mitigation number	Mitigation measure	Project Stage
	seriously • The person selected to liaise with the community should be adequately trained and experienced in such matters.	

6.8. Water use and flooding

This section summarises the findings of the Flood Impact Assessment (FIA) undertaken by Cumulus Engineering on behalf of the Applicant provided in Appendix F.8. The FIA was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential water use and flood impacts of the Project and the recommended measures to mitigate them.

6.8.1. Approach

This flood assessment has been prepared in accordance with the Flood Impact and Risk Assessment – Flood Risk Management Guideline LU01 (DPE, 2023), encompassing assessment of the following:

- Assessing the full range of flood risk, by assessing flood behaviour across a range of events by modelling the 5%, 1%, 0.5%, 0.2% Annual Exceedance Probability (AEP) and Probable Maximum Flood (PMF) events[8].
- Assessing the constraints flood places on the land (floodways, flood storage, & flood hazard) determined for the full range of events.
- Assessing the appropriateness of the development for the location.
- Assessing the adequacy of measures taken to ensure flood risks to the proposed developments are acceptable

Consultation was undertaken with the relevant council and government agencies, including the NSW State Emergency Service (SES), and the local community to acquire information and feedback regarding potential flood impacts.

Consultation

As stated above, consultation was undertaken with WWCC and the NSW SES by Cumulus and the Applicant as part of the EIS process. The key points from the discussions are outlined below.

Wagga Wagga City Council

Council provided the following insights and recommendations:

- Paper Forest Road, has had issues regarding flooding in historic flood events
- The township of Mangoplah itself becomes isolated in significant flood events.

NSW SES

SES provided the following insights and recommendations:

- Recommends a Flood Emergency Response Plan be included for the construction and operational plan of the project.
- Noted that even though the site will be mainly operated remotely with infrequent site visits, raised concerns over the relatively large construction crew who will be present on-site during construction.

[8] AEP is defined as '**chance of a flood happening in any given year'**

PMF is the **worst-case scenario flood**—the biggest flood that could possibly happen, based on extreme weather and catchment conditions – no based on probability like AEP

- Suggests the Probable Maximum Flood event be considered when assessing flood risk on emergency evacuation routes.

Community

Concerns about flooding and overland runoff were consistently raised throughout the community consultation process:

- Nearby receivers whether worst-case flood scenarios had been modelled and what design measures would be in place to manage heavy rainfall and overland flow. It was emphasised that the area has a known history of inundation and warned that any alteration to natural drainage paths could result in unintended runoff impacts to neighbouring land
- Concerns around floodwater pooling or redirection of floodwater in unexpected ways if not properly managed during site preparation and construction were raised.

Community consultation is detailed in full in Section 5.1 and Appendix D.

6.8.2. Existing environment

The Project Site is situated within the Paper Forest Creek catchment. The Project Site is relatively flat yet is situated on a local highpoint of the catchment and receives minimal direct upstream contributions. The surrounding topography slopes predominantly southwest.

The BESS Facility is located on the periphery of two third-order streams. The wider Development Footprint, which includes access routes, intersects several watercourses with Strahler orders ranging up to the ninth order—representing significant river systems.

Existing flood conditions

Hydraulic modelling was conducted to characterise the existing local hydrology of the Project Site. The results of the 1% AEP (a one in a hundred-year flood) event indicate that the Project Site would not be subject to inundation (refer to Figure 6-23). Inundation within the surrounding landscape would occur, primarily from direct local rainfall. Rainfall on the Subject Lot tends to collect in minor depressions before flowing towards the south-west towards Paper Forest Creek, eventually merging with the main watercourse.

Burkes Creek defines the northern border of the Involved Lands (refer to the Subject Lot in the Cumulus report (Appendix F.8)), and significant depths and flows are within the creek banks. The creek itself is very incised, where the depths up to 8m are confined to the creek bank, having minimal impact on flood depths within the Involved Lands.

While hazard levels on the Subject Lot are generally low (H1), a significant hazard (up to H5) is present within the minor dam on the west of the Subject Lot.

A flood function analysis of the 1% AEP event showed the BESS Facility lies outside of the floodway, flood storage, and flood fringe.

The BESS Facility is within the Flood Planning Area (FPA), and as such, the development must ensure that the building floor elevations are above the Flood Planning Level (FPL) of 269.81m Australian Height Datum (AHD). It is noted that the suggested FPA presented as part of the FIA is considered high level and indicative only.

Existing groundwater

No free groundwater or seepage was observed during borehole excavations for the soil survey (refer to Section 6.10. The maximum depth of excavation at the site was 1.5m.

The Project Site is situated within the Murrumbidgee Alluvium Groundwater Source of the Murrumbidgee Catchment (DPE, 2022) and falls under the Water Sharing Plan for the Murrumbidgee Alluvial Groundwater Sources 2020 under the *Water Management Act 2000* (refer to Figure 6-24)

The alluvium of the Murrumbidgee is made up of alluvial sediments and are divided into two main aquifers, the shallow Cowra formation and the deeper Lachlan formation, comprised of clay, silt, sand and gravel (DPE, 2022).

The assessment of likelihood of groundwater dependent ecosystems in the locality is based on the Bureau of Meteorology Groundwater Dependent Ecosystems Atlas. Groundwater Dependent Ecosystems (GDEs) include ecosystems which may rely on the surface expression of groundwater (including surface water ecosystems that may have a groundwater component) and ecosystems which may rely on the subsurface presence of groundwater (including vegetation ecosystems). There are no mapped Terrestrial or aquatic GDE's within the BESS Site. Paper Forest Creek and sections of native vegetation along the access road are mapped as aquatic and terrestrial GDE's respectively (refer to Figure 6-25).

The NSW DPI database of groundwater sites list no groundwater bores located within the Project Site.

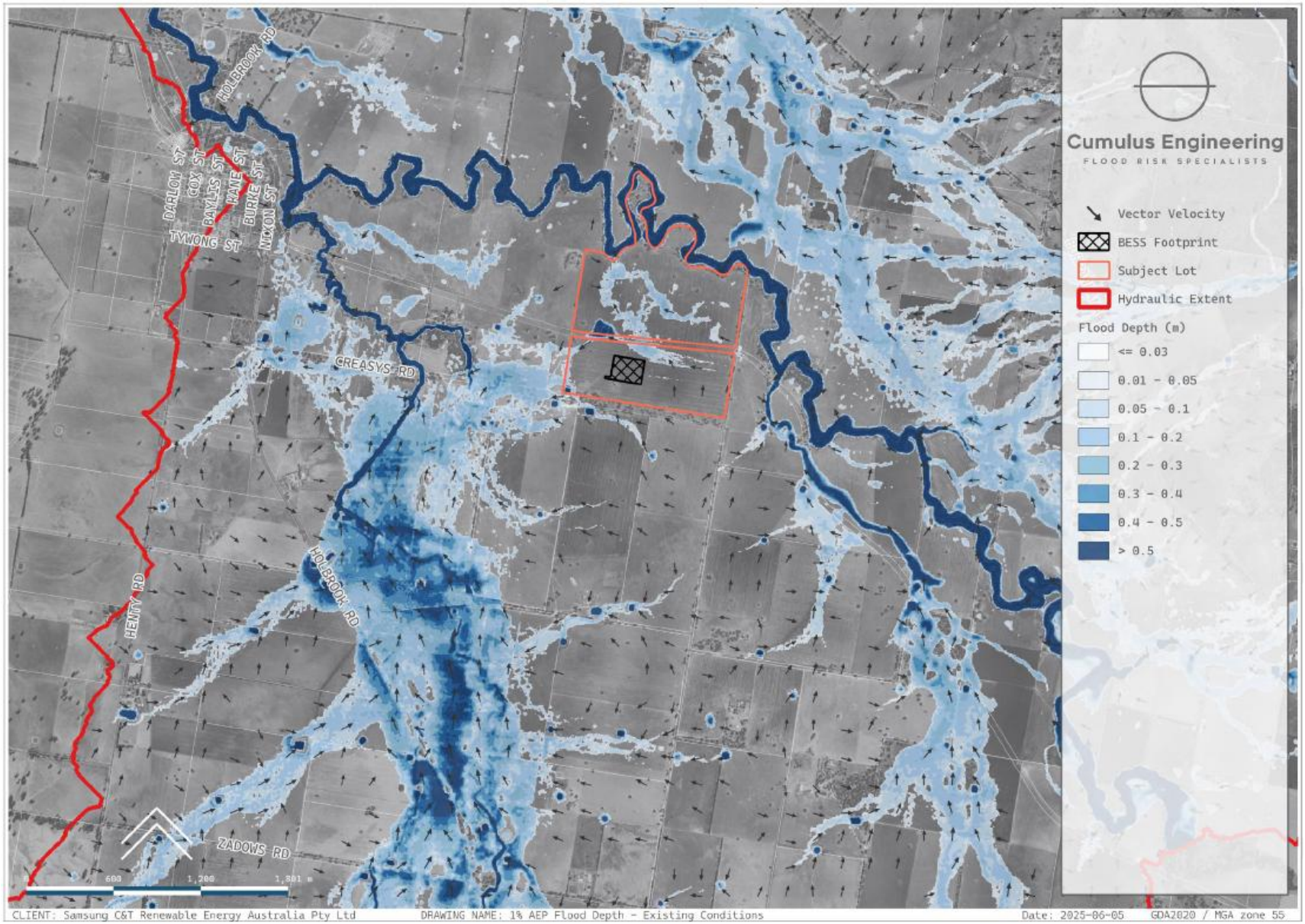

Figure 6-23 Existing conditions 1% AEP depth (Source, Cumulus 2025)

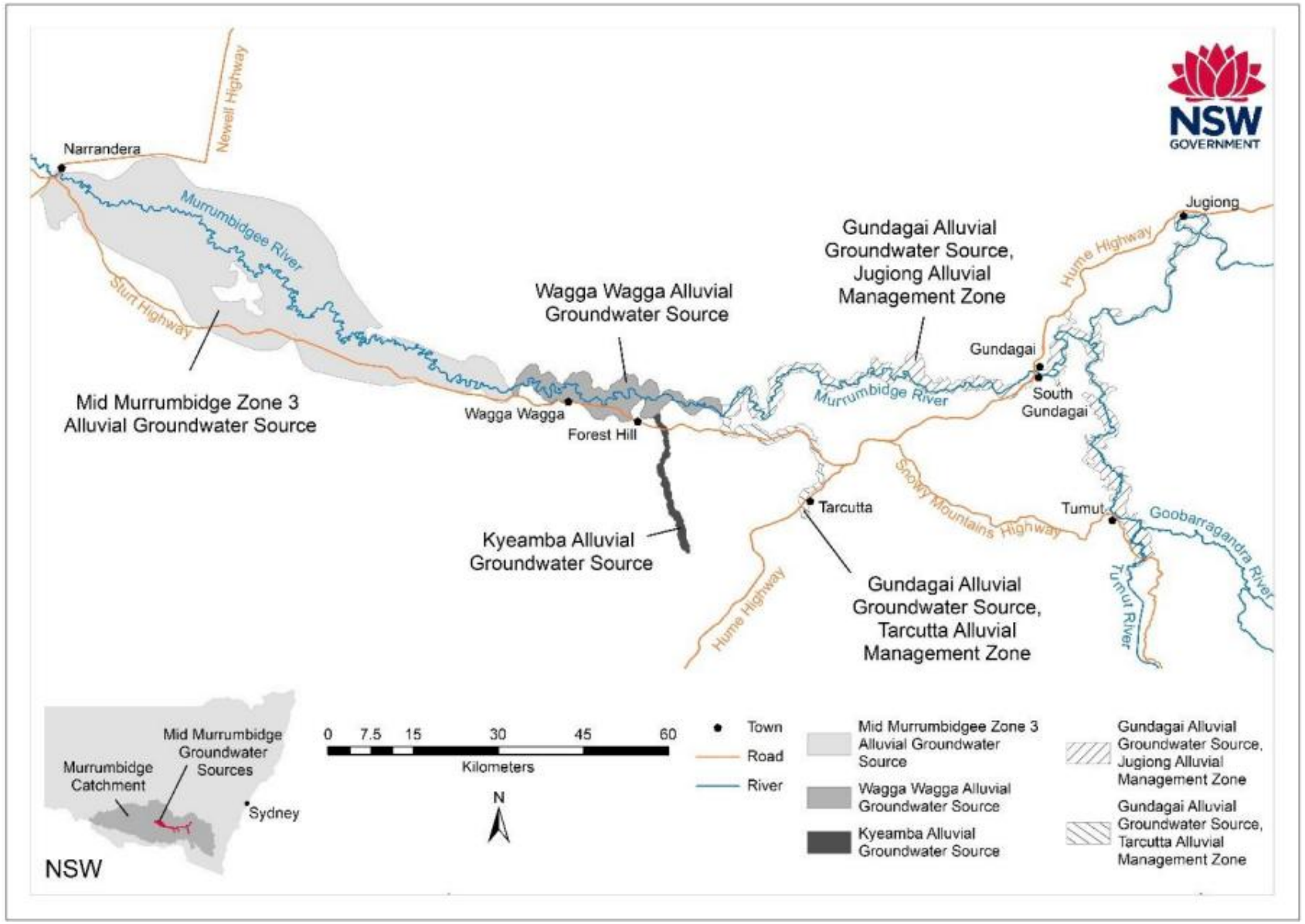

Figure 6-24 Groundwater Management Areas in the Murrumbidgee Catchment (DPE, 2022)

LEGEND

- Project Site
- Development Footprint
- Road

Hydrology features

- High potential GDE - from national assessment
- Low potential GDE - from regional studies
- Waterways
- Farm Dams

BURKES CREEK

Creasys Road

Holbrook Road

PAPER FOREST CREEK

Datum: GDA2020 / MGA Zone 55

0 0.5 1 km

Mangoplah BESS

Figure 6-25 Groundwater Dependent Ecosystems (GDE's) within Project Site and surrounds

6.8.3. Potential impacts

Flooding

Potential impacts on flood behaviour as a result of the construction of the Project include:

- Increase in the potential flood affection of other properties, assets and infrastructure
- Increase in flood hazard
- Impact on beneficial inundation of the floodplain environment, on adjacent to or downstream of the site
- Direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or water courses
- Impact on existing community emergency management response (flooding)
- Impact on the social and economic costs to the community as a consequence of flooding.

An analysis of 1% AEP event flood behaviour indicates the Project will have a minimal impact on existing flood patterns and characteristics. Maximum flood depths, hazard levels, and flow velocities are shown to remain consistent with those detailed for the existing, pre-development conditions.

The BESS Facility is shown to experience minimal inundation in the modelling. This reduced flood risk is due to its position on a ridge, preventing localised rainfall from pooling. The overall flood behaviour of the Involved Lands remains largely unchanged. Hazard levels on the BESS Facility remain low (H1), and a minor pocket of depths up to 30mm, indicating conditions on BESS Footprint are generally safe for people, vehicles, and infrastructure. No detailed design solutions for the BESS footprint are needed.

Hydraulic modelling of the 1% AEP event indicates that the access road off Holbrook Road would be impacted if Paper Forest Creek overtops, creating a wide flow path from south to north. The access road itself acts as a hydraulic control, causing water to pond upstream with flood depths reaching up to 700mm over the road. Furthermore, high hazard classifications (H3) and high velocities (approximately 1m/s) impact the access road. Modelling for 1% AEP event depths indicate that the emergency egress road is not expected to exceed 300mm. The road is predominantly subject to H1 hazard levels, with only minor areas experiencing H2 hazard conditions (refer to Figure 6-26). As hazard and depths are low, no further works are required to maintain this emergency egress road.

The adoption of the access road off Holbrook Road as the primary access to the site during day-to-day operations remains viable outside of when a flood event is occurring (i.e. for flood events less than the 5% AEP event). Access off Paper Forest Road is proposed to only be utilised in the event of emergency, as directed by NSW SES. Outside of these conditions, there will not be any traffic to and from the Subject Lot along the emergency access route due to the Project. The development of a Flood Emergency Response Plan (FERP) would facilitate safe evacuation prior to inundation of the site. Coordination with NSW SES is recommended to ensure emergency response planning aligns with local flood emergency protocols and to confirm if any additional evacuation arrangements or triggers are required. Given the BESS Facility is outside of the PMF Flood Extent, Shelter-In-Place measures may be appropriate.

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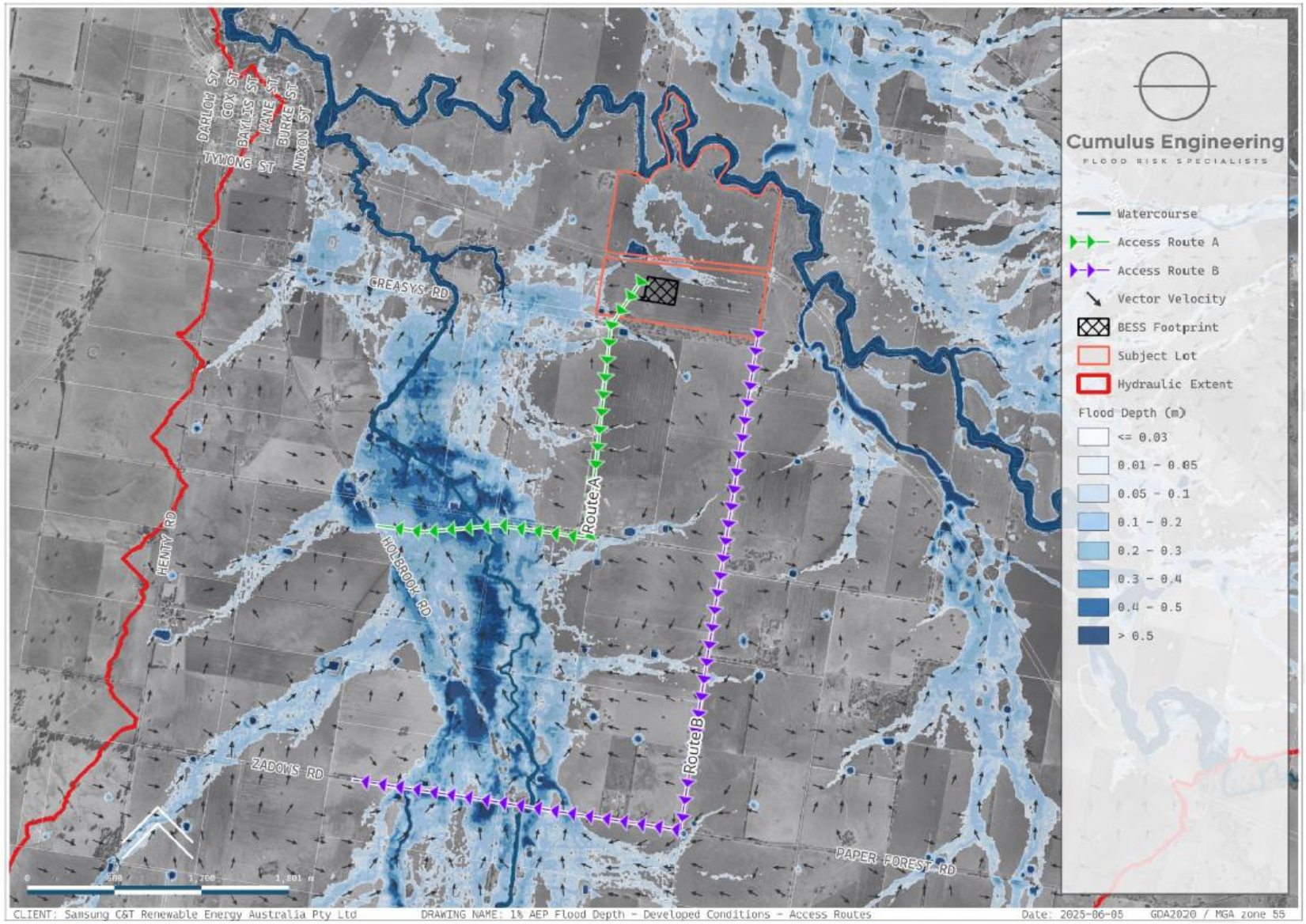


Figure 6-26 1% AEP event depths - Developed conditions for the access road (green) and emergency egress route (purple) (Source, Cumulus 2025)

Construction and decommissioning

Water use

Water use during construction is detailed above in Section 3.4.3. Water use during decommissioning would be similar to construction, used for dust suppression and quantity dependent on weather conditions. Due to the smaller scope of works and workforce, the decommissioning requirement is likely to be less than the anticipated construction requirements.

Surface water quality

The access road corridor intersects several watercourses, namely Paper Forest Creek, a 5th order steam (of the Strahler Stream Order). Due to the presence of waterway traversing the access road corridor, the design and construction of a watercourse crossing would be as per the Controlled activities – Guidelines for watercourse crossings on waterfront land (NSW DPE, 2022) (Figure 6-27).

Indirectly, the construction and decommissioning phases would involve a range of activities that would disturb soils and potentially lead to sediment laden runoff. This could affect local waterways during rainfall events. These impacts are discussed in this section and are unlikely to significantly impact on water quality with consideration given to appropriate mitigation measures.

The use of fuels and other chemicals on site pose a risk of surface water contamination in the event of a spill. Chemicals used onsite would include fuels, lubricants and herbicides, none of which are considered difficult to manage. Fuelling and maintenance sites would be nominated and fully bunded to contain any potential accidental spills.

While water would not be used to extinguish fires, it may be used for heat management of adjacent BESS units. This water would be managed onsite in accordance with current EPA guidelines and appropriate Australian and New Zealand standards.

With the BESS Facility being generally flat terrain, management of the site's slope, controlling of spills and implementation of erosions and sediment control measures in accordance with Landcom (NSW OEH, 2004) would minimise any potential for sediment laden water or spills to leave site.

Table 2: Riparian corridor matrix

Stream order	VRZ	RC offsetting for non-RC uses	Cycleways and paths	Detention Basins		Stormwater outlet structures and essential services	Stream realignment	Road crossings		
				Only within 50% outer VRZ	Online			Any	Culvert	Bridge
1st	10m	●	●	●	●	●	●	●		
2nd	20m	●	●	●	●	●		●		
3rd	30m	●	●	●		●			●	●
4th +	40m	●	●	●		●			●	●

Figure 6-27 Minimum waterway crossings as per the Guidelines for Waterfront Land

Flooding

The Project Site is identified as flood prone, based off hydraulic modelling undertaken by Cumulus. As the Project Site is likely to be impacted by flooding associated with localised rainfall, erosion and sediment control measures and onsite inspections of controls before and after rainfall during construction and decommissioning would ensure inundation of rainfall onsite and would have minimal impact.

Groundwater

It is unlikely that groundwater would be extracted or impacted throughout the life of the Project. If required, a licence would be obtained for water extraction. It is considered that the proposal would have a negligible impact on groundwater quality given the low pollution potential of the BESS. Impacts to groundwater as a result of the proposed works are unlikely.

Operation

Water use

Water use volumes during operation would be minimal, no more than 1ML per year, as detailed above in Section 3.4.3. Water would be required for staff amenities at the control and maintenance building, filling the onsite water tank and watering of screening vegetation. Water required would be maintained by rainfall collected off the O&M building or delivered to site.

Amenities onsite would need to be managed through an onsite sewerage system (e.g. septic, composting or other appropriate system). The system would be designed by an appropriate service provider and installed in accordance with local requirements.

Water used for fire management would be contained managed onsite in accordance with Country Fire Authority Design Guidelines and Model requirements (CFA, 2023) for management of Fire water runoff management. Specifically, the fire water management plan may consist of the contaminant and disposal of contaminated fire water. Containment provided would be in accordance with the applicable Australian and New Zealand safety standards.

Surface water quality

Potential for any impact to surface water quality during operation is negligible. Appropriate drainage features would be constructed along internal access roads to minimise the risk of dirty water leaving the Project Site or entering waterways. These sites would be largely vegetated, with the exception of internal roads, parking areas and areas around the O&M building. Risks to water quality impacts during operation would therefore be low.

There would be low risk of contamination in the event of a chemical spill (e.g. fuels, lubricants, herbicides) as storage and emergency handling protocols would be implemented.

Site water balance

A detailed and consolidated site water balance has been calculated for the Project once in operation (Appendix G). The Development Footprint would remain vegetated except for the access track and the compacted and gravelled BESS hardstand accommodating Project infrastructure. The BESS hardstand includes the batteries, substation, Control and Switch room and parking.

The impervious fractions (NSW Government, 2025) used in the site water balance are provided in Table 6-27.

Table 6-27 Runoff coefficients for the Project

Feature	Impervious fraction
Development Footprint	0.1
Containers of batteries, O&M Building, Control and Switch room	1.0
Compacted gravel hardstands and roads (BESS hardstand, parking, substation)	0.85

Water balance calculations used the design rainfall event for a 63.2% AEP for a 24-hour period. The latest 2016 rainfall Intensity Frequency Duration (IFD) data was obtained from the Bureau of Meteorology (BOM). The IFD Design Rainfall Depth for the proposal (-35.390, 147.279) for a 63.2% AEP with a 24-hour duration is 44.4mm. A summary of the site water balance is provided in Table 6-28.

Table 6-28 Site water balance

Feature	Fraction impervious	Size (m^2)	63.2% AEP 24 hour (m^3)	Runoff (m^3)	Comment
Development Footprint	0.1	25,160	1,117.10	111.71	Vegetated component of Development Footprint - not included are internal access track, BESS hardstand or BESS infrastructure. Development Footprint for this calculation does not include the existing access track.
Batteries	1.0	12,690	563.44	563.44	108 Tesla Megapack 2XL units with the following dimensions – 8.8 metres long by 1.7 metres wide.
Internal roads	0.85	7650	339.66	288.71	Calculated with an average road width of 8 metres.
Substation	0.85	1000	444	377.4	Positioned on gravel hardstand.

Feature	Fraction impervious	Size (m^2)	63.2% AEP 24 hour (m^3)	Runoff (m^3)	Comment
O&M Building and Switch room	1.0	1640	72.82	72.82	Water would not be captured from the roof, with 100% of rainfall captured in guttering and discharged to land.
Water tanks	1.0	40	1.57	1.57	No rainwater tanks are included in the Project layout. 100% of rainfall would be captured in guttering and discharged to land.
Hardstand surrounding infrastructure	0.85	29,460	1,308	1,111.82	Gravel hardstand around infrastructure.
Total		86600	3845.04	**2525.89**	Runoff from the BESS hardstand would flow into the vegetated paddock that surrounds the BESS and infiltrate the soil.

A total of 3.85ML of rainfall falls within the boundary of the development site during a 63.2% AEP for a 24-hour duration. Of this volume of rainfall, 61% or 2.53ML is runoff due to the impervious nature of the compaction of the gravel roads, gravel hardstands and BESS infrastructure. The remainder of the Project Site would remain vegetated and uncompacted following construction. Runoff from the BESS hardstand would flow into the vegetated paddock that surrounds the BESS and infiltrate the soil.

Flooding

As stated above, the analysis of 1% AEP event flood behaviour under developed conditions indicates the Project will have a minimal impact on existing flood patterns and characteristics. Maximum flood depths, hazard levels, and flow velocities are shown to remain consistent with those detailed for the existing, pre-development conditions (refer to Figure 6-28).

Groundwater

Operational activities will not affect groundwater.

Site access

As detailed in Section 3.2.8 above, four culverts are present along the private access road that will require widening or minor grade ajustments. This may impact water flows across the road – however it is understood that the culverts current inhibits natural flow. This has also been observed by near neighbours to the Project.

Upgrades and grade adjustments to culverts are expected to improve overall hydrology along Paper Forest Road, and will be designed appropriately.

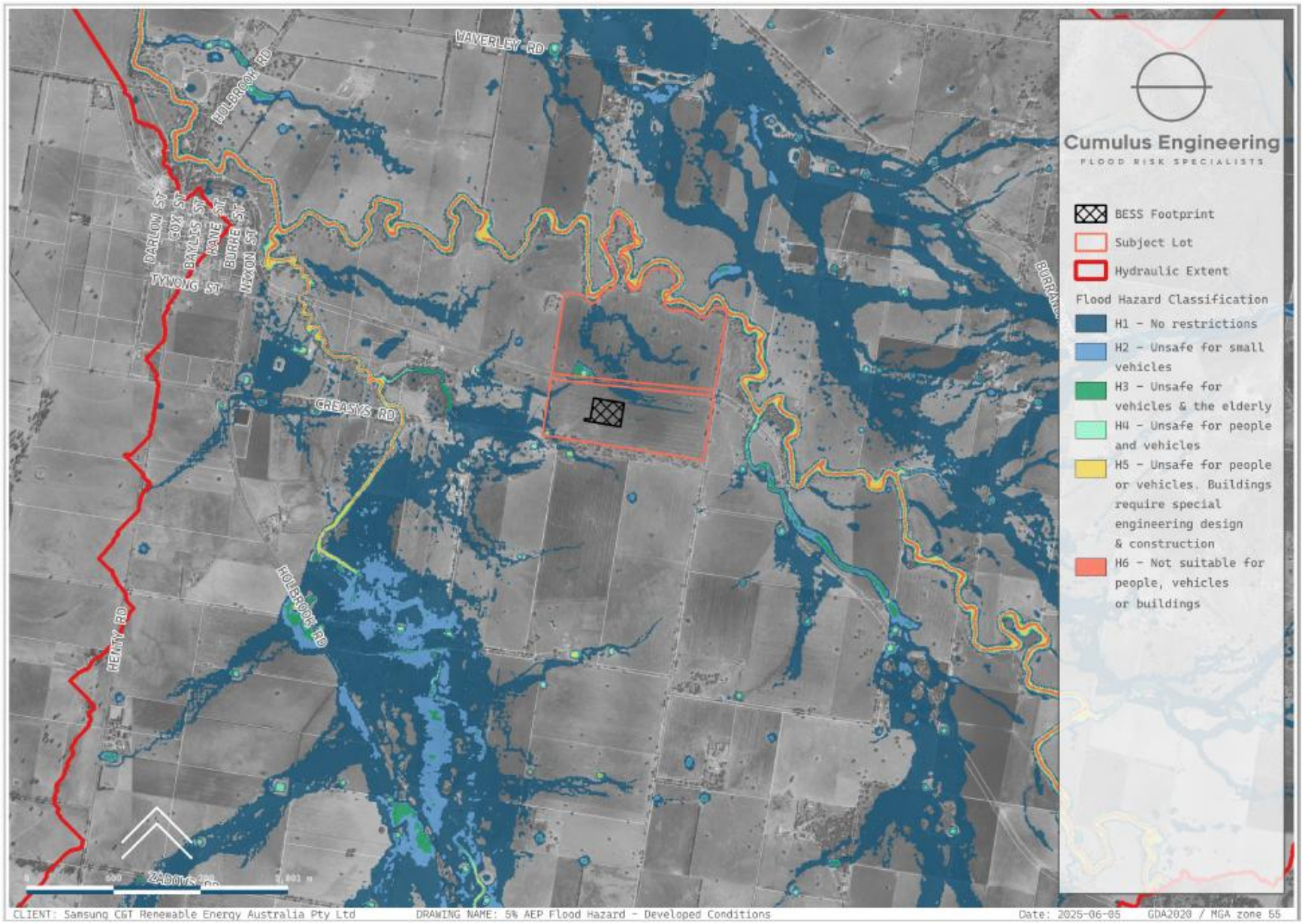


Figure 6-28 1% AEP Hazard – Developed conditions (Source, Cumulus 2025)

6.8.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on water use and flood behaviour is considered to be manageable.

Safeguards and mitigation measures relating to water use and flooding are outlined in Table 6-29 below.

Table 6-29 Water use and flooding mitigation measures

Mitigation number	Mitigation measure	Project Stage
W1	Increase levels to maintain adequate freeboard of BESS infrastructure to ensure the site is constructed above the 1% AEP event to reduce risk from flooding.	All stages.
W2	Develop Flood Emergency Response Plan (FERP).	Prior to construction
W3	A Fire Water Management Procedure would be included within the Emergency Response Plan in accordance with applicable Australian Standards for handling hazardous materials and EPA regulations.	Design
W4	Erosion and sediment control measures will be implemented to mitigate any impact in accordance with Landcom's Managing Uran Stormwater: Soils & Construction (NSW OEH, 2004) including for water access at any location.	Prior to construction Construction
W5	All staff would be appropriately trained in the minimisation and management of accidental spills.	All stages.
W6	The refuelling of plant and machinery would be undertaken in impervious bunded areas on hardstand areas only.	All stages
W7	Machinery would be checked daily to ensure there is no oil, fuel or other liquids leaking from the machinery. All staff would be appropriately trained through toolbox talks for the minimisation and management of accidental spills.	Construction Operation
W8	An incident management procedure to address any spills and pollution incidents will be developed and implemented. The procedure would be incorporated into the Construction and Operation Environmental Management Plans and include a requirement to notify EPA for incidents that cause material harm to the environment (refer s147-153 Protection of the Environment Operations Act).	All stages

Mitigation number	Mitigation measure	Project Stage
W9	Prior to construction, access to a RWCC filling station will be obtained. The Project will adhere to any rules and regulations.	Prior to construction Construction Operation
W10	Ensure appropriate drainage controls and hydrology are incorporated into the design to minimise the area of disturbance, runoff and pollutant generation. This would include consideration of water used during and emergency fire event, and road/culvert design.	Design

6.9. Aquatic

This section summarises the findings of the desktop assessment undertaken by NGH Pty Ltd, provided in Appendix F.9. The assessment was prepared to respond to the Project SEARs (Appendix A) and provides and assessment of the potential aquatic environment impacts of the Project and the recommended measures to mitigate them.

6.9.1. Approach

An Aquatic Assessment of Significance was undertaken by NGH for the potential impact on higher order waterways and potential Key Fish Habitat (KFH) that are present within the Project Site, in line with the requirements of the Fisheries Management Act (FM Act) 1994.

The objectives of the FM Act are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations (DPIRD, 2025), and in particular:

- to conserve fish stocks and key fish habitats,
- to conserve threatened species, populations and ecological communities of fish and marine vegetation,
- to promote ecologically sustainable development, including the conservation of biological diversity,
- and, consistently with these objectives:
- to promote viable commercial fishing and aquaculture industries,
- to promote quality recreational fishing opportunities,
- to appropriately share fisheries resources between the users of those resources,
- to provide social and economic benefits for the wider community of NSW, and
- to recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect, and promote the continuation of, Aboriginal cultural fishing.

To meet the primary objectives, Part 7 of the FM Act deals with the protection of aquatic habitats and Part 7A deals with threatened species conservation. Part 7 commonly applies to “integrated development” proposals as defined by the EP&A Act.

As part of this assessment, several aquatic 7-part assessments of significance were undertaken to determine whether there are likely to be any significant impacts on threatened species, populations or ecological communities listed under the FM Act. These assessments are appended as F.9 of the EIS.

6.9.2. Existing environment

There are two main waterways that are present within the Involved Lands and surrounding area, being Burkes Creek, immediately north of the Involved Lands, and Paper Forest Creek, situated within the southwestern section of the Involved Lands. Both waterways are mapped as KFH (Figure 6-30). Under the FM Act, KFH mapping is generally excluded from waterways identified as first and second order streams, unless they are known or likely to support fish species.

A search of the Fisheries NSW Spatial Data Portal (NSW DPIRD Fisheries, 2025) in October 2025 identified that the fish freshwater threatened species Southern Pygmy Pearch is mapped as present within Paper Forest Creek. The Lower Murray River Aquatic Endangered Ecological Community has been identified along Paper Forest Creek.

Paper Forest Creek intersects the Development Footprint along the Project's access track, within lot 228 DP754557. The track consists of both formed and unformed sections. Approximately 1.5km of the track is partially elevated and formed, providing some stability and drainage capability, while the remaining 1.5km remains an unformed boundary track lacking structured drainage and surface reinforcement.

As detailed above, four culverts are present along the formed sections (refer to Figure 6-29) installed by the landholder to manage water flow during wet periods. An initial desktop assessment indicates that most culverts are in good condition; however, culverts 1 and 3 (counted 1 to 4 from Holbrook Road towards the east) appear to have flow directions opposite to natural drainage patterns. Only culverts 4a and 4b achieve an adequate grade of 1-3% for effective water management.

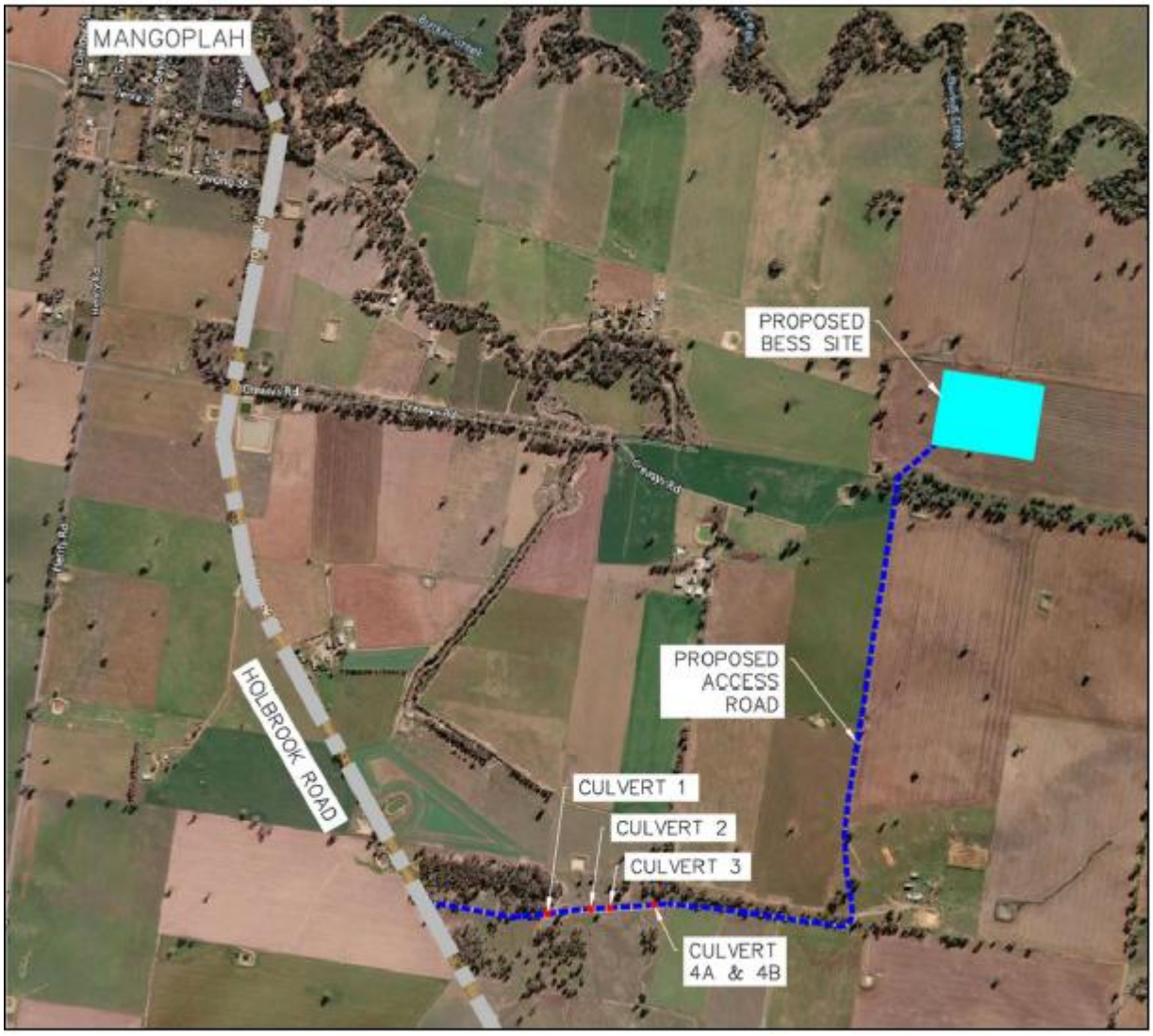


Figure 6-29 Culvert locations along access track (Source: Fyfe, 2025)

LEGEND

- Project Site
- Involved Lands
- Development Footprint
- Roads

Hydrology features

- Key Fish Habitat
- Farn Dams

Strahler stream order

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream
- 4th Order Stream
- 5th Order Stream
- >5th Order Stream

Lot 222
DP754557

Lot 225
DP754557

Lot 228
DP754557

BURKES CREEK

PAPER FOREST CREEK

Creasys Road

Henty Road

Holbrook Road

Burrandana Road

Mcraes Road

Datum: GDA2020 / MGA Zone 55

0 0.5 1 km

Mangoplah BESS

Figure 6-30 Key Fish Habitat

Ref: 240052 Mangoplah BESS Scoping Report Planning 20240919 \ Key Fish Habitat Author: Liarna Miller Date created: 06.11.2025 © NGH 2025 © ESRI 2022

6.9.3. Potential impacts

Aquatic assessment

Under part 7A of the FM Act, threatened aquatic species assessments are required for the Southern Pygmy Perch *(Nannoperca australis)* (Endangered species) and the Lower Murray River Aquatic Endangered Ecological Community. The results of the assessments are detailed below.

Southern Pygmy Pearch (*Nannoperca australis)*

Desktop and fieldwork assessments determined that the Southern Pygmy Perch is not likely to occur within the Project Site due to absence of suitable potential habitat. The possibility of Southern Pygmy Perch is restricted to approximately 50m south of the Project Site where water was observed in Paper Forest Creek. Due to these factors, it is unlikely that the Project would have an adverse effect on the life cycle of the species such that a viable population of this species is likely to be placed at risk of extinction. The area of impact includes highly modified and degraded habitat in the form of roadside creek lines, frequently subjected to pollution from pesticides, herbicides, agricultural run-off and other related wastes.

The Project is not likely to further degrade the Southern Pygmy Perch species' habitat. A small section of potential habitat would be removed from the Development Footprint, which is not currently suitable for the species due to lack of water. The habitat to be impacted is of low ecological value, and higher quality habitat is located upstream of the Development Footprint in Burkes Creek.

The suspected primary threats to this species include habitat removal, connectivity loss and sedimentation (Threatened Species Scientific Committee, 2021). Due to historic and present land use and modification for agricultural purposes, the potential habitat for this species has already been significantly fragmented within and surrounding the Development Footprint. The proposed Project would widen the existing access track where culverts currently provide water flow (when present) between the north and south of the track.

In conclusion, it is unlikely that the Project will significantly:

- Result in adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.
- Reduce the extent of habitat through removal or modification as a result of the action proposed.
- Fragment or isolate other areas of habitat as a result of the proposed action.
- Affect the long-term survival of the species, population or ecological community in the locality through habitat removal, modification, fragmentation or isolation.
- Result in an adverse effect on critical habitat.
- Counteract the objectives or actions of a recovery plan or threat abatement plan.
- Result in the operation of, or increase the impact of, a key threatening process.

Therefore, the Project is not likely to significantly impact the Southern Pygmy Perch

Lower Murray River Aquatic Endangered Ecological Community

The Project would not result in substantial removal of habitat of the Endangered Ecological Community (EEC). A small portion of the Paper Forest creek vegetation would be removed/modified from north and south areas adjacent to the existing access track. The area to be removed contains minimal aquatic habitat including *Juncus spp.* individuals and small puddles of water. Approximately 50m south of the Project Site, Paper Forest Creek was observed to widen to a full creek, containing a large volume of water and aquatic vegetation on the semi-eroded banks. This was noted to be absent from the entire Project Site and

Development Footprint during site inspections. Therefore, due to the degradation and low quality of the creek line (EEC) within the Project Site, the Project is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Furthermore, since the Project is not impacting the areas of Paper Forest Creek containing permanent water, and is only impacting degraded areas next to the existing access track, the Project is not likely to substantially and adversely modify the composition of the EEC such that its local occurrence is likely to be placed at risk of extinction.

The Project is located in a highly modified and degraded section of the EEC, and would impact an area of less than 0.05ha. The habitat would be slightly fragmented from other areas of habitat as a result of the proposed action from widening the existing access track, however this is already fragmented as a result of past land use modification. The species present within Paper Forest Creek are expected to persist and reproduce successfully during the operational phase of the Project.

The Project is not likely to contain critical habitat, given that the Development Footprint and Subject Land occur in a highly modified environment that has been degraded by land use practices and is subjected to frequent pollution from herbicides, pesticides, manure, agricultural run-off and other related wastes. Therefore, the Project is not likely to have an adverse effect on critical habitat.

In conclusion, it is unlikely the Project will significantly:

- Have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.
- Substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.
- Reduce the extent to which habitat is likely to be removed or modified as a result of the action proposed.
- Result in fragmenting or isolating habitat from other areas of habitat as a result of the proposed action.
- Remove, modify, fragment or isolate habitat important to the long-term survival of the species, population or ecological community in the locality.
- Adversely effect critical habitat (either directly or indirectly).
- Effect the objectives or actions of a recovery plan or threat abatement plan.
- Contribute to a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Therefore, the Project is not likely to significantly impact the Lower Murray River EEC.

Culvert design

As detailed above, culverts 1 and 3, appear to have flow directions opposite to natural drainage patterns, while only culverts 4a and 4b achieve an adequate grade of 1-3% for effective water management. The existing culverts are not sufficient in terms of length, grade, and direction, and modifications may be required to manage water flow effectively and prevent pooling. The natural slope of the site and minimum road grade are expected to assist with drainage.

While a short-term impact would occur on the existing waterways (namely Paper Forest Creek), the re-design of the culverts as part of the Project would aid in proper flow paths and runoff management along the waterways would provide a positive change for the waterways and aquatic species.

6.9.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on the local aquatic environment is considered to be manageable.

Safeguards and mitigation measures relating to the aquatic environment are outlined in Table 6-30 below.

Table 6-30 Aquatic mitigation measures

Mitigation number	Mitigation measure	Project Stage
A1	Protection shall be provided for the works in the vicinity of waterways to minimise runoff from construction into these waterways and waterbodies	Construction
A2	Work would not occur during high rainfall events and flooding	Prior to construction Construction
A3	Mitigation measures described in Section 6.10 (Soils and Contamination) regarding potential pollution and contamination would be implemented through the Erosion and Sediment Control and Soil and Water Management Plans	Prior to construction Construction

6.10. Soils and contamination

This section summarises the findings of the Soil Technical Report and Preliminary Site Investigation (PSI) undertaken by NGH Pty Ltd, provided in Appendix F.10 and Appendix F.11. These reports were prepared to respond to the Project SEARs (Appendix A) and provides and assessment of the potential soil and contamination impacts of the Project and the recommended measures to mitigate them.

6.10.1. Approach

Soil survey

The soil investigation drilling program was carried out in March 2025 using a 6.5T S590 bobcat with an auger 450mm wide to a depth of 1.5m below ground level (mbgl).

The soil sampling and classification was undertaken in accordance with the *Australian Soil and Land Survey Field Handbook* (CSIRO, 2009) and the *Australian Soil Classification* (Isbell, 2021). The density for number of boreholes completed was undertaken in accordance with the *Guidelines for Surveying Soil and Land Resources* (CSIRO, 2008) for a moderately (semi-detailed) intensity level (refer Table 6-31).

Table 6-31 Recommended soil survey intensity

Intensity level	Inspection density	Publication scale	Objectives
Moderately (semi-detailed)	1 to 5ha to 25ha i.e. 4 to 20 per km^2	1:25 000	Moderately intensive uses at 'field' level, detailed project planning

The total number of sampling points required was calculated as 1 site per 6.39ha for a total of four boreholes over approximately 25.16ha survey area. The survey area is identified as the area of land chosen to site the BESS and the proposed access road off Holbrook Road. The boreholes were all located within the indicative Development Footprint (Figure 6-31).

Preliminary Site Investigation

The Project Site and surrounding land have been historically utilised for agricultural activities, specifically cropping. Agricultural activities are listed as potentially contaminating land use activities within Table 1 of the Managing Land Contamination Planning Guidelines (EPA, 1998). Therefore, a PSI including preliminary soil sampling is required to determine if there is a potential soil contamination risk at the Project Site.

NGH engaged a local bobcat operator to undertake the intrusive investigation (under the direction of a NGH Environmental Consultant) on 7 July 2025. Soil sampling involved the excavation and sampling of four test pits to a maximum depth of 0.5mbgl, refer to Figure 6-31. Two quality control samples (a duplicate and triplicate sample) were collected, as part of the field quality control/quality assurance (QA/QC) process. Soil samples were sent to ALS Environmental (Sydney) for the following analyses:

All test pits were analysed for:

- Heavy metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc and mercury)

- Organochlorine Pesticides (OCPs)
- Organophosphate Pesticides (OPPs)
- The duplicate samples were tested for heavy metals.

LEGEND

- Project Site
- Involved Lands
- Development Footprint
- Cadastral boundary
- Roads
- Waterways
- Test pit locations (PSI)
- Borehole locations (soil survey)

Creasys Road

PAPER FOREST CREEK

Holbrook Road

BH 01

BH 02

BH 03

BH 04

TP01

TP02

TP03

TP04

Datum: GDA2020 / MGA Zone 55

NGH
A FYFE Company

0 0.5 1 km

Mangoplah BESS

Figure 6-31 Borehole (BH) locations for the soil survey and test pit locations for the PSI

6.10.2. Existing environment

The Project Site was observed to be gently undulating. The access track is devoid of plant growth. However, the edges of the track and the surrounding land have areas of dense native remnant vegetation of both grasses and overstorey plant species. The Project site is predominantly covered in dense harvested crop with an opportunistic self-sown crop of canola emerging underneath (refer to Figure 6-32 below). The land adjacent to the Project site on all sides has historically been used for dryland cropping and grazing enterprises.

Figure 6-32 Project Site is currently used for cropping, overstorey vegetation is limited to fence lines

Surface conditions include:

- Vegetation covering up to 90% of the soil
- Cleared of tall standing native vegetation in the Project Site
- All boreholes were terminated at full depth of 1.5m.

Soil Survey – Desktop review

A search of the Central Resource for Sharing and Enabling Environmental Data in NSW (SEED) database on 1 May 2025 indicated that the Involved Lands are mapped with the following features based off coarse statewide mapping:

- Land and Soil Capability (LSC); Class 3, Class 4 and Class 5 (refer to Figure 6-33)
- Australian Soil Classification (ASC) of Sodosols, Chromosols, Kandosols and Kurosols (refer to Figure 6-34)
- Great Soil Group of Red Podzolic soils, Red Podzolic soils – less fertile, non-calcic Brown soils, Sodolic Soils (refer to Figure 6-35).
- Assessed as a combination of hydrologic soil group, access track is Very Slow, Slow and Moderate infiltration rates, with the Project Site (BESS infrastructure area) being Moderate infiltration and Slow infiltration.
- Moderate soil fertility and areas of Moderately low fertility (refer to Figure 6-36)
- Gently undulating landscape.

It was noted that the access track is quite long and as such traverses a range of soil landscapes in addition to those captured by the area that will host the BESS infrastructure.

Kandosols, which lack a strong texture contrast, have a massive or only weakly structured B horizon and are not calcareous throughout. **Kurosols** have a strong texture contrast between A horizons and strongly acid B horizons. Many of these soils have some unusual subsoil chemical features (high magnesium, sodium and aluminium). These soils have a clear or abrupt textural B horizon in which is strongly acid (Isbell, 2021). **Chromosols** have a strong texture contrast between A and B horizons. Strong texture contrast is referred to as a 'clear or abrupt textural B horizon' in the ASC. **Sodosols** are soils with a strong texture contrast between A horizons and sodic B horizons that are not strongly acid (Isbell, 2021).

A comparison of the laboratory results and the statewide mapping identified:

- BH04 is located within this soil type and conforms to this ASC soil description for Kandosols.
- BH03 is located within this ASC soil description, but the laboratory results and site observations indicate that the soils tested for BH03 do not conform to this ASC definition
- The laboratory results and site observations are consistent with this description of Chromosols with all BH02 samples being non-sodic in topsoil and subsoil and recorded pH above 5.5 (H_2O).
- BH01 is located in this soil type and conforms with this description, with a sodic B horizon (16%).

Preliminary Site Investigation – Project Site walkover

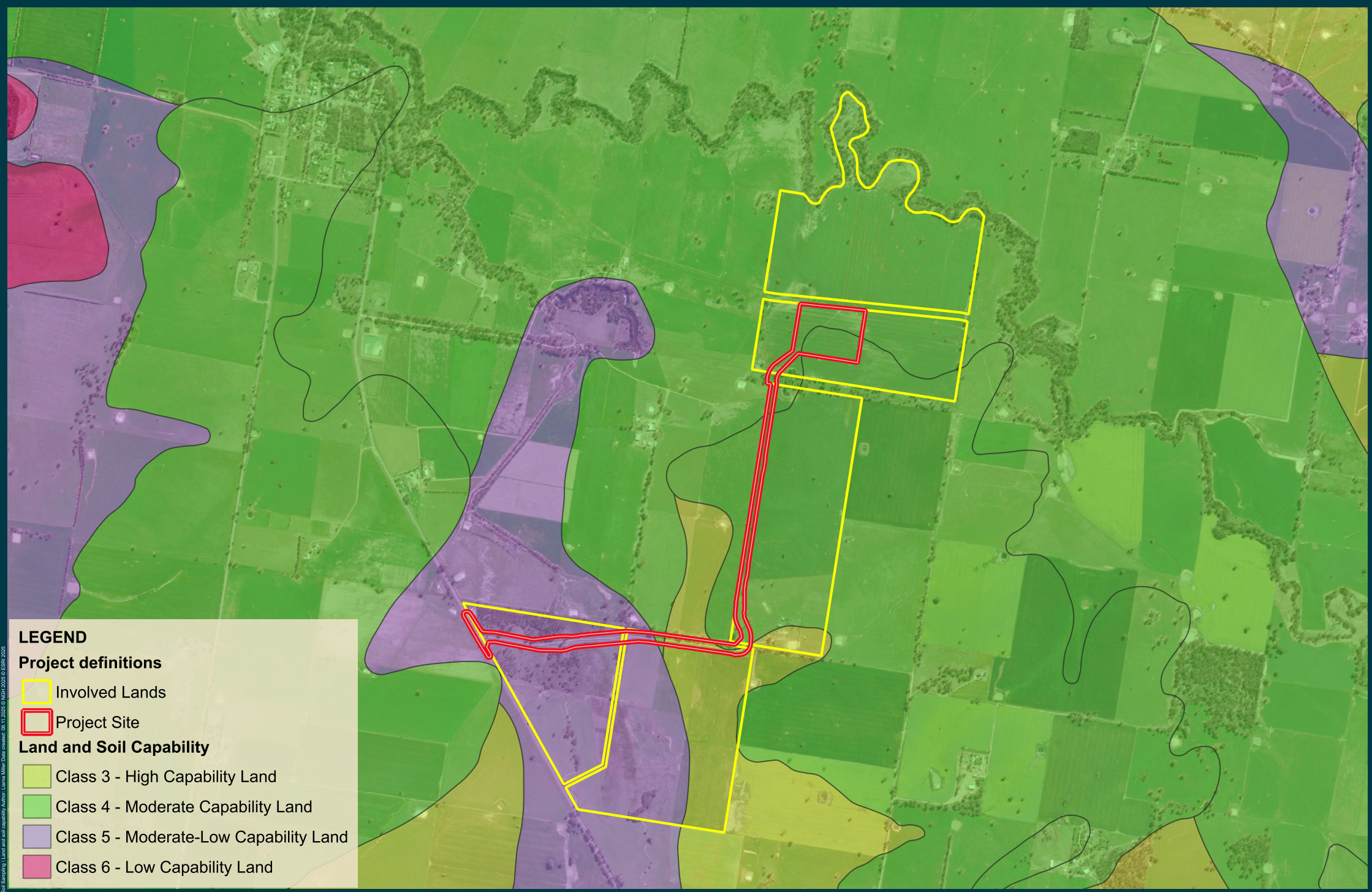
A targeted inspection of the Development Footprint, as well as general observations of the adjacent surroundings, was undertaken on 7 July 2025, to support the preparation of the PSI. No access to adjoining properties was undertaken. Observations relevant to the PSI included:

- Ground surface coverage nearly 100% grasses/crops, with no areas of bare soil observed
- Electricity transmission lines transect the eastern section of the Development Footprint (in a north – south direction)
- A small waste stockpile was observed in the southern portion of the Development Footprint
- Several informal tracks service the site
- Agricultural machinery was observed within proximity to the access road corridor
- Scrap metal, as well as plastic and rubber waste were observed within the access road corridor
- A stockpile of herbicide containers was observed within the access road corridor
- No notable signs of contamination (odour, soil staining, etc) were noted
- No Asbestos Containing Material (ACM) was observed.

A historic land title search for the site was undertaken by InfoTrack Pty Ltd on 5 August 2025. NGH also engaged Lotsearch to prepare an Enviro Pro database search report (refer to the PSI (Appendix F.11) for the full reports).

A summary of the findings has been provided below:

- The Contaminated Land Record returned no records within the Project Site
- The Contaminated Land Record of Notices did not return any notices within the Project Site
- The Project Site is not known to contain a former gasworks development.



Mangoplah BESS

Figure 6-33 Land and Soil Capability (statewide mapping)

LEGEND

- Project Site
- Involved Lands
- Roads

Australian Soil Classification Soil Types

- Chromosols
- Kandosols
- Kurosols
- Sodosols

Creasys Road

Holbrook Road

Datum: GDA2020 / MGA Zone 55

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0 0.5 1 km

Mangoplah BESS

Figure 6-34 Australian Soil Classification (statewide mapping)

LEGEND

- Project Site
- Involved Lands
- Roads

Great Soil Groups

- Non-calcic Brown Soils
- Red Earths - less fertile
- Red Podzolic Soils - less fertile
- Solodic Soils

Creasys Road

Holbrook Road

Datum: GDA2020 / MGA Zone 55

NGH
A FYFE Company

0 0.5 1 km

Mangoplah BESS

Figure 6-35 Greater Soil Group (statewide mapping)

LEGEND

- Project Site
- Involved Lands
- Roads

Inherent soil fertility

- Moderate
- Moderately low

Creasys Road

Holbrook Road

Datum: GDA2020 / MGA Zone 55

NGH
A FYFE Company

0 0.5 1 km

Mangoplah BESS

Figure 6-36 Inherent Soil Fertility (statewide mapping)

Soil Survey – Laboratory results

Units used in this section: milliequivalent – meq gram – g	P – Phosphorus cation exchange capacity - CEC

The results of topsoil laboratory analysis indicate:

- Topsoil pH values are generally acidic. As soils become more acidic, the soils become nutrient limiting, and some less ideal nutrients become more available (e.g. aluminium) and become toxic for most plants.
- The CEC in the topsoil ranges from 3.7 to 7.3meq/100g. CEC is the capacity of the soil to hold and exchange cations by electrical attraction and is a useful indicator of soil fertility. It demonstrates the ability of the soil to supply three big nutrients being calcium, magnesium and potassium. The CEC is low for all topsoils analysed. This means that the soil has more sand characteristics and higher levels of sand and a low capacity to hold onto these nutrients.
- Generally, the soils are deficient in plant available nitrogen.
- Topsoil phosphorus both total and available are deficient. The application of both a short-term P and a medium to long term P source would assist with site revegetation.
- All topsoils are considered non-sodic in the topsoil 0.0-0.20mbgl
- Emerson aggregate test (EAT) results indicate Class 3. The topsoils are considered dispersive with moderate to high risk of dispersion.
- The topsoil organic carbon content is considered low for the topsoil across the site.
- The pH of the subsoil is neutral.
- The CEC in the subsoil ranges from 8.3 to 16.5meq/100g indicating these are light to medium clays.
- Subsoil results indicate that they are non- sodic except for BH01.
- Generally, the fertility of the soil is low.
- BH01 subsoil is highly dispersive. Preventative measures should be undertaken to minimise disturbance and associated erosion events.

With the exception of BH03, the results of the laboratory analysis indicate that the topsoil and subsoils are consistent with their allocated ASC. The transition between ASC could mean that BH03 is within the transitional zone between Kurosols and Kandosols.

All topsoils recorded electrical conductivity values of <6 indicating that they are not saline. BH01 was considered sodic and highly dispersive in the subsoils. All topsoils returned EAT values of 3 indicating they have a moderate to high risk for dispersion and moderate to high risk of erosion.

The soils sampled at this site have poor nutrient status and an unbalanced cation exchange capacity. It is important to rehabilitate the soil to support the growth of soil stabilising pasture species that will stabilise the soil for the life of the project (in areas not covered in hardstand, tracks or infrastructure), to prevent the loss of soil due to erosional processes and to rehabilitate the soil on decommissioning.

The levels of plant available P detected is considered extremely low in most surface soil tested. Amelioration would be required to restore this site to have the capacity to support pasture growth in the future (post operation).

Preliminary Site Investigation – Laboratory results

Analytical results for the soil sampling program were below the Limit of Reporting (LOR) for all analytes, except for some metals/metalloids and nutrients. All results were below the adopted Tier 1 Soil Screening Levels (SSL) (refer to the PSI (Appendix F.11) for the relevant soil screening criteria). This analysis indicates that disturbance of site soils during construction activities are not likely to present a risk to human health or the environment under a commercial/industrial land use.

6.10.3. Potential impacts

The proposed disturbance area for siting the BESS is approximately 13.5ha. Construction activities that would impact soils include the use of equipment and earthworks.

Construction

The construction of the BESS would disturb soils through the following activities.

- Compaction during construction of access tracks and APZ area
- Construction of perimeter security fencing
- Hardstand foundations for the BESS container footings, substation and office
- Establishment of staff amenities and offices for construction
- Excavation of cable trenches 600mm – 900mm wide and 1000mm deep.
- The soil disturbance has the potential to result in the following impacts:
- Reduce soil stability and increased susceptibility to erosion due to vegetation removal or soil exposure in areas identified with a dispersive subsoil.
- Loss of topsoil and impacts on waterways due to increased erosion and sedimentation hazard
- Reduced soil permeability and increased run-off as a result of soil compaction for internal access roads and hardstand areas
- Risk of exposing buried contaminant (pesticides and hydrocarbons).

Groundcover would be maintained where possible during the pre-construction and construction stages of the Project and would be rehabilitated upon decommissioning.

Erosion and sedimentation impacts that may arise as a result of construction and decommissioning can be minimised by carrying out the activities in accordance with the provisions of the *managing Urban Stormwater: Soils and Construction "Blue book"* (Landcom, 2004).

Site specific erosion and sediment control requirements would be informed by the results of the soil survey (refer Appendix F.10).

Given the sensitivities identified in the existing environment, the nature and extent of the impacts proposed and the ability to mitigate these impacts with standard mitigation strategies, the overall impact is considered low and manageable.

Operation

During operation, the primary land use would transition from agricultural use to energy storage. This is limited to a relatively small area 3.6ha within the fenced area of the Project Site.

Activities associated with the operation stage would be mostly confined to formalised access tracks. Vehicles would be infrequent and limited to the access track and parking area.

Soil disturbance would be minimised by rehabilitation measures undertaken during construction and establishment of ground cover following soil disturbance activities.

The risk to soil impacts is considered low with the implementation of appropriate mitigation measures.

Decommissioning

When the BESS is decommissioned, all above ground and (including concrete footings and slabs) and below ground infrastructure would be removed. Rehabilitation of the site would commence. All buildings would be removed including all battery components and their associated footprints. All above ground and below ground cabling and infrastructure, would be removed and recycled.

Following decommissioning, rehabilitation of the site would be undertaken to restore the site to its former uncontaminated state consistent with the mapped LSC and with a balanced CEC and nutrient status including major and trace minerals. This would be informed by a detailed agronomic soil survey for baseline soil nutrient conditions and a rehabilitation plan. Rehabilitation to a safe agricultural environment would include undertaking a PSI with supplementary soil testing to inform remediation of contaminated sites, if required.

6.10.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on soil and potential contamination risk is considered to be manageable.

Safeguards and mitigation measures relating to soil and contamination are outlined in Table 6-32 below.

Table 6-32 Soil and contamination mitigation measures

Mitigation number	Mitigation measure	Project Stage
SC1	Progressive and adaptive Erosion and Sediment Control Plans (ESCP) and Soil and Water Management Plan (SWMP) will be prepared for the Project in accordance with Landcom Soils and Construction: Managing Urban Stormwater (Landcom, 2004) and include, but not be limited to: • Minimising the extent and duration of ground disturbance • Progressive rehabilitation of disturbed areas • Stockpile management of topsoil to prevent soil structural decline. Topsoil will be stripped and stockpiled separately. Stockpiles will be stabilised with a groundcover (i.e. geotextile or similar) if stockpiling is required for more than six weeks • Spill Response Procedure • Unexpected Finds Procedure, for contaminated soil • Maintain at least 70% groundcover where applicable throughout the site during operation to reduce the risk of erosion	All stages

Mitigation number	Mitigation measure	Project Stage
SC2	A comprehensive agronomic nutrient soil survey sampling and analysis prior to construction to establish a baseline nutrient data set would be undertaken to: • Support rehabilitation of the Project Site land to Class 4 stable, non-polluting, productive land on decommissioning. • Support preparation of the vegetative screening area to provide a growing environment which is conducive to achieving a successful vegetative screen.	Prior to construction Decommissioning
SC3	A Revegetation and Rehabilitation Plan for decommissioning will be prepared and include stabilisation and topsoil amelioration (e.g., incorporation of organic matter to improve soil structure or gypsum to improve structure, reduce hard-setting surfaces and reduce soil dispersion).	Decommissioning
SC4	Avoid altering the groundwater and surface water regime to prevent mobilisation of any salt stores, however low, in the soil.	All phases
SC5	Reference the soil survey results (this document), Australian Soil and Land Survey Handbook (CSIRO, 2009), Guidelines for Surveying Soil and Land Resources (CSIRO, 2008) and the Land and Soil Capability Assessment Scheme: second approximation (NSW OEH, 2012) when returning the site to the BESS farmland capability	Decommissioning
SC6	An Unexpected Finds Procedure should be developed and implemented, should contaminated material be identified onsite during the construction program.	Construction
SC7	A post decommissioning PSI with supplementary soil testing would be undertaken within the BESS Facility, with recommendation to a detailed site investigation if required. This would occur prior to significant soil disturbance.	Decommissioning

6.11. Land use compatibility

This section summarises the findings of the desktop assessment undertaken by NGH Pty Ltd and informed by other specialist studies. A Land Use Conflict Risk Assessment (LUCRA) was prepared to respond to the Project SEARs (Appendix A) and provides and assessment of the potential land use conflicts of the Project and the recommended measures to mitigate them.

6.11.1. Approach

This section summarises the land uses carried out at the Project Site and surrounds. A desktop assessment, informed by the results of the Soil Technical Report, was undertaken, in accordance with the DPI *Land Use Conflict Risk Assessment Guide* (DPI, 2011).

6.11.2. Existing environment

The majority of the Project Site is currently mapped as cropping (refer to Figure 6-37). The Project Site is actively cropped. However, it is expected that cropping activities will continue on the balance of the property owned by the host landowner and excluded from the extent of the Project Site.

NSW State mapping shows the following breakdown of land use on site. There are four listed land use activities relevant to the Project Site, these are:

- 3.3.0 Cropping
- 2.1.0 Grazing native vegetation
- 5.4.5 Farm buildings/infrastructure
- 5.7.2 Roads

The surrounding land use is dominated by cropping, grazing native vegetation and farm buildings/infrastructure. Other important land uses identified are detailed in Table 6-33 below.

Table 6-33 Land use table within surrounding area

Land Use	Description
Reserves	Livingstone National Park (approximately 2.5km northeast of the Project) Nest Hill Nature Reserve (approximately 13km southeast of the Project)
Major Projects	Within the broader region, there are several renewable and other major projects proposed or operating including: • Maxwell Downs Solar Farm • Belhaven Battery Energy Storage System • Gregadoo Solar Farm • Wagga Wagga Lithium-Ion Battery Recycling Facility • Bomen Solar Farm • Arundle BESS • Wagga North BESS

Land Use	Description
Crown land and paper roads	There is Crown Land in the form of paper roads that are intersected by the access road for the Project.
Drinking water catchments	The Project is not located within a drinking water catchment.
Exploration licences and mining leases.	There is a historic Exploration License (EL9347) mapped across the site, and no active Exploration Licences (as of 10 September 2025).

Lot 222
DP754557

Lot 225
DP754557

Lot 228
DP754557

Creasys Road

Holbrook Road

Henty Road

Mcraes Road

Burrandana Road

LEGEND

- Project Site
- Involved Lands
- Roads

NSW Landuse

- 1.2.0 Managed resource protection
- 2.1.0 Grazing native vegetation
- 3.2.0 Grazing modified pastures
- 3.3.0 Cropping
- 5.4.0 Residential and farm infrastructure
- 5.4.1 Urban residential
- 5.4.5 Farm buildings/infrastructure
- 5.7.2 Roads
- 6.5.0 Marsh/wetland

Datum: GDA2020 / MGA Zone 55

NGH

0 0.5 1 km

Mangoplah BESS

Figure 6-37 Land Use

Agricultural use: Land and soil capability

Regional agricultural economy

The Project Site is located within the Riverina region in which Agriculture occupies 4,467,837ha, about 78.60% of the region (total 5,698,7690) (ABARES, 2025). Grazing native vegetation and modified pastures is the most common land use (39.81%) of the region, followed by cropping (37.81%).

Based on the gross value of agricultural production, the top three agricultural commodities in the region area Wheat ($760.2 million), cattle and calves ($336.2 m) and poultry ($310.5 m). These three commodities contributed 39.19% of the total value of agricultural production in the region, which is valued at $3,590 m.

As of August 2025, there were 3,419 farms within the region with grain sheep or grain beef cattle Farming being the most common type of farm.

Biophysical Strategic Agricultural Land (BSAL) is land that is considered to be of high agriculture value capable of sustaining high levels of productivity. There is no BSAL land mapped within or near the Project Site.

The NSW Department of Primary Industries Draft State Significant Agricultural Land Map (SSAL) was also revised (NSW DPI, 2025). Only a small section of the access road is mapped as SSAL. It is noted that given the size of the Project, it would have negligible impact on the total area of mapped SSAL.

Site conditions

The Project Site is mapped as Class 4 under the Land and Soil Capability (LSC) Assessment statewide mapping and is considered moderate capability land (refer to Figure 6-33). Class 4 land has limitations that must be managed to prevent soil and land degradation. However, the limitations can be overcome by a range of widely available and readily implemented land management practices (NSW OEH, 2012). The size of the lot and proposed Project limits agricultural production on site by approximately 10.82ha.

6.11.3. Potential impacts

Potential land use impacts relevant to the Project include:

- Construction
    - Land use conflict with existing or adjacent activities – primarily due to noise, visual and traffic impacts associated with earthworks.
    - Land impact through physical impacts such as installation of infrastructure, erosion or contamination risks.
- Operation
    - Land use conflict with existing or adjacent activities
    - Land degradation, through physical impacts such as weed ingress or contamination risks.

The Project would involve earth works, ground disturbance, and change its current usage to energy storage and would preclude agricultural production from the Project Site, access and transmission line.

Compatibility and conflicts: Land Use Conflict Risk Assessment

A Land Use Conflict Risk Assessment (LUCRA) has been applied to analyse the compatibility of a change in use as a result of the Mangoplah BESS.

A LUCRA has been carried out in accordance with the DPI *Land Use Conflict Risk Assessment Guide* (DPI, 2011). The LUCRA assessment is primarily used to investigate agricultural developments, but can be used to assess other land uses, in this case, residential land use, utilities, transport and reserves. This assessment aims to identify and rank potential land use conflicts to ensure they are adequately managed. The risk ratings are rated from 1 to 25 with the combination of the probability of the event occurring and the consequence of the event occurring determining the risk rating. It is not linear in nature.

The risk rating in Table 6-37 has been determined using probability and consequence as shown in Table 6-34 below, and in accordance with the probability table (Table 6-35). Table 6-36 measures the level of consequence if an action is not mitigated.

Table 6-34 LUCRA Risk Rating Matrix

Probability	**A**	**B**	**C**	**D**	**E**
Consequence					
1	**25**	**24**	**22**	**19**	**15**
2	**23**	**21**	**18**	**14**	**10**
3	**20**	**17**	**13**	**9**	**6**
4	**16**	**12**	**8**	**5**	**3**
5	**11**	**7**	**4**	**2**	**1**

Table 6-35 Probability:-–descriptor that scores the likelihood of the consequence happening

Level	**Descriptor**	**Description**
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or ‘it has happened’
C	Possible	Could occur, or ‘I’ve heard of it happening’
D	Unlikely	Could occur in some circumstances, but not likely to occur.
E	Rare	Practically impossible

Table 6-36 Consequence:- description of the measure of consequence

Level	**Descriptor**	**Description**
1	Severe	• Severe and/or permanent damage to the environment • Irreversible • Severe impact on the community

Level	Descriptor	Description
		• Neighbours are in prolonged dispute and legal action involved.
2	Major	• Serious and/or long-term impact to the environment • Long-term management implications • Serious impact on the community • Neighbours are in serious dispute.
3	Moderate	• Moderate and/or medium-term impact to the environment and community • Some ongoing management implications • Neighbour disputes occur
4	Minor	• Minor and/or short-term impact to the environment and community • Can be effectively managed as part of normal operations • Infrequent disputes between neighbours
5	Negligible	• Very minor impact to the environment and community • Can be effectively managed as part of normal operations • Neighbour disputes unlikely

Table 6-37 LUCRA assessment of Mangoplah BESS including consideration of mitigation options

Identified Potential Conflict	Risk Rating		Management Strategy	Revised Risk Rating	
Agriculture					
Agricultural expansion (land opportunities)	C5	4	The Project would result in the loss of a small proportion of active grazing land (about 3.6ha within the fenced area of the BESS)	C5	4
Contaminated surface water runoff	B3	17	Implementation of soil and water management plan and an erosion and sediment control plan would minimise the potential impact.	D4	5
Weed and pest control	A3	20	Implementation of pest and weed management plan during construction and operation phases.	D4	5
Rural residential					
Dust	A3	20	Dust generated during the construction and decommissioning stages to be managed using water carts when required.	D4	5

Identified Potential Conflict	Risk Rating		Management Strategy	Revised Risk Rating	
			Dust is not expected to generate a significant land use conflict during operation.		
Visual amenity	D3	9	Additional vegetation screening would be undertaken despite low visual risk.	D5	2
Noise	C3	13	Noise generated during construction and decommissioning stages would be minimised through the implementation of mitigation measures. Where regular practices are incorporated into operation, noise is not expected to generate a land use conflict. Noise studies have been undertaken and have been shown to be compliant in both construction and operation for non-associated receivers.	C4	8
Utilities					
Fire/Bushfire	C1	22	Implementation of a Bushire Management Plan and a minimum 11m APZ would significantly reduce the probability of the BESS operation starting a fire or bushfire damaging the BESS infrastructure or escaping onto neighbouring properties.	D3	9
Traffic generation and disruption	C4	8	Traffic generation and disruptions during construction and decommissioning stages are considered likely, however, the impact would be temporary and able to be managed in the TMP. Traffic is not to generate a land use conflict during operation.	C4	8
Mining					
Mining land use	E5	1	The Project would temporarily remove the Development Footprint from exploration and mining activities for the life of the BESS. There is a historic Exploration License (EL9347) mapped across the Project Site.	D5	2

Identified Potential Conflict	Risk Rating		Management Strategy	Revised Risk Rating	
			After decommissioning, the BESS infrastructure would be removed and the site made available for alternative land uses if desired.		
Environmental Protection					
Loss of SAII species	B4	12	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions TEC has been identified within the Development Footprint and classifies as a SAII entity. A total area of 0.22ha of the TEC may be impacted by the Project. Management actions will be undertaken to avoid and minimise direct and indirect impacts for Euphrasia arguta species.	E5	1
Direct impact Clearing vegetation	D4	5	Approximately 0.22ha of high level vegetation would be cleared as part of the Project.	E5	1
Direct impact Habitat loss	C4	8	Management actions will be undertaken to avoid and minimise direct and indirect impacts for Striped Legless Lizard, Southern Myotis, Barking Owl, Squirrel Glider, Golden Sun Moth and Masked Owl	E5	1
Other; transport, reserves. The site is small, and the construction, operation and decommissioning activities are considered unlikely to affect these nearby land uses.					

Construction and operation

Agriculture

The potential impacts of the Project on agriculture are detailed below with respect to *Primefact 1063 Infrastructure proposals on rural land* (DPI, 2013).

Resource loss and fragmentation

- Agricultural activities within the Development Footprint would temporarily cease upon commencement of construction in areas. However, upon operation, only the fenced area around the BESS would be excluded from agricultural activity.

- The Project would result in the temporary loss of approximately 3.6ha (BESS fenced area) of agricultural land for the life of the BESS (approximately 35 years) and is negligible given the small area and does not significantly reduce the availability of land for primary production in the region.
- The Project is not placed on land that is of higher quality LSC than the surrounding lands. It is not classified as BSAL. As such there would be no losses of uniquely high value land to the locality during the construction and operation of the BESS.
- The Project Site (where the BESS infrastructure would be located) constitutes approximately 3.6ha and is not likely to significantly detract from the 387,808ha of Class 4 land in the Wagga Wagga LGA. It is not likely to lead to fragmentation of Class 4 land within the landscape.

Impacts on farming operations and livestock

- Agricultural use of the land would continue post construction on the rest of the associated lot outside the fenced Development Footprint.
- The Project would not affect access or agricultural land uses on surrounding properties during the operation phase. The existing surround uses are known, and the BESS is not considered to be an incompatible land use with a potential to create land use conflicts.
- Best practice wastewater management, fuel storage and refuelling and chemical handling would be stringently applied to prevent soil and water pollution.
- Impacts on soil and erosion risks are assessed in Section 6.10, impacts on downstream water quality are assessed in Section 6.8 and impacts on local air quality are assessed in Section 7.1. These assessments conclude that the Project would not be likely to adversely affect land use or activities on neighbouring properties or elsewhere in the locality, subject to identified mitigation measures.

Increased weed, biosecurity and bushfire risks

- The increased movements of vehicles, machinery and people within the Development Footprint, particularly during construction and decommissioning poses the largest risk to biosecurity. Weed seeds can be transported via tyres and undercarriages of vehicles and clothing of staff resulting in a risk of spreading weeds. Confining vehicles and machinery movements to formed access tracks during all phases and implementing a washdown procedure of vehicles entering and leaving the site would mitigate potential risk of seed dispersal.
- Risk of increasing pest animals (cats and foxes) at the Project Site during operation would be managed by ensuring putrescible waste is covered and removed regularly. Targeted pest management during the operational phase of the Project would control cat, rabbit and fox numbers. Resources and cover for pest species would be reduced.
- Preparation of a Weed Management Plan for all phases of the Project based on Local Land Services requirements would assist in the management of weeds for all phases of the Project including rehabilitation.
- Prior to commencement of construction, representative soil samples would be gathered as part of a specialist soil survey in order to establish baseline data on the existing agronomic characteristic of the soil. The survey would include sampling for full soil nutrient balance, nutrient store (plant available, exchangeable and total) for all major minerals and trace minerals, acidity, organic matter, soil texture.

Rural residential

Residences located near the site or along the access route may experience temporary noise, dust and traffic during construction. Traffic and activities onsite during operation would be minimal compared to construction

and are unlikely to generate substantial noise and dust. During operation, there is a very low likelihood for potential visual impacts. These potential impacts to residences during construction and operation are best managed through consultation and mitigation measures outlined for each specific issues outlined in Section 6.3, Section 6.7, Section 6.8 and Section 7.1 respectively.

Mining

There is a historic Exploration License (EL9347) mapped across the Project Site. However, there are no active exploration licences.

Other land uses

During construction and operation of the BESS, there is unlikely to be any significant impacts on other land uses including:

- Industry and commercial use (transmission line) – minimal impact is anticipated during the connection to the transmission line, consultation with Transgrid would be undertaken
- Crown Land – Consultation has been undertaken with Crown Lands to purchase crown lands in between the Involved Lands. It is expected that these crown roads will be closed prior to construction.

The assessments above have demonstrated that risks in relation to maintaining soil capability, agricultural productivity and other land uses, including transport, residential development and mining are highly manageable and unlikely to produce significant offsite effects at the local and regional levels.

Decommissioning

The potential impacts of the Project during decommissioning on surrounding land uses is considered to be manageable with the implementation of the mitigation measures presented in this EIS. The Project is considered reversible given the relatively low impact on the soil surface. Following decommissioning rehabilitation and monitoring of the success of the rehabilitation of the site would be undertaken to restore the site to its pre-existing condition. All above ground and below ground infrastructure would be removed upon decommissioning and alternate land uses including agriculture could resume.

Potential impacts to surrounding land uses are most relevant to agricultural activities. Existing agricultural land uses, or future agricultural land uses on the Development Footprint or adjacent land are not anticipated to be impacted due to the reversible nature of the Project. BESS infrastructure would be removed from the compacted gravel headstand surrounding the site. The hardstand areas would be removed in consultation with the landowner. Following the removal of the hardstand, topsoil would be reinstated, and the area could be revegetated. A rehabilitation Plan associated with the decommissioning activities would be developed and implemented with objectives of:

- Returning the land to a stable, non-polluting productive state
- Soil resource management
- Landform and land use areas
- Development of completion criteria and monitoring reporting.

The plan would be informed by soil information derived from the baseline nutrient soil surveys to be undertaken prior to construction (refer Section 6.9).

Impacts during decommissioning for the other surrounding land uses would be similar to construction and operation as discussed above.

Cumulative impacts

Cumulative impacts with other major projects in the region are considered in Section 7.3.

6.11.4. Mitigation measures

The assessments above have demonstrated that risks in relation to maintaining soil capability, agricultural productivity and other land uses are highly manageable and unlikely to produce significant offsite effects at the local and regional levels.

The management of these risks is largely related to:

- The management of soil and water resources, including vegetation management and management of pests and disease, these are set out below
- The management of fire risks – this is addressed in more detail in Section 6.9 and mitigation strategies are not duplicated here
- The management of amenity for neighbours – this is addressed in more detail the sections below and mitigation strategies are not duplicated here:
    - Section 6.3 Traffic impacts
    - Section 6.6 Visual and landscape impacts
    - Section 6.7 Noise and vibration impacts
    - Section 6.12 Socio economic impacts

Safeguards and mitigation measures relating to land use compatibility are outlined in Table 6-38 below.

Table 6-38 Land use compatibility mitigation measures

Mitigation number	Mitigation measure	Project Stage
LU1	A Revegetation and Rehabilitation Plan is to be prepared in consultation with NSW Department of Primary Industries prior to decommissioning to return the land to safe stable non-polluting productive state.	Decommissioning
LU2	All above ground and below ground cabling and infrastructure would be removed.	Decommissioning
LU3	An agronomic soil survey would be undertaken prior to construction and post decommissioning to inform soil nutrient amelioration prior to revegetation.	Decommissioning
LU4	Land forming would return the site to the pre-existing slope and flat features suitable for agricultural purposes	Decommissioning

6.12. Social and economic impacts

This section summarises the findings of the Social Impact Assessment (SIA) undertaken by NGH Pty Ltd, provided in Appendix F.12. The SIA was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential social and economic impacts of the Project and the recommended measures to mitigate them.

6.12.1. Approach

A Social Impact Assessment (SIA) was prepared by NGH in accordance with DPHI's *Social Impact Assessment Guidelines 2023* (DPHI, 2025) to consider potential socio-economic impacts presented by the Project (refer to Figure 6-38). The SIA aims to identify, predict and evaluate the likely social impacts arising from the Project, and to propose appropriate responses to mitigate and manage negative impacts and enhance positive benefits.

- **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 SIA guideline including consideration of any increase in demand for community infrastructure services, consideration of construction workforce accommodation, and consideration of potential opportunities for nearby settlements.
- **Economic** – including and 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 programs.

The economic assessment for the Project considers the potential for economic diversification at both the community and landholder levels.

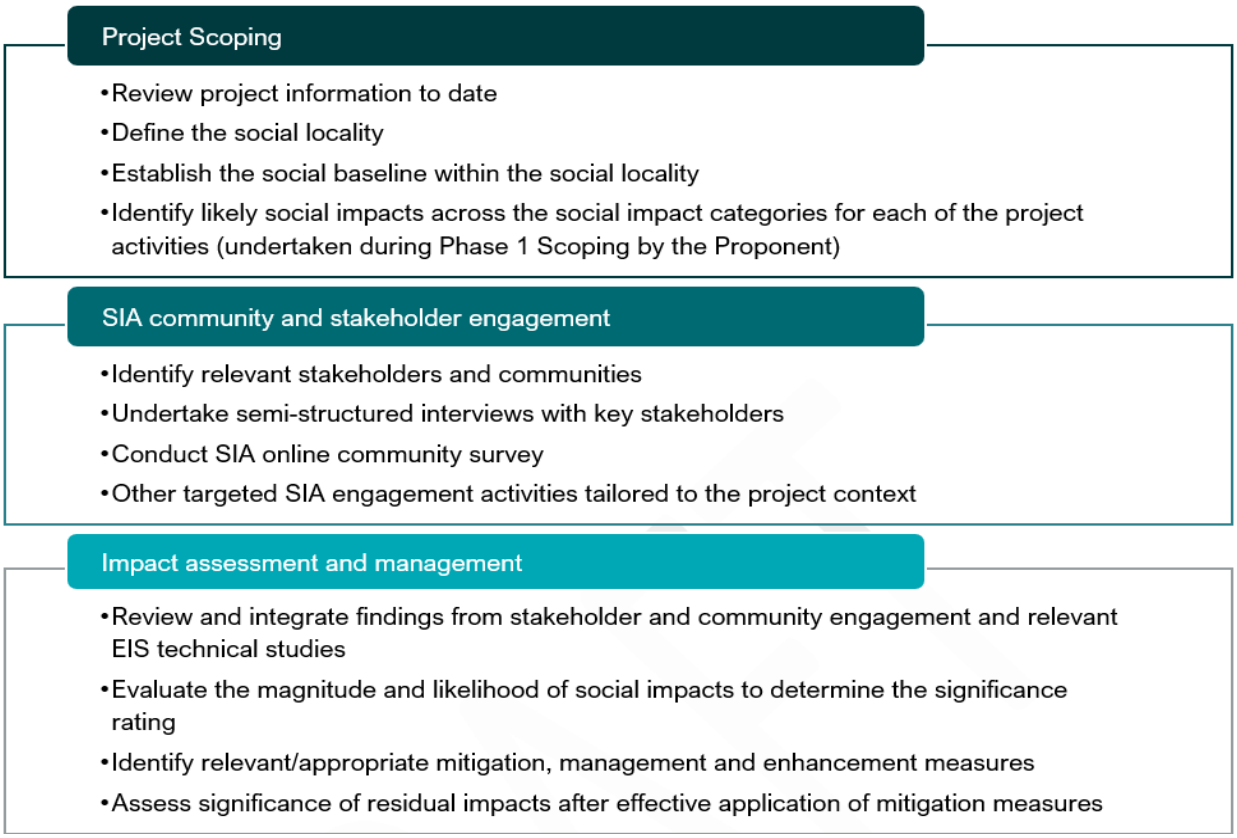


Figure 6-38 Overview of SIA methodology

6.12.2. Existing environment

Social baseline

Social and economic environment: Land-use planning across the region is guided by the Riverina Murray Regional Plan 2041 (DPE, 2023), which seeks to enable productive and innovative growth through the protection and enhancement of natural assets, improved transport and infrastructure connectivity, and investment in emerging industries such as renewable energy.

The plan also prioritises the integration of Aboriginal culture, heritage, and aspirations into local planning processes. Housing affordability and supply are highlighted as critical issues, particularly in light of anticipated population growth along the Murray River corridor. The plan supports the region's transition to a net zero carbon future by 2050, including the establishment of the South-West REZ. Objective 13 of the plan explicitly emphasises support for this transition as a regional priority (p. 58).

The Plan also supports NSW's broader transition to a net zero emissions economy by 2050, prioritising the development of REZs. The South-West REZ, which includes areas of the Riverina and Murray regions, is expected to attract multi-billion-dollar investments in solar, wind, and transmission infrastructure. The REZ will not only reshape local land use but also generate thousands of construction and operational jobs, adding pressure on housing, services, and community infrastructure.

At the local level, socio-economic planning is directed by the Local Strategic Planning Statement: Planning for the future Wagga Wagga 2040' sets out the strategic priorities for the LGA within the eleven guiding principles grouped under three strategic themes: the environment, a growing economy, and community place and identity. Due to the rapid development of Wagga Wagga, the Planning Statement raises key social considerations including housing availability, equitable service delivery, cultural preservation, and governance inclusivity.

Economically, manufacturing was the leading export sector in Wagga Wagga City, generating an estimated $949 million in total exports (.idcommunity, 2025b). Export figures includes both domestic and international exports. The strength of manufacturing exports highlights the sector's significant role in the regional economy and its contribution to trade beyond local boundaries.

In 2023/24, manufacturing also accounted for the highest total imports by industry, valued at approximately $1,522 million. The high volume of manufacturing imports indicates the sector's strong dependence on external supply chains to support local production and economic activity. The largest industry overall, by employment, is Health Care and Social Assistance. Health Care and Social Assistance accounts for 7,417 local jobs or 18.8% of all employment in 2023/24 (.idcommunity, 2025b). In total, the three largest industries, Health Care and Social Assistance, Construction (4,413 jobs or 11.2%), and Education and Training (4,385 jobs or 11.1%), comprised 41.0% of the city's workforce.

Several regional initiatives further support the Riverina's transformation into a logistics, manufacturing, and renewable energy hub. The Wagga Wagga Special Activation Precinct (WWSAP) is a key example (NSW Government, 2023). Situated along the Inland Rail, the precinct is anchored by the Riverina Intermodal Freight and Logistics (RiFL) hub, connecting regional producers to national and global markets. The WWSAP is projected to create up to 6,000 new jobs across sectors such as food processing, advanced manufacturing, and freight logistics. This project, led by the Regional Growth NSW Development Corporation, is already in the delivery phase and is a catalyst for broader economic activity in the region.

Taken together, these frameworks and projects demonstrate how socio-economic planning in the Riverina Murray region is increasingly shaped by a commitment to sustainable development, inclusive growth, and cultural recognition. The integration of Aboriginal values into planning processes, through collaboration with LALCs and other governance bodies, ensures that Traditional Owner knowledge and priorities are not only respected but leveraged as a strength in regional development.

Given the scale of proposed renewable energy investments, including potential state-significant developments in and around the Wagga Wagga region, careful planning is required to manage their social impacts. Workforce influxes, pressure on housing markets, and demand for community services must be anticipated and addressed through early and inclusive planning efforts. Alignment between regional and local planning instruments will be critical to ensuring that these projects deliver long-term socio-economic benefits while maintaining community wellbeing.

Locality context – Mangoplah SAL and Surrounding areas: Mangoplah is a small rural locality situated approximately 30 kilometres south of Wagga Wagga in the Riverina region of NSW. With a population of 291 recorded in the 2021 Census, Mangoplah is characterised by its strong agricultural identity, close-knit community, and proximity to other regional centres. It lies just 3.1km west of the proposed Project Site, making it the most immediately adjacent settlement.

While the social and economic conditions of all surrounding townships and localities, including Mangoplah, could have been addressed collectively under the broader assessment of the Wagga Wagga Local LGA, a separate analysis has been undertaken for Mangoplah given its proximity to the proposed Project Site.

Accordingly, a brief assessment of Mangoplah is provided, alongside an accommodation overview for each of the proximal townships and localities, to offer a broader understanding of housing availability and workforce-related infrastructure in the immediate region. An Accommodation Inventory would be undertaken during the Response to Submissions phase initially to understand potential accommodation constraints. If an Accommodation and Employment Strategy is required following the Accommodation Inventory, it would be developed for the Project.

At the time of the 2021 Census, Mangoplah recorded a total of 117 private dwellings, of which 13 were unoccupied. Residential vacancy rates in the township, identified under postcode 2652, have remained low since 2017, fluctuating between 0% and 3.2%.

As of June 2025, the vacancy rate stood at 2.4% (SQM Research, 2025), corresponding to an estimated four unoccupied dwellings. Although this represents a comparatively higher vacancy rate than that of the nearby urban centre of Wagga Wagga (postcode 2650), where the rate was 0.6% in the same period, the absolute number of available dwellings in Wagga Wagga was significantly higher, with 52 properties listed as vacant. This contrast reflects the limited housing stock in Mangoplah and suggests a tighter accommodation market in absolute terms, despite the proportionally higher vacancy rate.

Despite its small size, Mangoplah contributes to the broader agricultural productivity of the Riverina. Its settlement characteristics, such as low density, ageing population, high homeownership, and limited-service base, underscore its role as a traditional rural locality within the peri-urban fabric of Wagga Wagga. These attributes also imply potential vulnerabilities, including ageing workforce, declining youth retention, and limited local access to services, which are important considerations for future planning and social impact assessment.

Data show a predominantly agricultural workforce, with the largest proportion of residents employed as Managers (36.9%), many of whom are likely engaged in family-owned or operated farms. Key industries of

employment include specialised beef cattle farming, sheep farming, and grain-livestock mixed farming, underscoring the locality's strong dependence on primary production.

6.12.3. Potential impacts

Potential impacts were identified though stakeholder and community engagement and from comparative studies. The significance of these impacts are assessed using the risk matrix taking into account the likelihood and magnitude of impacts. The key themes of the SIA impact assessment include how the Project would impact on:

1. Livelihoods
2. Community
3. Accessibility
4. Health and wellbeing
5. Surrounding
6. Decision-making systems
7. Cumulative impacts.

Opportunities for local employment, service provision during the construction and operation phases, as well as ongoing revenue streams for participating landholders through lease arrangements have been assessed. The Applicant will develop a community benefit-sharing program which will be implemented through the voluntary planning agreement (VPA) in close consultation with Wagga Wagga City Council, aiming to deliver long-term local benefits aligned with community needs and priorities.

These factors are identified as potential positive impacts, supporting broader regional goals to strengthen economic resilience. The Project may also stimulate flow-on effects to local businesses and contribute to a more diversified and sustainable local economy.

Table 6-39 and Table 6-40 present a summary of potential social impacts and response measures. The stakeholder significance rating has been determined by the perceived importance of the issue to the affected stakeholder group, their sensitivity to the impact, and the frequency that the issue was raised by the group during the consultation and engagement process. The significance rating (unmitigated) further considers the issue in light of additional information drawn from the technical assessments and comparative studies.

The residual impact significance rating represents the likely significance of an issue once the proposed mitigation/enhancement measure/s have been successfully implemented. These impacts are presented by Project Phase, with construction impacts listed first.

Table 6-39 Social Impact Assessment Summary - Positive Social Impacts

Social Impact Category	Potential Social Impact	Project Aspect/Activity	Affected Stakeholder Group	Evaluated Impact Significance	Existing and Potential Enhancement Measure	Residual Significance
Livelihoods	Increased local employment opportunities	Establishment, construction, and operation of Project infrastructure.	Broader Community	Minor + Possible **Low**	Continue to foster the use of local contractors and suppliers	**Medium**
	Increase in training opportunities			Moderate + Possible **Medium**	Liaise with local training providers and tailor the training needs to develop the required skills	**Medium**
	Increase in economic activity to local businesses	Establishment, construction, and operation of Project infrastructure.	Broader Community, Local service providers and businesses	Minor + Possible **Low**	Continue to foster the use of local contractors and suppliers. Coordinate efforts and liaise with key stakeholders to coordinate the provision of accommodation and other services or suppliers, including opportunities for local contractors and services.	**Medium**
	Diversification of household incomes	Establishment, construction, and operation of Project infrastructure.	Landowner	Minor + Almost certain **Medium**	Payments to host landholders via neighbour agreements result in financial contributions to the local community.	**Medium**
	Increased economic benefit through	Community benefit fund generating	Broader community, Local service	Minor + Almost Certain	Indirect benefits to local services through the construction and operation phases. A	**Medium**

Social Impact Category	Potential Social Impact	Project Aspect/Activity	Affected Stakeholder Group	Evaluated Impact Significance	Existing and Potential Enhancement Measure	Residual Significance
	community investment	economic activities.	providers, Community groups, Local government, Vulnerable community members	**Medium**	community benefit-sharing program will include a component to fund community benefit and employment programs. Promote training and upskilling opportunities in the local community.	

Table 6-40 Social Impact Assessment Summary - Negative Social Impacts

Social Impact Category	Potential Social Impact	Project Aspect/Activity	Affected Stakeholder Group	Evaluated Impact Significance	Existing and Potential Mitigation Measure	Residual Significance
Livelihood	Perceived distributive inequity	Establishment and operation of Project Infrastructure.	Proximal landholders	Minor + Possible **Low**	Continued engagement with host and proximal landholders and the broader community. Continued implementation of Host landholder and neighbour agreements.	**Low**
	Perceived loss of agricultural land	Establishment, operation, and decommissioning of Project infrastructure.	Landholders and the broader community for farm production	Minor + Unlikely **Low**	Continued implementation of landholder and neighbour agreements. The soil technical report identified low nutrient status, limiting the soil's ability to support healthy plant growth.	**Low**
	Potential impacts to property values	Establishment, operation, and decommissioning of Project infrastructure.	Near neighbours	Moderate + Possible **Medium**	Further engagement with the broader community.	**Medium**
Community	Potential changes to community cohesion	Payments to host landholders and difference in	Host landholders, near neighbours and the broader community	Moderate + Possible **Medium**	Further engagement with the broader community and strategies to increase social acceptance, such as through	**Low**

Social Impact Category	Potential Social Impact	Project Aspect/Activity	Affected Stakeholder Group	Evaluated Impact Significance	Existing and Potential Mitigation Measure	Residual Significance
		attitude towards the Project. Differences in attitude towards the Project.			community benefit investment and funding.	
Accessibility	Increased pressure on housing and accommodation	Establishment and construction of Project infrastructure.	Accommodation providers and the Broader community	Moderate + Possible **Medium**	Develop Employment and Accommodation Strategy with the following strategies: • Continue to foster the use of local contractors and suppliers. • Coordinate efforts and liaise with key stakeholders to coordinate the provision of accommodation and other services or suppliers. • Collaboration with other renewable energy applicants.	**Medium**
	Increased traffic on local roads	Movement of construction materials & increased traffic due to workforce travel.	Broader Community and road users	Moderate + Possible **Medium**	Development and implementation of a Construction Environmental Management Plan (CEMP), including traffic management measures. Develop and implement Traffic Management Plan reflecting planning of transport routes with public safety	**Low**

Social Impact Category	Potential Social Impact	Project Aspect/Activity	Affected Stakeholder Group	Evaluated Impact Significance	Existing and Potential Mitigation Measure	Residual Significance
					considerations and information disclosure, notifying residents and considering any sensitive user groups.	
	Increased pressure on social infrastructure	Establishment and construction of Project infrastructure.	Health providers	Moderate + Possible **Medium**	Finalised Planning Agreements with host Councils. Collaboration with other renewable energy Applicants. Explore the potential of recruiting health workers to cater to the Project's needs.	**Low**
Health and Wellbeing	Increased stress and anxiety to those opposing the Project	Establishment and construction of Project infrastructure.	Proximal landholders and the broader community	Moderate + Possible **Medium**	Continued engagement with host and proximal landholders and the broader community. Implement measures outlined in the EIS relating to hazard and risk management.	**Low**
Surrounding	Change in landscape character and visual amenity	Establishment of Project infrastructure.	Proximal landholders, nearby residents, tourists, and tourism operators	Minor + Unlikely **Low**	The Landscape and Visual Impact Assessment found visual impacts from the Project to be minimal, with public views largely screened by distance, topography, and existing vegetation. Key landscape features, including Livingstone National Park ridgelines, are	**Low**

Social Impact Category	Potential Social Impact	Project Aspect/Activity	Affected Stakeholder Group	Evaluated Impact Significance	Existing and Potential Mitigation Measure	Residual Significance
					unaffected. Visual impacts are confined to nearby private properties, where existing vegetation already limits views. Continued implementation of Host landholder and neighbour agreements. Targeted vegetation screening is to be planned in collaboration with affected landholders.	
	Increased fire risks	Establishment, construction, and operation of Project infrastructure	Proximal landholders, and the Broader community	Major + Possible **Medium**	The bushfire assessment for the Project concludes that the Project is located on bushfire-prone land but can be designed to meet the requirements of *Planning for Bushfire Protection 2019* (PBP 2019) and achieve compliance with State Significant Development (SSD) approval standards. Recommendations include integrating findings into fire safety plans, maintaining Asset Protection Zones, and ensuring compliance with design and fire safety standards.	**Low**

Social Impact Category	Potential Social Impact	Project Aspect/Activity	Affected Stakeholder Group	Evaluated Impact Significance	Existing and Potential Mitigation Measure	Residual Significance
					Develop management and emergency response plan in consultation with FRS.	
	Increased flood risks and associated environmental impacts	Establishment, construction, and operation of Project infrastructure.	Proximal landholders, and the Broader community	Moderate + Possible **Medium**	The Flood Impact Assessment of the Project found the site to be located outside the floodway, subject only to very shallow inundation (<30 mm) and low hazard levels (H1). Develop Flood Emergency Response Plan.	**Low**
	Increased risks to ecology, biodiversity and species	Establishment, construction, and operation of Project infrastructure.	Broader community	Minor + Possible **Low**	Retention of key habitat features, protection of riparian zones, and timing works to avoid critical breeding or migration periods are important to mitigate risks.	**Low**
Decision-making systems	Perceived lack of procedural fairness and exclusion from decision-making	Community and stakeholder engagement activities.	Broader Community	Major + Likely **High**	Continued community engagement and community drop-in sessions throughout construction and operation. Continue proactive personal engagement with community members and proximal residents.	**Low`**

The Mangoplah community may experience a broad range of changes as a result of the Project. These span livelihoods, community cohesion, accessibility, health and wellbeing, environmental values, decision-making systems, and the cumulative effects of multiple nearby developments. Employment and economic opportunities are contested.

While construction may boost local business activity and diversify income especially for host landholders concerns remain about equitable benefit distribution, with many fearing profits will largely flow offshore and to a few landowners. The potential loss of productive agricultural land, even in small amounts, is viewed as an irreversible impact on both farming livelihoods and local identity.

Residents value a close-knit, cooperative social fabric rooted in agricultural heritage, but consultations indicate renewable projects have already caused divisions, with some families fractured over differing views. The Project could deepen these tensions, especially given the proximity of other large-scale developments. Housing pressures from non-local workers, increased traffic from heavy vehicle movements, and strains on local services such as health and waste management were raised repeatedly. With tight rental markets, an influx of workers could exacerbate shortages. Road safety and capacity are ongoing concerns, as are the increased demands on limited health and emergency services during peak construction periods.

Opponents of the project report heightened stress and anxiety tied to fears of environmental harm, landscape change, and social division, which are intensified by a lack of trust in engagement processes. The rural landscape, biodiversity, and agricultural character are highly valued, and the Project is seen as a permanent visual intrusion. Fire risk is a major concern, especially battery fires beyond the capacity of the local rural fire brigade to manage. Flood events are feared to mobilise contaminants from the Project Site into waterways, posing risks to soil health, biodiversity, and agricultural productivity. Some residents also voiced concerns about potential impacts on wildlife, including frogs and bird species.

A perceived lack of procedural fairness and exclusion from decision-making emerged as a significant theme, with many believing that consultation is tokenistic and outcomes predetermined. Mangoplah lies within 50km of at least 11 other large-scale developments, and this clustering raises concerns about overlapping construction traffic, progressive industrialisation of the landscape, increased environmental risks, and deepening community division. While the combined presence of multiple projects could create shared economic opportunities, scepticism remains over whether benefits will be distributed fairly.

Overall, perceived social impacts particularly division, procedural unfairness, and loss of rural identity may outweigh potential economic or infrastructure benefits unless the project delivers tangible, equitable outcomes and adopts engagement practices that build trust and demonstrate genuine inclusion in decision-making.

6.12.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on social and economic matters are considered to be manageable

Safeguards and mitigation measures relating to potential social and economic impacts are outlined in Table 6-41.

Table 6-41 Social and economic impact mitigation measures

Mitigation number	Mitigation measure	Project Stage
SIA1	Community and Stakeholder Engagement Strategy would be prepared. The following key engagement needs that have been identified for stakeholder and community engagement in the upcoming phases of the Project would be included in the strategy: • Ensure open, transparent, timely, and accessible communication of Project information to reduce uncertainty and address community concerns. • Proactively address both real and perceived concerns about potential amenity and safety impacts, including traffic, noise, visual changes, and environmental impacts. • Maintain regular engagement with local councils, particularly during the construction phase, to monitor, discuss, and adaptively respond to emerging concerns from the community and local businesses. • Develop accessible and responsive grievance and remedy mechanisms to ensure that community concerns and complaints are handled appropriately and fairly. • Clearly communicate accommodation arrangements for construction workforces. • Establish a Community Benefit Sharing Program (CBSP) that could be implemented through the VPA, ensuring these initiatives offer ongoing opportunities for meaningful community involvement and decision-making. • Provide robust engagement with the community to address and alleviate concerns based on perception as well as technical realities. • Collaborate with local councils and relevant regional stakeholders to support initiatives that promote regional	Prior to construction

Mitigation number	Mitigation measure	Project Stage
	economic and social development. • Engage economic development agencies to share and promote the Project's positive outcomes, showcasing the renewable energy industry's contribution to the region.	
SIA2	An Accommodation and Employment Strategy (AES) would be prepared. To mitigate potential impacts on housing and accommodation within the Project's social locality, it is recommended that the AES be developed in consultation with local Councils and key stakeholders. The AES should: • Propose measures to ensure an adequate supply and availability of accommodation for both construction and operational workforces. • Prioritise accommodation options that minimise adverse social impacts on local communities, particularly those related to housing affordability and availability for existing residents. • Collaborate with the Council and local stakeholders to undertake an inventory of under-utilised buildings that could be repurposed as temporary workforce accommodation. • Facilitate the employment of local residents wherever feasible, including through the use of locally registered contractors who may already employ a local workforce. This approach can reduce the need for importing labour and minimise accommodation pressure. • Engage with education and training providers such as TAFE to identify local skills gaps and sponsor upskilling or certification programs aligned with Project workforce needs, contributing to regional capacity building. • Develop and implement workforce behaviour and safety policies, including clear expectations for conduct while in transit, on-site, in accommodation, and when interacting with local communities. • Where possible, coordinate with community liaison officers or representatives from other renewable energy or major infrastructure projects in the region to ensure a harmonised approach to workforce management and minimise cumulative impacts on local housing, services,	Prior to construction

Mitigation number	Mitigation measure	Project Stage
	and businesses.	
SIA3	A Community Benefit Sharing Program (CBSP) implemented as part of the Voluntary Planning Agreement (VPA) would be prepared with the aim to maximise benefits for local community members throughout the Project lifecycle. The Applicant has committed to entering into a VPA for the Project with the Council. The CPSP will: • Ensure initiatives offer ongoing opportunities for meaningful community involvement and decision-making. • Include representation from Traditional Owners and other key local Aboriginal stakeholders to uphold inclusive and culturally respectful engagement. In addition to the CBSP, the Applicant will explore opportunities to support local initiatives through community sponsorships. To ensure that both the CBSP and community sponsorships deliver meaningful and lasting impact, the Applicant could: • Continue to consult with local communities to identify needs and priorities and tailor CBSP initiatives accordingly over the life of the Project. • Collaborate with other renewable energy developers and industry stakeholders to ensure coordination and complementarity of benefit programs across the region, reducing the risk of duplication and improving effectiveness.	Prior to construction

7. Assessment of additional issues

7.1. Non-Aboriginal heritage

This section summarises the review of a primarily desktop-based assessment undertaken by NGH Pty Ltd. This section was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential historic heritage impacts of the Project and the recommended measures to mitigate them.

7.1.1. Approach

This section utilised the following information in the assessment of non-Aboriginal heritage impacts for the proposed Mangoplah BESS project:

- Searches of the Australian Heritage Database (World, National and Commonwealth Heritage Lists);
- Searches of the Heritage NSW State Heritage Inventory, this includes items on the State Heritage Register and items listed by state agencies in the s170 Register;
- Search of the relevant Local Environmental Plans;
- Review of relevant literature, and
- Site visit, carried out in conjunction with the Aboriginal heritage survey program on the 17 February 2025.

7.1.2. Existing environment

Heritage register searches

Searches of heritage databases were undertaken to identify any items or places in proximity to the Project Site, with a focus on the immediate area and its surrounding landscape. The following resources were used as part of this assessment:

- The NSW State Heritage Inventory (SHI), this includes items on the State Heritage Register and items listed by state agencies and local Government, to identify any items currently listed within or adjacent to the Project Site.
- The Australian Heritage Database, this includes items on the National and Commonwealth Heritage Lists, to identify any items that are currently listed within or adjacent to the Project Site.

The results of the NSW SHI database search indicated there are four (4) previously recorded heritage sites listed under the *NSW Heritage Act* within the Wagga Wagga LGA. None of the sites are located within or adjacent to the Project Site. The closest site, Mobile Cook's Gallery, Museum of the Riverina (SHR #01722) is located in Wagga Wagga located approximately 28km to the north of the Project Site.

There are 354 previously recorded heritage sites listed by the Local and State Agencies within the Wagga Wagga LGA. None are located within or adjacent to the Project Site. The closest site is Scots Uniting Church in Mangoplah (LEP #I159) which is approximately 2km southeast of the Project Site.

The Australian Heritage Database covers listings of heritage places that fall under the Commonwealth Heritage List, the National Heritage List and the World Heritage List, each of which are slightly separate and have different management and legal protections, although all come under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act* 1999 (EPBC).

The results of the Australian Heritage Database search indicated that there are 20 items listed within the Wagga Wagga LGA. None are located within or adjacent to the Project Site. The closest sites are located in the City of Wagga Wagga approximately 25km north of the Project Site.

No other known previously recorded heritage sites are located within or adjacent to the Project Site.

Local European historical context

Charles Sturt was the first explorer to pass through the Wagga Wagga area during an expedition along the Murrumbidgee River in 1829 (Morris, 1999). Up until 1825 land grants designed to settle parts of the colony were given out by the Governor and were free and could be up to 30 acres in size. In 1826 Governor Darling gave an order to limit the settlement within the colony of New South Wales to “The Nineteen Counties” surrounding Sydney (website: Limits of Location) but these did not extend to the Wagga Wagga area. Those persons settling on unoccupied land outside of the Nineteen Counties were classed as squatters (website: Squattocracy). However, in 1829 Darling extended the boundary to include a 400 km radius from the centre of Sydney (Museums of History NSW, 2017)which placed Wagga Wagga at the potential edge of approved settlement (French, 1965).

The first European settler in the Wagga Wagga area was Charles Tompson who was an emancipated convict who established the Eunonyhareenyha run on the northern bank of the Murrumbidgee River in 1832. Soon after this George Best established the Wagga Wagga run on the southern bank of the river where the town of Wagga Wagga now stands. Incidentally Wagga Wagga is generally accepted as an Aboriginal term for the waterhole where the crows congregated. Other settlers then followed who squatted illegally before the government regulated their tenure and established a licensing scheme in 1836 (Morris, 1999).

In 1880, a gold bearing reef said to be very rich was discovered in Mangoplah and several claims were pegged out (The Argus, 1880). It follows that there likely would have been temporary or crude structures erected to house miners and other individuals supporting the mining industry in the area. The first bridge in Mangoplah was built in 1862 (Sydney Morning Herald, 1862) but the village wasn’t determined to be set aside as a village until 1888 by Henry Parkes (NSW Government Gazette, 1888). Gold mining continued at the Warbling Springs mine into 1913 when three shafts were drilled to 100 feet and encountered a 10-foot reef ((Wagga Wagga Express, 1913). In 1923 a new rail line from The Rock to Mangoplah was constructed but a large bushfire in 1952 destroyed the Mangoplah railway station and forced its closure, with the rail line ceasing operation in 1956. The bushfire burned an estimated 390,000ha in 18 days (O'Donnell, 2022)

Historical landholdings

The land that the Project Site is located on was originally a part of the Mangoplah Holding No. 462 which was transferred from C.L. Crisp to John Cox in 1869 (The Albury Banner and Wodonga Express, 1869). By 1888 the Mangoplah run had been subdivided and the portions containing the Project Site were owned by John Cox (Portion 82), John Cox (Portion 84), William Ryan (Portion 17), John Cox (Portion 20), Catherine Clune (Portion 24) and John Cox (Portion 22). At this time there was a road gazetted at the southern end of both Portion 84 and 82 and Holbrook Road had already been gazetted.

The 1917 parish map doesn’t deviate from these new property boundaries, but it does now show the rail line that runs through the middle (west to east) of Farm 29 from Mangoplah Railway Station to Pulletop. The railway is shown clearly in the grant of land for Vol. 8475 Fol. 115 which also shows a transmission line running north to south through the same property. The transmission line ran between Wagga and Hume and was 132kV, gazetted in 1961. By 1957 the properties had changed hands again and were now owned by

W.F. Lloyd who had taken over Lot 222 from R.S. Creasy. The Bank of Australasia Ltd now owned Lot 225 and Walter and W.F. Lloyd now owned Lot 228.

The historical aerial imagery from 1969 shows the land was used for crops with plough lines evident. It is also clear that the station road has changed route slightly over time.

Site inspection

A site visit was conducted on the 17 February 2025 to assess the Project Site for both Aboriginal and historical heritage items. Historical aerial imagery and the current land use that the Project Site has been used for agriculture for some time, but it's not known if the land use prior was different prior to 1969. The 1969 aerial image shows both plough lines and dams in different paddocks. The structures and plantings are no longer there and appear to have been removed by at least the 1990s leaving only the trees remaining. The trees are no longer present, and the field is continually ploughed.

No structures or historical objects were recorded within the Project Site during the survey and there was no evidence for the presence of historic archaeological features. This is in line with the desktop assessment which did not identify any potential for historic archaeological features to occur within the Project Site.

Significance assessment

As no historic heritage items or potential for historic heritage items were identified during the site visit or during the desktop assessment it is not necessary to undertake an assessment of significance for historic heritage.

7.1.3. Potential impacts

The Project Site is not listed on any heritage register at a State or Local level and no items or structures of historical significance were encountered during the site visit or identified as likely to occur during the desktop assessment. Additionally, there is no evidence of any historical activity including structures noted on the parish maps or within any of the literature researched for this project. This is despite the acquisition of the property by early white settlers in the Mangoplah area.

The proposed development of the Mangoplah BESS will have no impact on historical heritage items within the Project Site or the surrounding areas.

Key uncertainties of the assessment

Although there were no objects of historical significance encountered during the site visit or identified during the background research, unexpected finds cannot be ruled out. It is however considered unlikely that historical objects will be encountered during construction for this project. In the unlikely event that unexpected historical objects are identified during works an unexpected finds procedure should be implemented and followed.

7.1.4. Mitigation measures

Safeguards and mitigation measures relating to historic heritage are outlined in Table 7-1 below.

Table 7-1 Historic heritage mitigation measures

Mitigation number	Mitigation measure	Project Stage
NAH1	Should an item of historic heritage be identified, the Heritage NSW would be contacted prior to further work being carried out in the vicinity in accordance with the Non-Aboriginal Heritage unexpected finds procedure in the EIS.	All Stages

7.2. Resource use and waste generation

This section summarises the findings of the desktop assessment undertaken by NGH Pty Ltd. This section was prepared to respond to the Project SEARs (Appendix A) and provides and assessment of the potential resource use and likely waste streams from the Project and the recommended measures to mitigate them.

7.2.1. Approach

Statutory requirements

Legal requirements for the management of waste in NSW are governed by the *NSW Protection of the Environment Operations Act 1997* (POEO Act) and the Protection of the Environment Operations (Waste) Regulation 2014. Unlawful transportation and deposition of waste is an offence under Section 143 of the POEO Act.

The NSW Waste Avoidance and Resource Recovery Act 2001 include waste minimisation and management objectives to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development. The Project's resource management options would be considered against a hierarchy of the following order:

- Avoidance of unnecessary resource consumption
- Resource recovery (including reuse, reprocessing, recycling and energy recovery)
- Disposal.

The NSW Waste Avoidance and Resource Recovery Strategy, the 'WARR Strategy', provides a framework for achieving these statutory objectives (NSW EPA, 2014).

Adopting the above principles would encourage the most efficient use of resources and reduce costs and environmental harm in accordance with the principles of ecologically sustainable development. The following additional pieces of legislation and guidance are also considered in this assessment:

- NSW Wate Avoidance and Resource Recovery Strategy 2014-2021
- NSW Waste and Sustainable Materials Strategy 2041, Stage 1: 2021:2027
- NSW Environmental Planning & Assessment Act 1979 (EP&A Act), specifically Ecologically Sustainable Development
- NSW Waste Classification Guidelines 2014
- NSW Water Management Act 2000
- NSW Dangerous Goods (Roads and Transport) Act 2008
- Commonwealth Hazardous Waste Act 1989

7.2.2. Existing environment

Current waste streams

The Development Footprint is utilised for agricultural practices, and therefore current waste streams pertain to agricultural products such as chemical disposal, machinery waste (e.g. batteries, tyres), and general waste.

Regional waste disposal capabilities

Regional capabilities are highly relevant for ensuring waste reuse options are fully explored. The region has low population density over large distances, which limits waste collection, separation, reuse and recovery options.

Sourcing local resources and disposal options and building local capabilities for separation, reuse and recycling are important to reducing the wastage related with transporting wastes large distances for disposal.

Specific facilities in the Wagga Wagga LGA are located at:

- Gregadoo Waste Management Centre
- Kurrajong Recycling (Wagga)
- Albury Waste Management Centre
- Culcairn Transfer Station
- Wagga Wagga Lithium-Ion Battery Recycling Facility (currently in planning stage).

Metal recycling would be available through local contractors in Wagga Wagga and the surrounding towns. Independent metal recycling contractors can support the collection and recycling of metal waste.

It is noted that Wagga Wagga City Council is an associate member of the Riverina and Murray Joint Organisation (RAMJO) Riverina Waste Group. PAMJO provides for a collaborative approach across 11 council areas to reduce the amount of waste disposal at landfill sites and develop facilities which individual councils could not afford independently. The voluntary group works collaboratively to deliver projects, programs and education to assist the member councils with waste disposal and sustainability issues.

Funding for improved waste treatment for the region was secured in 2022. Hay Shire Council for example will be constructing a new material recovery facility. It will allow Hay and surrounding councils to expand recycling capabilities with 6,400 tonnes of waste being recovered annually. Plans are included for a new sorter, crusher, shredder and baler will recycle plastics, glass, paper, cardboard and tyres as well as construction and demolition waste. This development will support environmental sustainability and is a major stepping-stone towards sustainable waste practices in the region. It is also expected to boost employment, with the creation of additional local jobs.

Industry context

Australia currently recycles 10% of its lithium-ion battery waste, compared to 98% of lead acid batteries. The CSIRO is confident that lithium-ion batteries are highly recyclable (CSIRO, 2024) and has developed a pilot program to test the dry shredding of lithium-ion batteries to recover valuable materials. These materials could then be used to manufacture new batteries in the future as the demand for these batteries increases (CSIRO, 2024). B-Cycle is a government backed scheme which is run by the Battery Stewardship Council and authorised by the Australian Competition and Consumer Commission (ACCC) to promote the safe use and disposal of batteries including LFP batteries.

In 2025, there are 10 B-Cycle accredited, EPA - permitted and licensed recyclers of mixed batteries including LFP batteries in Australia that are collecting, sorting and processing batteries. There is one processor currently recycling commercial sized LFP batteries. The number of recycling plants with these accreditations is anticipated to grow with demand, with one facility already proposed in Wagga Wagga.

Other State Significant Developments have identified opportunities for reuse of construction waste within local communities:

- Men's sheds
- TAFE, high schools and trade schools
- Day care centres
- Sporting grounds
- Local farmers
- Garden centres.

This is an emerging opportunity for the Renewable Energy Sector and energy storage developers to demonstrate coordinated reuse options within local communities. Community and business initiatives could see substantial benefits from Project waste streams that lead to:

- Timber and metal supplied to trade schools and local craft workshops

Composted materials supplied to local gardeners and farms.

7.2.3. Potential impacts

The NSW Waste and Avoidance and Resource Recovery Act 2001 sets out to encourage the most efficient use of resources to reduce the environmental harm. Resource management options should be considered in the following order:

- Avoidance of unnecessary resource consumption
- Resource recovery (including reuse, reprocessing, recycling and energy recovery)
- Disposal, as a last option.

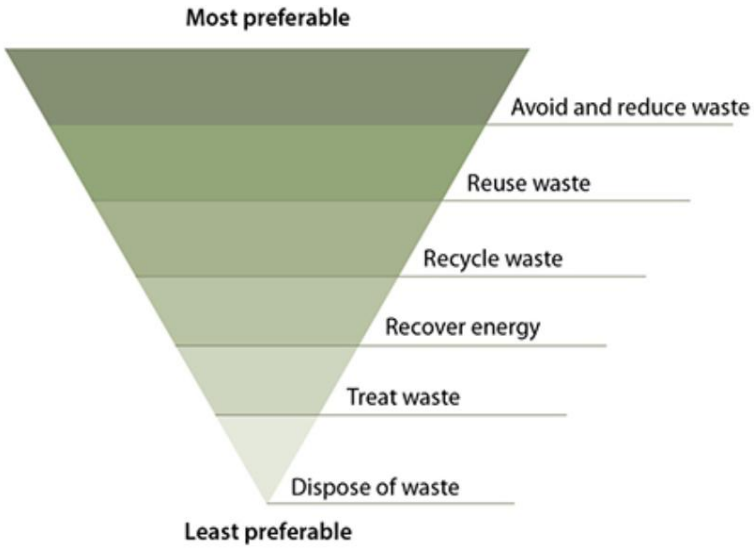


Figure 7-1 Waste hierarchy, Source: (NSW EPA, 2025)

Construction

The estimated bulk material requirements of the Project are set out in Section 3.4 for construction, operation and decommissioning. The final volumes of waste materials would not be known until the detailed designs are completed and a construction contractor is appointed. As such details in this assessment are estimates only and would be formalised in a Waste Management Plan (WMP) in the post approvals stage.

The materials required for the BESS (batteries, cabling and quarry materials) are expected to have adequate supply stores available. Where materials are required that are in short supply, alternative materials may be sought to meet timelines and reduce costs. In considering the volumes required, the Project is unlikely to

place significant pressure on the availability of local or regional resources. The use of the required resources is considered reasonable in light of the benefits of supporting renewable electricity generation.

Wastes that are likely to be generated from the Project during construction include:

- Vegetation from site clearing – this is expected to be limited to grasses
- Surplus spoil from earthworks required for the Project – excess spoil would be reused onsite to fill in trenches and stabilise cleared areas
- General construction waste e.g. concrete, steel, timber – this is expected to be minimal with quantities of building materials required to be accurately estimated
- Domestic waste materials including plastics, packaging materials, putrescible waste generated by construction personnel
- Chemicals and oils
- Wastewater generated at construction compounds
- Waste from onsite amenities i.e. septic disposal.

All waste would be transported and disposed of in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014).

The impact from waste generation, on regional waste facilities is assessed to be moderate without the implementation of any recycling or reuse measures. It is critical that all waste stream end locations are identified prior to construction, and any limitations of facilities is communicated through updates to the WMP.

With the implementation of detailed WMP and identification of recycling waste facilities in the LGA, the impacts from construction waste disposal on regional landfills, the biological environment and social environment is assessed to be minor.

Table 7-2 provides a summary of expected construction waste stream types and operation for reducing, reusing and recycling.

Table 7-2 Expected waste streams and waste options

Components	Waste stream details	Waste hierarchy options		
		Reduce/Avoid	Reuse	Recycle
Construction				
Excavated soils	Greatest during construction for BESS hardstand. Other activities will better achieve cut and fill balance.	☑ Minimise disturbance areas, ensure cut and fill balance.	☑ Soil to be retained and reused onsite.	☐ N/A
Excess construction materials: Concrete aggregates Timber products Masonry products	Greatest during construction.	☑ Reduce water consumption by installing water saving appliances	☑ Offer to local TAFE and high schools	☑ Recyclable material to be sorted and disposed at appropriate facilities
Paper and cardboard	Life of project.	☐ N/A	☐ N/A	☑ Recycled at appropriate facility
Packaging timber: Pallets, timber cable drums	Greatest during construction.	☐ N/A	☑Offer to local TAFE, High School and Art community, local contractors	☑ Recycled at appropriate facility
Packaging (plastics)	Greatest during construction when highest volume of staff onsite.	☑ Packaging is minimised	☐ N/A	☑ Sort and recycle at appropriate facility

Components	Waste stream details	Waste hierarchy options		
		Reduce/Avoid	Reuse	Recycle
Packaging (ferrous and non-ferrous metals)	Greatest during construction.	☐ N/A	☐ N/A	☑ Sort and recycle at appropriate facility
Putrescible waste: Food waste, food packaging	Greatest during construction when highest volume of staff onsite.	☑ Avoid plastic	☐ N/A	☑ Sort on site (glass, plastic, green) 90% recycle
Bio waste (septic) / black water	Greatest during construction when highest volume of staff onsite.	☑ Install water saving appliances. Install bio-septic tank or worm farm waste composting septic (or similar) tank to reduce volume of biohazard black water.	☑ Utilise local composting facilities to incorporate into their activities for end use to be on farm (associated land) soil improvement.	☑ Treated and disposed of by appropriately licensed contractor

Operation/decommissioning

The average life of the LFP batteries is assumed to be 15 to 20 years based on normal operating conditions (Najera, Arribas, de Castro, & Nunez, 2023) . The batteries may require replacement 1–2 times during the life of the BESS.

Lead-acid and nickel-cadmium batteries are considered 'hazardous waste' in accordance with the EPA's waste classification guidelines. LFP cells are not detailed within the guideline, but for the purpose of this assessment could be considered hazardous under the Commonwealth *Hazardous Waste Act 1989*, and Dangerous Goods under the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code). The code has a special provisions and packaging instructions for LFP batteries transported for disposal or recycling.

A battery unit is made up of multiple individual cells. During operations, individual faulty cells will be replaced, rather than a whole unit. This occurs as part of the regular maintenance program. If temporary storage of waste battery cells is required, the operator of the Project will adhere to the Victorian EPA guideline Storage and Management of Waste Batteries (2018).

LFP cells are considered class 9 miscellaneous dangerous goods, which pose little threat to people or property. The transportation screening thresholds in the Preliminary Risk Screening undertaken by NGH have not been exceeded, therefore doesn't indicate the transport of LFP cells triggers that the development is 'potential hazardous'.

Any spent batteries would be recycled at a B-Cycle accredited, EPA permitted and licensed recycler of LFP batteries. Batteries would be handled, stored, and transported according to manufacturer's guidelines and the ADG Code.

Given the rapid rise of LFP battery use in Australia, including in renewable energy Projects and electric cars, cost-effective local recycling may be available at the time of battery replacement or decommissioning. AEMO (2015) predict strong growth in the consumption of LFP batteries for both electric vehicles and PV solar over the next 20 years. This growth would begin to significantly affect the waste stream from 2025 (Randell Environmental Consultancy, 2016).

Table 7-3 provides a summary of expected operation and decommissioning waste stream types and options for reducing, reusing and recycling.

Table 7-3 Estimated waste streams during operation and decommissioning

Components	Quantification		Waste hierarchy options		
			Reduce/Avoid	Reuse	Recycle
Decommissioning					
Ancillary buildings and structures	Greatest during decommissioning	Battery containers, O&M buildings, fences etc.	☐ N/A	☑ Option to reuse on other infrastructure projects depending on the condition of the infrastructure at the time of decommissioning.	☑ Recycled at licensed and approved metal recycling facility
LFP batteries	During operation (component failure) but greatest during decommissioning when the battery is disassembled and removed. Components may also require disposal during operation as they reach the end of their life span.	Approximately 3,200 tonnes	☐ N/A	☐ N/A	☑ Recycled at approved recycling facility
Electrical cables Recovered electrical cables	Greatest during decommissioning	Approximately 150 tonnes (subject to detailed design); some may be retained in situ where dependant on disturbance risks and recovery costs.	☐ N/A	☐ N/A	☑ Recycled at licensed and approved metal recycling facility

7.2.4. Mitigation measures

With the effective implementation of the mitigation measured set out below, the overall impact of the Project on resource use and waste generation is considered to be manageable.

Safeguards and mitigation measures relating to resource use and waste generation are outlined in Table 7-4 below.

Table 7-4 Resource use and waste generation mitigation measures

Mitigation number	Mitigation measure	Project Stage
RW1	A Waste Management Plan (WMP) would be developed in consultation with Council to minimise waste, including: • Identification of opportunities to avoid, reuse and recycle, in accordance with the waste hierarchy. • Quantification and classification of all waste streams. • Confirmation and evidence of waste management agreements with waste facilities prior to the disposal of any waste product. • Defining appropriate lines of communication for each waste stream so any restrictions can be identified. • Provision for recycling management on-site. • Provision of toilet facilities for on-site workers and identify that sullage would be disposed of (i.e., pump out to local sewage treatment plant). • Tracking of all waste leaving the site. • Disposal of waste at licenced facilities permitted to accept the waste. • Requirements for hauling waste (such as covered loads).	Construction and operation
RW2	A septic waste management system would be installed and operated according to the Wagga Wagga City Council regulations.	Construction Operation
RW3	Where possible, waste would be removed on a daily basis, or as soon as reasonably practical, to maintain the Development Footprint being litter free.	Construction
RW4	LFP batteries would be kept, stored, managed and transported according to manufacturer's instructions and the ADG Code. Any spent batteries would be recycled at a B-Cycle accredited, EPA permitted and licensed recycler of LFP batteries.	Construction Operation Decommissioning

Mitigation number	Mitigation measure	Project Stage
RW5	Develop a Decommissioning Waste Management Plan, when the project is planned for decommissioning.	Decommissioning

7.3. Cumulative impacts

This section summarises the findings of desktop assessment undertaken by NGH Pty Ltd. This section was prepared to respond to the Project SEARs (Appendix A) and provides an assessment of the potential cumulative impacts of the Project and the recommended measures to mitigate them.

7.3.1. Approach

This EIS addresses the NSW Government's *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPHI, 2024). It considers Strategic and Project-level Cumulative Impact Assessment (CIA).

Strategic-level CIA

The strategic-level CIA has been identified as predominantly positive cumulative impacts and are detailed in Section 2. In summary, they include the Project's cumulative contribution to:

- Federal and state regional renewable energy and storage policies
- Regional and local land use plans
- Potential contribution in a reduction in energy costs
- Understanding and protecting the site's unique environmental and social context
- Community benefits.

Project-level CIA

The Project-level cumulative impact risks exist where the Project may interact with other large developments in the region. The cumulative impact study area has been considered based on significant development projects outside of the Project in the following LGAs:

- Greater Hume Shire
- Lockhart
- Wagga Wagga

Significant development projects are considered as the following in alignment with Section 3.4 of the *Cumulative Impact Assessment Guideline for State Significant Projects*:

- Other SSD and State significant infrastructure (SSI) projects
- Projects that are classified as designated development and require an EIS
- Projects that have been declared to be controlled actions under the Commonwealth Environment Protection and Biodiversity Conservation Act 199 (EPBC Act)
- Projects that require assessment under division 5.1 of the EP&A Act that are likely to significantly affect the environment and require and EIS
- Any major greenfield and urban renewal developments that are scheduled for the area (e.g. new areas zoned for urban development).

Being located within a candidate REZ, local cumulative impacts could be relevant for several nearby utility scale renewable facilities.

The key environmental considerations considered in this EIS include:

- Mandated by the Project SEARs

  - Biodiversity (refer to Section 6.1)
  - Traffic (refer to Section 6.3)
  - Landscape and visual amenity (refer to Section 6.6)
  - Noise (refer to Section 6.7)
- Project identified or guideline prescribed impacts
  - Social (refer to Section 6.12).

7.3.2. Existing environment

The significant developments in the study area (i.e. within ~50km) currently proposed as of August 2025 with their brief description, distance from Project Site, their anticipated construction timeline and a statement on the key potential cumulative impacts listed in Table 7-5 below.

The distribution of nearby renewable projects are shown in Figure 7-2.

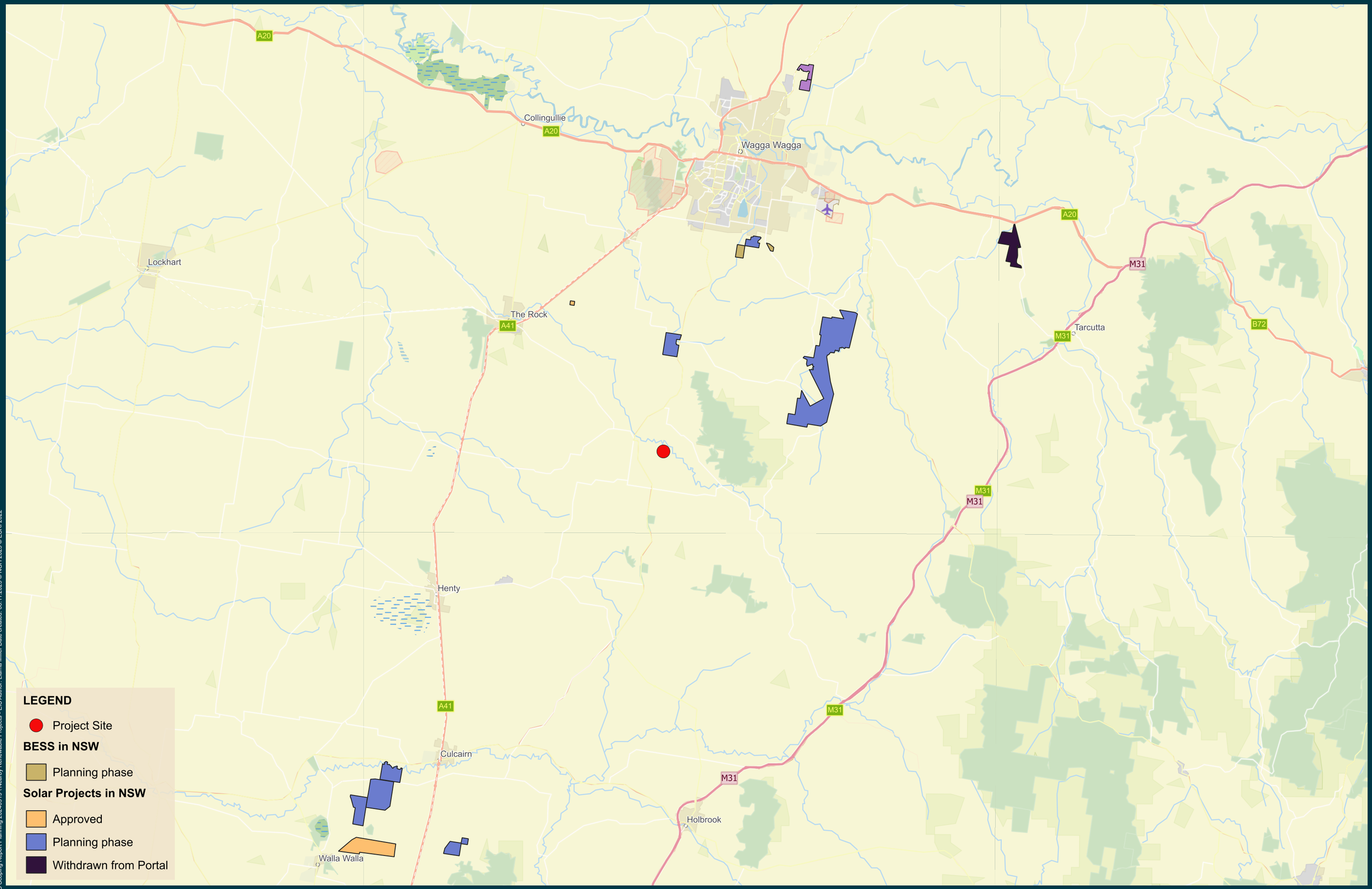
As stated in Table 3-1 of Section 3.1, the Mangoplah BESS current timeline expected to take 12-15 months starting 2027, the key cumulative impact interactions would be expected in the construction phase within the exception of noise which has the potential to extend into operation.

Table 7-5 Significant developments within 50km of the Project Site

Project	Stage	Status	Distance from Project (km)	Indicative timeframe	Specific cumulative impacts to consider	Project overlap
Maxwell Downs Solar Farm	Prepare EIS	Assessment	10km	Construction unknown Operational period 35 years	Social and economic Access and traffic	Construction, operation and decommissioning overlap
Burkes Creek Solar Farm	Approved	Determination	17km northwest	Construction 2026 Operational period 30 years	Social and economic	Potential construction overlap Operation overlap
Livingstone Solar Farm	Prepare EIS	Assessment	17km northeast	Construction unknown Operational period 40 years	Social and economic Access and traffic	Potential construction overlap Operation overlap
Belhaven BESS	Prepare EIS	Assessment	21km northeast	Construction 2025/26 Operational period 20 years	Social and economic Access and traffic	Construction, operation and decommissioning overlap
Gregadoo Solar Farm	Approved	Determination	22km northeast	Determined 2018 Construction unknown Operational period 30 years	Social and economic Access and traffic	Construction, operation and decommissioning overlap
Arundel BESS	Request SEARs	Assessment	23km northeast	Construction 2027 Operational period 20 years	Social and economic Access and traffic	Construction and operation overlap
Uranquinty Solar Farm	Withdrawn	Withdrawn	25km northwest	N/A	Nil	N/A

Project	Stage	Status	Distance from Project (km)	Indicative timeframe	Specific cumulative impacts to consider	Project overlap
Riverina Storage Pipeline	Prepare EIS	Assessment	26km northwest	Construction 2026 Operational period unknown	Social and economic Access and traffic	Potential construction overlap Operation overlap
Wagga Wagga Lithium-Ion Battery Recycling Facility	Response to Submissions	Assessment	30km northeast	Construction 2024 Operational period unknown	Access and traffic Social and economic	Potential operation overlap
Bomen Solar Farm	Approved	Operational	40km north	Determined 2018 Operation 2020 Operational period 30 years	Social and economic	Operation overlap
Mates Gully Solar Farm	Withdrawn	Withdrawn	41km northwest	N/A	Nil	N/A
Culcairn Solar Farm	Approved	Determination	42km southwest	Determined 2021 Construction 2024 (underway) Operational period 30 years	Social and economic	Operation overlap
Morven Solar Farm	Prepare EIS	Assessment	46km southwest	Construction 2027 Operational period 50 years	Social and economic Access and traffic	Construction and operation overlap

Project	Stage	Status	Distance from Project (km)	Indicative timeframe	Specific cumulative impacts to consider	Project overlap
Walla Walla Solar Farm	Approved	Construction	48km southwest	Determined 2020 Construction 2024 (underway) Operational period 30 years	Social and economic	Operation overlap
Wagga North BESS	Submissions	Assessment	38km north	Construction 2027 Operational period 35 years	Social and economic Access and traffic	Potential construction overlap Operation overlap



Datum: GDA2020 / MGA Zone 55

NGH

0 10 20 km

Mangoplah BESS

Figure 7-2 Nearby Renewable Projects

7.3.3. Potential impacts

Biodiversity

An assessment of proposed development of projects within 5km of the Project Site has been carried out to provide a summary of potential cumulative impacts to Biodiversity. No developments were identified through the major projects portal within the 5km assessment buffer.

Impacts resulting from the Project are largely consistent with impacts that are considered to occur at other nearby projects. The summary of biodiversity impacts from publicly available information was reviewed to gain an understanding of the main biodiversity impacts and how these may contribute to cumulative impacts when considering the development of the project. The proposed Mangoplah BESS has taken steps to avoid and minimise native vegetation in accordance with the relevant guidelines and initial site selection. Despite this, some residual impacts will occur. As such the project will add a negligible increase to cumulative impact of vegetation clearing within the assessed 50km buffer. The cumulative impacts are considered manageable with the mitigation measures proposed in Section 6.1.

Noise and vibration

Cumulative noise impacts for the Project have been considered against other nearby Projects, if an overlap with the construction phase was likely to occur.

The closest project listed on the Major Projects Portal, as of August 2025, is approximately 10km from the Project Site.

As such, there are no cumulative noise impacts predicted as a result of the Project.

Traffic

Regarding potential cumulative traffic impacts, the projects listed above were considered that may generate additional vehicle traffic within and around Wagga Wagga. Overall, the construction traffic is expected to have a minimal impact on the operation of the road network. Accordingly, it is concluded that the road network is able to accommodate the traffic generated by the development during the construction period.

Visual

The occurrence of large-scale renewable energy projects within a region has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed, as these projects could become part of the existing landscape. It is essential to determine whether the effect of multiple projects and other major infrastructure within the region would combine to become the dominant visual element, altering the perception of the general landscape character.

Within 8km of the Project Area, there are two infrastructure projects associated with large scale energy production and reticulation:

- 330kV Wagga 330 to Walla Walla Transgrid overhead transmission line
- 132kV Wagga 330 to Australian Newsprint Mills Transgrid overhead transmission line

The results of the public and private viewpoint assessment have revealed that visual impacts from the Project are limited to private viewpoints and private agricultural land immediately surrounding the Project. Due to the

low scale of the Project, low accessibility from public viewpoint locations and intervening vegetation, the cumulative visual impacts are confined to the immediate surrounds and are considered low.

Social

The assessment of social and economic impacts centres on the combined effect of the Project on local community values and resources. Excluding the issues already addressed above, it identified the key positive cumulative residual significant for the Project as (high to very high residual significance):

- Diversification of household incomes
- Increase in economic activity to local businesses
- Increased economic benefit through community investment
- Increase in training opportunities
- Increased local employment opportunities.

The key negative cumulative residual significant for the Project as (medium residual significance):

- Potential impacts to property values
- Increased pressure on housing and accommodation
- Community consultation fatigue from multiple projects with the LGA

Land

Operationally, the area of land required for the development of Mangoplah BESS is less than 4ha and would not impede or fragment any agricultural assets or activities. The assessment of the cumulative impact of this Project or in the event that any nearby projects were constructed would be negligible in the context of the wider agricultural landscape.

Hazards

The specialist PHA assessed the cumulative impacts of nearby developments within the candidate REZ.

As the Project does not pose a significant off-site risk, other approved or constructed projects, and projects currently in the planning phase, within the candidate REZ, would not pose a significant off-site risk and there is an absence of credible mechanisms for interaction between them, the cumulative risk of projects (specifically other BESS') in the Candidate REZ is considered negligible.

Key uncertainties

In the absence of certainty, this cumulative impact assessment chapter has considered that it is possible that all of the projects listed in Table 7-5 will progress to completion and be developed within the general parameters described therein. This is considered as 'worst-case' scenario as a number of the projects are only proposed. Not all of these will be approved, and if approved, not and if approved, not all will be developed to their full scope.

Projects which may be proposed after this EIS will be required to take into account this Project (in addition to other relevant projects)

7.3.4. Mitigation measures

The chapters above have considered each Project impact in isolation and provided mitigation strategies where required to address impacts. No additional mitigation measures are proposed for the Project. It is considered that all mitigation measures included in each impact chapter and summarised in Appendix E will work together to minimise the risk of cumulative impacts with other projects.

8. Project justification

8.1. Responsive design and mitigation

The Mangoplah BESS is appropriately located to support grid firming in a region transitioning to renewable generation sources. The Project strategically located adjacent to an existing transmission line and is within the identified candidate Wagga Wagga REZ. The feasibility of alternatives is considered in Section 2.3, which concludes that the benefits of the BESS as proposed would out-weigh the alternatives.

The Project has been designed to be responsive to the site's environmental features and community concerns. Specifically, the BESS footprint is located to avoid native vegetation and the impact on native woodland along the access road is significantly reduced by making use of an existing track where possible. Impacts to neighbours show low to very low visual impacts and no noise exceedances. Hazards and traffic safety are manageable, with the implementation of mitigation strategies set out in the EIS. Social impacts remain a serious consideration as the Project progresses. Perceived community division, procedural unfairness, and loss of rural identity that the community have identified may outweigh potential economic or infrastructure benefits at a local level, unless the project delivers tangible, equitable outcomes and adopts engagement practices that build trust and demonstrate genuine inclusion in decision-making. A series of strong recommendations in this regard aim to maximise the project benefits for the local community.

If constructed the Project will address the following key issues to meet the Project objectives identified in Section 1.2:

- Assist Australia's energy transition from fossil fuels to renewable energy and contribute to achieving net-zero emissions by 2050.
- Provide system strength services to the transmission (and distribution) networks in the area and therefore, provide security of supply and safeguard the energy network.
- Increased economic activity locally and more broadly though grid investment.
- Delivering direct employment and labour opportunities.
- Avoid minimise and mitigate adverse impacts on the environment and community during construction and operation.
- Establish a strong network of positive relationships within the local community.
- Make efficient use of existing electrical infrastructure, notably the existing 132kV transmission line that intersects the Project Site to minimise the need for additional easements.

8.2. Alignment with government policies and statutory requirements

The Mangoplah BESS is appropriately located to support grid firming in a region transitioning to renewable generation sources. The Project strategically located adjacent to an existing transmission line and is within an identified candidate REZ. If constructed the Project would have a contribution to storing power and stabilising the grid for an estimated 35 years.

As detailed in Section2, the Project generally aligns with local, state and Australian government policies related to this transition, including:

- 2024 Integrated System Plan (ISP)
- *Climate Change (Net Zero Future) Act 2023*
- NSW Net Zero Plan

- NSW Electricity Infrastructure Roadmap (2020)
- NSW Transmission Infrastructure Strategy (2018)
- NSW Electricity Strategy (2019)
- Riverina Murray Regional Plan 2041
- Wagga Wagga Local Environmental Plan 2010
- Wagga Wagga Operational Plan 2024-2025
- Wagga Wagga Local Strategic Planning Statement 2040
- Wagga Wagga Community Net Zero Emissions 2050 Roadmap

The Project has demonstrated it is permissible in Section 4. As a State Significant Development, the Project has been assessed in accordance with Environmental Planning and Assessment Act 1979 (EP&A Act). It is permissible in accordance with State Environmental Planning Policy (Transport and Infrastructure) 2021. Mandatory matters have been considered including biodiversity, hazards and native title.

8.3. Community views and benefits

The engagement activities undertaken throughout the EIS phase are detailed in Section 5 and Appendix D. Overall, the engagement program indicates that concern around the Project is high. However, multiple social and economic benefits and been identified.

Key issues raised by community members during consultation activities included:

- Environmental impacts (including fire risk, pollution, flooding)
- Visual and noise concerns
- Access restrictions and local road disruption
- Property devaluation, mental health concerns, and insurance impacts
- Uncertainty around decommissioning and long-term site management
- Perceived imbalance of risk and reward for nearby landowners; not clear what the benefits are to the community and neighbours
- Loss of agricultural land and farming continuity
- Lack of confidence in the consultation process and the regulatory framework.

Opportunities that were identified during consultation activities included:

- Local job creation and training pathways
- Cultural heritage preservation
- Infrastructure upgrades (roads)
- Partnerships with educational institutions
- Community benefit initiatives and investment
- Environmental rehabilitation and stewardship.

While targeted mitigation strategies have been incorporated into the Project to address these concerns and maximise local benefits, the broader Project benefits show the Project is important to:

- ✓ Builds on the aims of the NSW Electricity Infrastructure Roadmap to transition away from coalfired energy, towards greater levels of renewable energy.
- ✓ Stabilise and secure the supply of electricity for residents, business owners and service providers.
    - It is estimated that the Project would have the capacity to power approximately 112,000 (assuming a household with four people) households for a 4-hour period during a full discharge (AER, 2023).

- ✓ Assist to drive down the wholesale electricity prices for energy consumers.
- ✓ Generate local employment, economic stimulus and other local economic benefits

Furthermore, the Project would include broader benefits to the community through a Community Benefit Fund (CBF) established via a Voluntary Planning Agreement (VPA) developed in consultation with WWCC.

8.4. Environmental impacts, and uncertainty

Potential environmental impacts that would result from development of the Mangoplah BESS have been investigated through specialist investigations and the resulting mitigation strategies are considered feasible to address the impacts identified.

Key uncertainties of the assessment activities are acknowledged below. Overall, the results of obtained in this EIS can be considered with moderate to high confidence, given the limited nature of the impacts. To ensure flexibility in the final consent, where required, conservative considerations have been given to all potential impacts.

Similarly, while an indicative Infrastructure Layout is provided to provide a clearer understanding of what would be constructed, the delineation of a broader Development Footprint at this stage provides the assessment and approval some resilience to minor layout changes in the final design. Together this 'upper limit' or 'worst case' approach ensures that all impacts of construction, as well as operation and decommissioning are captured in the environmental assessment section of this EIS and that any recommendations and mitigation strategies would be appropriate to the final detailed design.

Regarding uncertainty, the investigation of key environmental matters found:

- Biodiversity; field surveys are a snapshot of a dynamic ecological system and cannot hope to capture all site values with total accuracy. However, the biodiversity assessment has followed the prescriptive NSW Biodiversity Assessment Method, developed to address this issue, with its focus on 'candidate species' for targeted assessment during appropriate time, aiming to maximise detection of these species. Adaptive management is incorporated in the environmental management strategy, to respond to new information.
- Hazards including bushfire ignition risks; the final layout of bushfire management infrastructure such as water storage tank locations and volumes has not been confirmed. The final design would be confirmed in consultation with NSW RFS and FRNSW and would take on recommendations from these agencies. This is a commitment of the Project.
- Detailed soil nutrient surveys have not been undertaken to date but would be contracted pending Project approval to inform a rehabilitation for areas disturbed during construction and upon which to base a rehabilitation plan to ensure the site is left safe, stable, non-polluting and with the capacity to return the site to its former agricultural capacity capability.
- Recycling options at this time are not well developed for decommissioning stage, however, BESS development is a key growth industry progressing rapidly to meet state and federal energy targets. As such, this is not considered a limiting factor for the Project.

The Project demonstrates responsiveness to the findings of the specialist assessments. Project outcomes in terms of impacts on key social and environmental values of the site are summarised as follows in Table 8-1.

Table 8-1 Project impact summary

Environmental impact	Impact
Biodiversity	The Development Footprint for the BESS occurs mostly on highly modified agricultural land, with native vegetation present within the private site access road only. Two Plant Community Types (PCTs), three flora species and seven fauna species were identified or assumed present onsite in areas that would be impacted. An offset obligation has been generated for impacts on native vegetation and candidate species either identified or assumed to occur onsite, in accordance with the Biodiversity Assessment Method. Further surveys are planned that may reduce this obligation for species assumed to occur prior to Project determination. The Project was referred under the EPBC Act and has been determined 'not a controlled action'. No further assessment is required under this act.
Aboriginal heritage	Two artefact scatters, two isolated finds and one scarred tree were identified within the Project Site, of which the scarred tree falls outside of the Development Footprint. The assessment of harm overall for the Project is assessed as low. Mitigation strategies have been developed in consultation with Registered Aboriginal Parties who registered an interest in the Project.
Access and traffic	Access to the Project Site would be off Holbrook Road via a private access road. The available sight distance at the intersection exceeds requirements however, traffic assessment has determined that a Basic Left Turn (BAL) and a Basic Right Turn (BAR) treatment are required. The Project is expected to generate approximately 3 high risk over-size over-mass (OSOM) vehicles during construction; a period of approximately 12 months. The minimum clearance for underpasses of 5.1m is provided along the entire OSOM route. During operation the BESS is expected to generate a negligible amount of additional traffic.
Preliminary Hazards Analysis	Preliminary risk screening found that the Project is not considered as 'potentially hazardous industry'. Systematic identification of possible hazards, both on-site and off-site identified 13 medium-risk events. Most are related to fire incidents resulting from various causes, such as the release of flammable materials, battery thermal runaway, transformer fire, and bushfires. Considering the identified controls, the highest likelihood for these events was rated as very unlikely, and the risk assessment concluded that there is negligible potential for

Environmental impact	Impact
	offsite fatality or injury. Specific design requirements and safety studies now form part of the Project to address the risks identified. Electric and Magnetic Fields created from the Project will not exceed the International Commission on non-Ionizing Radiation Protection (ICNIRP) Guidelines reference level.
Bushfire	The BESS Development Footprint proposed in on low slope, low-grade exotic grassland fuel environment. Bush fire risks during construction and decommissioning would be managed through the standard mitigation measures recommended in the EIS. Existing access roads and informal farm roads, as well as proposed Asset Protection Zones, and BESS internal service roads would provide RFS and emergency service access throughout the Project Site.
Visual amenity	No notable visual impacts would occur. Field work has confirmed that the theoretical (modelled) visibility of the infrastructure would be screened by existing and proposed vegetation screening. Nearby residential receivers and public view points result in low and very low visual impacts. The Project commits to planting landscaping screening on the western side of the BESS in response to neighbour concerns.
Noise amenity	No noise exceedances (including sleep disturbance criteria) are relevant to construction or operation for non-associated receivers. No vibration or traffic noise exceedances would occur. No noise exceedances during the construction would occur for any non involved receivers.
Water and flooding	An analysis of 1% annual exceedance probability (AEP) event flood behaviour indicates the Project will have a minimal impact on existing flood patterns and characteristics. Maximum flood depths, hazard levels, and flow velocities remain consistent with the existing, pre-development conditions. The BESS facility is shown to experience minimal inundation in the modelling, and the overall flood behaviour of the Involved Lands remains largely unchanged, when the Project is modelled. Modelling of the 1% AEP event indicates that the access road off Holbrook Road would be impacted if Paper Forest Creek overtops, creating a wide flow path from south to north. The development of a Flood Emergency Response Plan (FERP) would facilitate safe evacuation prior to inundation of the site.

Environmental impact	Impact
Aquatic	Threatened aquatic species assessments were undertaken for the Southern Pygmy Perch and the Lower Murray River Aquatic Endangered Ecological Community. The assessment determined the Project is not likely to significantly impact either of these species.
Soils and contamination	Results for the soil contamination sampling program were below the Limit of Reporting (LOR) for all analytes, except for some metals/metalloids and nutrients. Disturbance of site soils during construction activities are not likely to present a risk to human health or the environment under a commercial/industrial land use.
Land use compatibility	The Project Site is currently utilised for agricultural purposes, predominantly cropping. The relatively small operational BESS footprint would be sterilised from ongoing agricultural use but the surrounding land would benefit from improved site access and can continue to be farmed. No current exploration licences are present over the Involved Lands. Land use conflict risk assessments have been used to develop mitigation strategies to address risks to adjacent agricultural, residential, utility, mining and environmental land.
Social and economic	The social impact assessment has concluded that the perceived community division, procedural unfairness, and loss of rural identity that the community have identified may outweigh potential economic or infrastructure benefits at a local level, unless the project delivers tangible, equitable outcomes and adopts engagement practices that build trust and demonstrate genuine inclusion in decision-making. A series of strong recommendations regarding continued engagement, accommodation and employment and training from the assessment have been included as project commitments and aim to maximise the project benefits for the local community.
Non-Aboriginal heritage	The Project Site is not listed on any heritage register at a State or Local level and no items or structures of historical significance were encountered during the site visit or identified as likely to occur during the desktop assessment.
Resource use and waste	The impact from waste generation during construction on regional waste facilities has identified several recycling and reuse measures. It is critical that all waste stream end locations are identified prior to construction, and any limitations managed through a waste management plan. With the implementation of detailed plan, the impact is assessed to be minor.

Environmental impact	Impact
	Any spent batteries during operation would be recycled at a B-Cycle accredited, EPA permitted and licensed recycler of LFP batteries. Batteries would be handled, stored, and transported according to manufacturer's guidelines and the ADG Code.
Cumulative impacts	Several positive strategic cumulative impacts have been identified for the Project, including alignment with federal, state and local regional renewable energy and storage policies and land use plans. While most adverse cumulative impacts are best mitigated on a project-by-project basis, traffic and social impacts may be more significant and are more uncertain. They are also an area of particular interest to the local council and community. While the chance of overlap with other large projects cannot be known with certainty at this time, the period of overlap of peak construction traffic is not considered significant in terms of the ability of the local road network to handle this overlap. Cumulative traffic impacts will require more accurate data, closer to construction with regard to managing overlapping constructing schedules. Key negative cumulative impacts identified include potential impacts to property values, increased pressure on housing and accommodation, and consultation fatigue. An Accommodation and Employment Strategy is required prior to construction and will be central to managing the latter impacts.

8.5. Compliance and monitoring

All commitments and mitigation measures would be managed through the implementation of a Project Environmental Management Strategy (EMS). The EMS would comprise a Construction Environmental Management Plan (CEMP), an Operation Environmental Management Plan (OEMP) and a Decommissioning Environmental Management Plan (DEMP). These plans would be prepared sequentially, prior to each stage of works by the contractor (CEMP, DEMP) and Applicant (OEMP). Operating within these overarching plans will be a number of sub-plans, these are all included in Table 8-2.

The EMS would include performance indicators, timeframes, implementation and reporting responsibilities, communications protocols, a monitoring program, auditing and review arrangements, emergency responses, induction and training and complaint/dispute resolution procedures. A monitoring and auditing program would clearly identify any residual impacts following mitigation.

The plans would incorporate all of the specific protocols and mitigation measures contained in this EIS and any additional applicable requirements from the DPHI's Conditions of Consent. They would be submitted to DPHI for endorsement prior to commencement of works.

In addition to the Project specific management plans, in line with other State Significant Development consents, it is expected that the DPHI would condition the following in relation to this Project:

- Detailed plans of the final layout, showing comparison to the approved layout, prior to commencing construction.
- Incident and non-compliance notification requirements.
- Independent environmental audits.

Key plans identified in this EIS, and which would be prepared in consultation with relevant stakeholders are summarised in Table 8-2.

Table 8-2 Specific management plans required for the Mangoplah BESS project

Management plan	Project phase
Environmental Management System (EMS)	Prior to construction
Construction Environmental Management Plan (CEMP)	Prior to construction
Biodiversity Management Plan (BMP)	Prior to construction
Erosion and Sediment Control Plan (ESCP)	Prior to construction
Traffic Management Plan (TMP)	Prior to construction
Fire Safety Study (FSS)	Prior to construction
Fire Water Management Plan (FWMP)	Prior to construction
Emergency Response Plan (ERP)	Prior to construction
Flood Emergency Response Plan (FERP)	Prior to construction
Bush Fire Emergency Management and Operations Plan (BFEMOP)	Prior to construction
Landscape Management Plan (LMP)	Prior to construction
Noise Management Plan (NMP)	Prior to construction
Soil and Water Management Plan (SWMP)	Prior to construction
Community and Stakeholder Engagement Strategy (CSES)	Prior to construction
Accommodation and Employment Strategy (AES)	Prior to construction
Waste Management Plan (WMP)	Prior to construction
Operation Environmental Management Plan (OEMP)	Prior to commissioning

Management plan	Project phase
Decommissioning Environmental Management Plan (DEMP)	Prior to decommissioning
Revegetation and Rehabilitation Plan (RRP)	Prior to decommissioning
Decommissioning Waste Management Plan (DWMP)	Prior to decommissioning

8.6. Ecologically sustainable development – Conclusion

The Precautionary Principle

The Precautionary Principle states that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. This EIS has been prepared utilising the precautionary principle. That is, if threats are perceived as possibly leading to serious or irreversible environmental damage, then either the non–development of the Project would occur, or the development modified to ensure that such threats do not exist.

This EIS assesses the environmental and social impacts associated with the Project. A conservative approach was adopted for the assessments, which were often based on the worst-case scenarios. This has been the approach in relation to the recommended mitigation measures. No threat of serious or irreversible environmental damage is considered likely as a result of this Project. Section 0 and Section 7 detail the ongoing management measures to minimise environmental and social impacts.

Inter-generational equity

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. The Project would not impact on natural or cultural features to a level that would compromise the health, diversity or productivity of the environment to a level that would impact on future generations. Furthermore, this Project would provide stability and reliability to the renewable energy supply in the area. This would help facilitate the transition to low carbon energy generation and help to reduce greenhouse gas emissions to minimise climate change implications for future generations.

Conservation of biological diversity and ecological integrity

The Project would disturb areas of highly degraded agricultural land and previously disturbed remnant woodland. The assessment has identified that the works would not impact significantly on the biological diversity and ecological integrity of the locality. Furthermore, safeguards have been developed in assisting to protect aquatic habitats if required.

Iterations of the design of the Project, in particular the access road, has incorporated avoidance, minimisation and mitigation of impacts. Up to five hollow-bearing trees are proposed to be removed, with 20 to be retained through design.

Environmental management measures have been identified to reduce the severity of impacts of the Project on biodiversity. Impacts to native vegetation and habitat would be offset in accordance with the Biodiversity

Offset Scheme under the BC Act. This would ensure that improvements to biodiversity and conservation outcomes would be achieved.

Appropriate evaluation of environmental matters

The principle relates to giving monetary values to environmental resources. These matters ensure that the development would conform to the principles of ecologically sustainable development. Environmental matters were considered during the iterative design of this Project to ensure environmental impacts were avoided or minimised through design and / or mitigation measures.

Environmental management safeguards and mitigation measures will be implemented during the construction, operation and decommissioning of this Project that will ensure impacts are manageable.

8.7. Where to from here?

During the public exhibition of this EIS, the local community, local council and government agencies are invited to make informed submissions in relation to the Project. The consent authority will consider formal submissions made during the exhibition period, if relevant to the Project. The Applicant's response to all matters raised in submissions will also be exhibited as DPHI commence preparation of their own assessment of the Project's impacts and its merits and make a recommendation regarding its ability to be approved.

Furthermore, the local community is encouraged to take the opportunity to make a submission directly to the DPHI and to participate in the future engagement activities planned prior to the Project's determination.

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Appendix A Project SEARs

The following cross reference table is provided to demonstrate the EIS has addressed the Project-specific Secretary's Environmental Assessment Requirements (SEARs) issued for the Project.

Issue summary	Addressed in this EIS
The Environmental Impact Statement (EIS) for the development must meet the minimum form and content requirements in Part 8 of the Environmental Planning and Assessment Regulation 2021 (the Regulation) and must have regard to the *State Significant Development Guidelines*, and any relevant planning circulars. In particular, the EIS must include:	
• A stand-alone executive summary.	Provided following the table of contents
• A full description of the development, including: ○ details of construction, operation and decommissioning, including any staging of the development; ○ the Project Area (as per Table 1 of the SSD guidelines – preparing an environmental impact statement) and Development Footprint (disturbance area including but not limited to areas for infrastructure, road works, access tracks, defendable space, fencing and temporary ○ 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); ○ 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 ○ confirmation if the project is designated development in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the Regulation;	Descriptions and indicative designs provided in Section 3. Key Features map included as Figure 2-3. The Project is not designated development as it is classified as a State significant development. State significant development is excluded from designated development classification under Section 4.10 of the EP&A Act.
• consistency in information presented in the EIS and all technical reports, including distances, development footprint, project design and infrastructure proposed, construction time frames and receiver numbers;	Noted and checked
• a table of commitments including mitigation measures;	Consolidated mitigation measures are included in Section Appendix E

Issue summary	Addressed in this EIS
	lists all management commitments
• 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 existing land use, other proposed or approved energy facilities, major projects, rural/residential development, Crown lands within and adjacent to the project site and subdivision potential);	The project justification is included in Section 8. Potential land use conflict is assessed in Section 6.11.
• a risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment;	Section 0 and Section 7
• an assessment of the likely impacts of the development on the environment, and any other significant issues identified in this 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 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 *Cumulative Impact Assessment Guideline* (DPIE, 2022); ○ a description and assessment if staging of the project is proposed, including any site mobilisation or pre-construction 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 ○ a description of the measures that would be implemented to monitor and report on the environmental performance of the development;	Impact assessment chapters are included as Section 0 and Section 7 Monitoring and environmental compliance are covered in Section 8.5
• a consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS; and	A list of all management plans to be completed is included in Section 8.5, the summarised mitigation commitments of the EIS are included in Appendix E.

Issue summary	Addressed in this EIS

• a detailed evaluation of the merits of the project as a whole having regard to:
  ○ the requirements in Section 4.15 of the Environmental Planning and Assessment Act 1979 (EP&A Act), and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development;
  ○ the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses;
  ○ feasible alternatives to the development and its key components, including siting and project design alternatives to avoid areas of biodiversity value, opportunities for shared infrastructure with proposed developments in the region, and the consequences of not carrying out the development; and
  ○ 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.
	Principles of ecologically sustainable development are discussed in Section 8.6
	Site suitability, alternatives and consideration of the capability of the project to contribute to the security and reliability of the electricity system in the National Electricity Market are discussed in Section 8.2.

Capital Investment Value and Employment
• Provide the Estimated Development Cost (EDC) of the development prepared in accordance with the relevant planning circular using the Standard Form of EDC Report;
• Provide an estimate of the retained and new jobs that would be created during the construction and operational phases of the development, including details of the methodology to determine the figures provided;
• 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); and
  ○ a declaration from a Registered Environmental Assessment Practitioner that the EIS includes the information specified in the *Department's Registered Environmental Assessment Practitioner Guidelines*.
	EDC report supplied directly to DPHI.
	Job estimates are discussed in Section 3.4.4 and included in Section 5
	Landowner consents have been provided directly to DPHI.
	Registered Environmental Assessment Practitioner declaration is included following the table of contents.

Key Issues	
Biodiversity	
• an assessment of the biodiversity values, and the likely biodiversity impacts of the project in accordance with Section 7.9 of the Biodiversity Conservation Act 2016 (NSW) (BC Act), having regard to the Biodiversity Assessment Method (BAM) 2020 and documented in	Summarised in Section6.1. Appended in full, Appendix F.1

Issue summary	Addressed in this EIS
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 (SAII) 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 BCS and DPHI determine the proposed development is not likely to have any significant impact on biodiversity values • an aquatic ecological assessment in accordance with the Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (2013 update), including an assessment of the likely impacts on aquatic ecology of any Key Fish Habitat (if required) and an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the Fisheries Management Act 1994, and a description of the measures to minimise and rehabilitate impacts; • a cumulative impact assessment of biodiversity values in the region from nearby developments; and • if an offset is required, details of the measures proposed to address the offset obligations.	
Heritage	
• An Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (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 earthworks, construction works, and road works), and including results of archaeological test excavations (where required), undertaken in accordance with the relevant standards and requirements; • evidence of adequate and ongoing consultation with Aboriginal communities in determining and assessing impacts, identifying and selecting options for avoidance of Aboriginal cultural heritage and identifying appropriate and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage	Aboriginal cultural heritage summarised in Section 6.2 and appended in full in Appendix F.2 Historic heritage included in Section 7.1Non-Aboriginal heritage

Issue summary	Addressed in this EIS
Consultation Requirements for Proponents (DECCW, 2010) including the consultation process outlined within; and • assess the impact to historic heritage having regard to the *NSW Heritage Manual.*	
Land	

• 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;
• 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 erosion to occur; and
  ○ 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 in consultation with Council (if proposed);
  ○ completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industries Land Use Conflict Risk Assessment Guide; and
  ○ an assessment of impact on agricultural resources and agricultural production on the site and region; and
	Section 6.11 for Land use compatibility and LUCRA.
	Section 6.9 for soils and capability for rehabilitation with detailed assessment in Appendix F.10
	Section 6.8 for water resources and flooding Section 6.9 for soil survey
	Cumulative impacts, refer Section 7.3

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 of significant vistas and road corridors in the public domain; and • 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)	Summarised in Section 6.6. Appended in full, Appendix F.6
Noise	

Issue summary	Addressed in this EIS
Including: • an assessment of the construction noise impacts (including impacts from proposed road upgrades) of the development in accordance with the Interim Construction Noise Guideline (ICNG), operational noise impacts in accordance with the NSW Noise Policy for Industry (2017) and cumulative noise impacts (considering other developments in the area), including (where appropriate): ○ identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours; ○ details of noise monitoring survey, background noise levels and amenity noise levels at the most-affected residential receivers; ○ details of the likely daily charging/discharging load profile, manufacturer specifications for plant and equipment and a noise source inventory (including intensity, quantity, location, directivity and frequency information); ○ an assessment of 'worst case' noise emission scenarios during periods of charging and discharging; ○ consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area; and ○ 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.	Summarised in Section 6.7. Appended in full in Appendix F.7 Operational noise contours were deemed not necessary due to full compliance with zero operational exceedances
Transport	
• an assessment of the peak and average traffic generation, including over-dimensional vehicles/heavy vehicles requiring escort and construction worker transportation; • an assessment of the likely transport impacts to the site access route(s), site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance; • a cumulative impact assessment of traffic from nearby developments (including mining operations); and • provide details of measures to mitigate and / or manage potential impacts (developed in consultation with the relevant road authorities) ○ a schedule of all required road upgrades (including resulting from heavy vehicle and heavy vehicle requiring escort traffic haulage routes),	Summarised in Section 6.3. Appended in full in Appendix F.3

Issue summary	Addressed in this EIS
○ clear figures of proposed road upgrades (including the site access point), and ○ road maintenance contributions, and any other traffic control measures.	
Water	
• an assessment of the likely impacts of the development (including flooding and flood modelling) 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 • a site water balance for the development; • details of water requirements and supply arrangements for construction and operation (including consultation with suppliers); • a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with Managing Urban Stormwater: Soils & Construction (Landcom, 2004) and Managing Urban Stormwater: Soils and construction - Volume 2A manual (Landcom, 2008); • assessing the impacts of the development, including any changes to flood risk and overland flows on-site or off-site, and detail design solutions and operational procedures to mitigate flood risk where required; and • 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 (DPE, 2013); • 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 NSW Flood Risk Management Manual; ○ 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 Flood Impact and Risk Assessment – Flood Risk Management Guide LU01; and ○ detailed design solutions and operational procedures to mitigate flood risk where required.	Summarised in Section 6.8. Appended in full in Appendix F.8 A description of the erosion and sediment control measures that would be implemented is included in the measures of Section 6.9 Site water balance attached as Appendix G
Hazards	

Issue summary	Addressed in this EIS
Including: • Health – 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 International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields; • *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;* • Dangerous Goods - a preliminary risk screening completed in accordance with the State Environmental Planning Policy (Resilience and Hazards) 2021; and • Battery Energy Storage System - a Preliminary Hazard Analysis (PHA) prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment. 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 Hazardous Industry Advisory Paper No. 4, Risk Criteria for Land Use Safety Planning. The PHA must consider the effect of bushfires on batteries or other components of the BESS.	The PHA covers health and dangerous goods and is summarised in Section 6.4. Provided in full in Appendix F.4 Bushfire impacts are summarised in Section 6.5, and appended in full in Appendix F.5.
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 Social Impact Assessment Guideline (DPE, 2023), including consideration of any increase in demand for community infrastructure services, local workforce and consideration of construction workforce accommodation	Summarised in Section 6.12. Detailed assessment provided in Appendix F.12.
Economic	
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 Benefit Sharing Guideline 2024 and Private Agreement Guideline 2024.	Summarised in Section 6.12. Detailed assessment provided in Appendix F.12.
Waste	
• 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); and	Section 7.2 with WMP committed to as outlined in Section 8.5.

Issue summary	Addressed in this EIS
• provide a waste management plan (as appropriate).	
Plans and Documents	
The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Part 8 of the 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.	Provided throughout the EIS in the appropriate sections where required.
Legislation, Policies and Guidelines	
The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, 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	Applicable guidelines for each environmental parameter are stated in Sections 2 and 4.
Consultation	
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, relevant government agencies, including the relevant local Council. The EIS must: • detail how engagement undertaken was consistent with the *Undertaking Engagement Guidelines for State Significant Projects* (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.	Detailed in Section 5
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,	Noted.

Issue summary	Addressed in this EIS
please consult with the Planning Secretary 3 months prior to the expiry date.	

Appendix B Statutory Compliance table

B.1 Section 4.15 (1) of the EP&A Act

Matter	Section addressed
(a) the provisions of: (i) any environmental planning instrument, and (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and (iii) any development control plan, and (iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and (iv)the regulations (to the extent that they prescribe matters for the purposes of this paragraph),	(i) Section 4 (ii) Section 4 (iii) Not applicable to SSD's under the provisions of the Planning Systems SEPP (iiia) Section 2.4 (iv)Appendix B.2
(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,	Section 0 and Section 7
(c)the suitability of the site for the development,	Section 2 and Section 8
(d)any submissions made in accordance with this Act or the regulations,	Facilitated by public exhibition on the DPHI planning portal.
(e) the public interest.	Section 5 and the NSW SSD process.

B.2 Division 5 Environmental Planning and Assessment Regulation 2021

Matter	Section addressed
Section 190 Form of an environmental impact statement	
(1) An environmental impact statement must contain the following information— (a) the name, address and professional qualifications of the person who prepared the statement, (b) the name and address of the responsible person, (c) the address of the land— (i) to which the development application relates, or (ii) on which the activity or infrastructure to which the statement relates will be carried out, (d) a description of the development, activity or infrastructure, (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.	(a) REAP certification page (b) REAP certification page, Author Qualifications and Section 1.3 (c) Section 1.5.1 (d) Section 2.6 (e) Certification page
(2) The person preparing the statement must have regard to— (a) for State significant development—the State Significant Development Guidelines, or ~~(b) for State significant infrastructure—the State Significant Infrastructure Guidelines.~~	REAP certification page
(3) An environmental impact statement must also contain a declaration by a relevant person that— (a) the statement has been prepared in accordance with this Regulation, 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, and (d) for State significant development or State significant infrastructure—the statement contains the information required under the Registered Environmental Assessment Practitioner Guidelines.	REAP certification page

Matter	Section addressed
Section 191 Compliance with environmental assessment requirements	
The environmental impact statement must comply with the environmental assessment requirements notified under section 176 or the Act, section 5.16(4).	Appendix A
Section 192 Content of environmental impact statement	
(1) An environmental impact statement must contain the following— (a) a summary of the environmental impact statement, (b) a statement of the objectives of the development, activity or infrastructure, (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, (d) an analysis of the development, activity or infrastructure, including— (i) a full description of the development, activity or infrastructure, and (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 (iii) the likely impact on the environment of the development, activity or infrastructure, and (iv) a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment, and (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, (e) a compilation, in a single section of the environmental impact statement, of the measures referred to in paragraph (d)(iv),	(a) Executive summary (b) Section 1.2 (c) Section 2.3 (d) (i) Section 3 (ii) Section 3, Section 0 and Section 7. (iii) Section 0 and Section 7 (iv) Section 0 and Appendix E (v) Section 4. Section 8.4 and Appendix B (e) Appendix E (f) Section 2 and Section 8

Matter	Section addressed
(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.	

B.3 Statutory compliance list

Statute	Section addressed
Commonwealth statutes	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Section 4, Section 6.1 and Appendix F.1
Native Title Act 1993	Section 4
NSW statutes	
Environmental *Planning and Assessment Act 1979* (EP&A Act)	Section 3.1 and Section 4
Environmental Planning and Assessment Regulation 2021	Section 4
Environment Protection and Biodiversity Conservation Regulations 2000	Section 4 and Appendix F.1
Roads Act 1993 (Roads Act)	Section 4
Protection of the Environment Operations Act 1997 (POEO Act)	Section 4
Crown Lands Management Act 2016 (CLM Act)	Section 4
Conveyancing Act 1919	Section 4
Fisheries Management Act 1994 (FM Act)	Section 4
Heritage Act 1977	Section 4
National Parks and Wildlife Act 1974 (NPW Act)	Section 4

Statute	Section addressed
Rural Fires Act 1997	Section 4
Water Management Act 2000 (WM Act)	Section 4
Biodiversity Conservation Act 2016	Section 4 and Section 6.1
NSW planning policies and local provisions	
State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP)	Section 4
State Environmental Panning Policy (Transport and Infrastructure) 2021 (TISEPP),	Section 4, Section 6.5 and Appendix F.5
State Environmental Planning Policy (Resilience and Hazards) 2021	Section 4, Section 7.1 and Appendix F.7
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Section 4, Section 6.1 and Appendix F.1
State Environmental Planning Policy (Primary Production and Rural Development) 2021	Section 4, Section 6.9 and Appendix F.6
Wagga Wagga Local Environmental Plan 2010	Section 4

Appendix C Community engagement strategy

Appendix D Community Engagement Summary Report

Appendix E Consolidated mitigation measures

Mitigation number	Mitigation measure	Project Stage
Biodiversity		

B01	A Biodiversity Management Plan (BMP) would be prepared prior to construction to include all recommendations of the BDAR. It will include but not be limited to:
	• Unexpected Threatened Species Finds Procedure will include:
	  ○ Stop work procedures, where relevant
	  ○ Further surveys to delineate the population
	  ○ AoS or liaison with appropriate agencies.
	• Implementation of hygiene protocols for plant and equipment entering and exiting the construction site.
	• Management of wastewater to the receiving environment
	• Clear physical demarcation of the boundary between areas to be retained and areas slated for clearing
	• Waste Management protocols
	• Weed and pathogen management plan and protocols
	• Clearing limits (refer Appendix F.1)
	Trained ecologist on site during clearing events
		All Stages

B02	As part of the overall Environmental Management System (EMS) to ensure protection of waterways: Preparation of a Stormwater Management Plan (SWMP) and Erosion Sediment Control Plan (ESCP) in accordance with the ‘Blue book’ (Landcom, 2004).	Prior to construction
B03	Adaptive management strategy to prevent trampling of unexpected threatened flora.	All Stages

Mitigation number	Mitigation measure	Project Stage
	• All plans will be progressively reviewed and updated throughout all stages All adaptive management strategy plans including the BMP will form part of an overall Environmental management strategy.	
B04	Retire the offsets as calculated by the BDAR in accordance with the Biodiversity Offsets Scheme	Prior to construction
Aboriginal heritage		
AH1	The Environment Management System (EMS) would incorporate safeguards and mitigation relevant to Aboriginal heritage, including an unexpected finds protocol for Aboriginal objects (refer Appendix B1, of Appendix F.2 Aboriginal heritage should also be included in any induction for the Project.	All stages
AH2	The works must avoid the modified tree site MBESS CMT1 which is located approximately 45m north of the Project Site. A minimum 10m buffer is required to ensure no inadvertent harm occurs to this Aboriginal site. As this site is outside the Project Site and on private property no long-term management or monitoring of this site is required as part of the Project.	All stages
AH3	If complete avoidance to any of the valid Aboriginal sites with stone artefacts recorded within the Project Site (MBESS AS1, MBESS AS2, MBESS IF1 and MBESS IF2) is not possible, a reasonable attempt to relocate and collect the surface stone artefacts as part of a surface collection salvage program must occur within the approved development footprint at each of these recorded locations. Until surface collection salvage has occurred a minimum 5m buffer must be observed around MBESS AS1, MBESS AS2, MBESS IF1 and MBESS IF2 for construction activities.	Prior to construction
AH4	The collection of the surface stone artefacts within the approved Development Footprint should be undertaken by an	Prior to construction

Mitigation number	Mitigation measure	Project Stage
	archaeologist with representatives of the RAPs, as selected by the Applicant. Once the stone artefacts have been salvaged from within the Development Footprint these artefacts should be relocated to one of the proposed reburial locations and the reburial must be consistent with Requirement 26 of *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* and/or the wishes of the RAPs. The relocation area must not be subject to any future ground disturbance and must be registered on the AHIMS database.	
AH5	An Aboriginal Site Impact Recording Form (ASIRF) must be completed and submitted to AHIMS following harm for each site collected or destroyed from salvage and/or construction works.	All stages
AH6	The Applicant should prepare a Cultural Heritage Management Plan (CHMP) to detail the address the potential for finding additional Aboriginal artefacts and objects during the construction of the Project. The CHMP should include at a minimum the following items: • Address salvage requirements including a methodology for surface collection (provided in Appendix C of Appendix F.2) for Aboriginal heritage within the development footprint • Ongoing consultation requirements • An unexpected finds procedure to manage any objects suspected to be Aboriginal in origin during the construction, maintenance, operational and decommissioning works (Appendix D of Appendix F.2) • Detail the protection of Aboriginal heritage outside the development footprint (MBESS CMT1) and Include requirements for heritage to be included as part of the site inductions and note that all employees • Contractors and utility staff working on site will receive Aboriginal Cultural Heritage Awareness Training in the form of an induction before they begin work on site. Preparation of the CHMP should be undertaken in consultation with the RAPs.	Prior to construction
AH7	If unexpected Aboriginal objects are identified during works the relocation of the objects should be undertaken by a qualified archaeologist with a representative of the RAPs, as selected by the Proponent/Project Owner, and be consistent with Requirement 26 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*. The relocation area must be within the Subject Lots in an area that will not be disturbed into the future. If an alternative	All stages

Mitigation number	Mitigation measure	Project Stage
	relocation area outside the Subject Lots for the Project is required due to unforeseeable reasons, additional consultation with the RAPs must occur.	
AH8	In the unlikely event that human remains are discovered during the development works, all work must cease in the immediate vicinity and the unexpected find protocol followed. The local NSW police must be notified. Further assessment would be undertaken to determine if the remains were ancestral Aboriginal or not. In the event that any remains are determined to be ancestral Aboriginal in origin Heritage NSW must be notified.	All stages
AH9	Further archaeological assessment would be required if the proposed development activity extends beyond the areas assessed. This would include consultation with the RAPs and may include further field survey.	All stages
Access and traffic		
TA1	A Traffic Management Plan will be developed to minimise the impact of construction traffic and would include: • Neighbours of the Project to be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access • Heavy vehicles will avoid travel during peak bus operating times to limit the interaction of larger vehicles and vulnerable road users • Requirement for site specific TMP's that include appropriate safety signage manage traffic and guide road users including regulatory signs that dictate rules and restrictions, warning signs alerting to potential hazards, guide signs for navigation, and temporary signs for events or road works. • Any OSOM vehicle trips be timed so they do not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network, which can be undertaken as part of the permit application.	Prior to construction
TA2	Implement a community information and awareness program to inform the community of traffic disruptions. This would include;	All stages

Mitigation number	Mitigation measure	Project Stage
	• Press releases in local newspapers. • Specific emails, newsletters and individual letter drops to neighbouring residents along the access route to the Project. • Provision of a website providing details of the status of works and contact details for complaints or enquiries. • Provide key contact personnel and contact details, including out of hours contact information to residents, schools, public activities and business operating alongside the local route. • Neighbours of the Project would be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.	
TA3	On-site mitigation measures would be included in the TMP and would include • On-site speed restrictions • Dust suppression • Loading and unloading would occur within the work area, not on streets or roads • All vehicles associated with the Project would park onsite • Carparking and loading areas to be designed in accordance with the relevant Australian standards.	All stages
TA4	Driver Protocols would be included in the TMP and would include • All vehicles would enter and exit the site in a forward direction • Heavy vehicles will avoid peak school bus times • Safety initiatives to minimise risk and disruption to residential and or school bus zones would be implemented • Vehicles would only utilise designated transport routes • Construction vehicle movements are to abide by finalised heavy vehicles schedules as agreed and permitted by the relevant authorities. • All permits for working within the road reserve must be received from the relevant authority prior to works commencing.	All stages

Mitigation number	Mitigation measure	Project Stage
TA5	Schedule of road upgrades would be included in the TMP and would • Construction of BAR/BAL at site access prior to construction commencing	All stages
Hazards – PHA		
HZ1	The results of the PHA should be incorporated as inputs into other safety studies, such as: • Fire safety study (FSS) • Emergency response plan • Bush Fire Emergency Management and Operations Plan.	All stages
HZ2	APZs to be maintained in accordance with Appendix 4 of PBP for the life of the Project	All stages
HZ3	The detailed design of the BESS will comply with the requirements of Sections 3.2 of the PHA, including separation distances, UL9540A test reports and OEM recommendations.	Design
HZ4	Dangerous or hazardous materials shall be stored and handled in accordance with AS1940-2004: The storage and handling of flammable and combustible liquids.	Construction Decommissioning
HZ5	All recommendations from the Victorian Big Battery Fire Statement of Technical Findings – Victorian Government 2021 will be implemented.	Design
Hazards – Bushfire		
BF1	Dangerous or hazardous materials shall be stored and handled in accordance with AS1940-2004: *The storage and*	Construction

Mitigation number	Mitigation measure	Project Stage
	handling of flammable and combustible liquids.	Operation Decommissioning
BF2	Develop a Bushfire Emergency Management and Operations Plan in consultation with NSWRFS and FRNSW to include but not be limited to: • Detailed measures to prevent or mitigate fires igniting • Construction work that should not be carried out during total fire bans • Availability of fire-suppression equipment, access and water • Storage and maintenance of fuels and other flammable materials • Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate • Appropriate bush fire emergency management planning. • Provide a defendable space ○ An APZ of minimum 11m will be maintained between remnant or planted woody vegetation and the BESS and ancillary infrastructure. • Manage grass height within the APZ at or below 5cm throughout fire season (October to April) • Average grass height outside the APZ will be maintained at 10cm or below throughout the fires season. • Non-combustible 100kL water storage tank/s should be installed adjoining the main internal access road, or nearby the BESS, for fire-fighting and other non-potable water uses. The final location/s and volume of water tanks will be determined in agreement with NSW RFS and FRNSW recommendations • Provided a contact point for the BESS to the NSW RFS and FRNSW during construction and operation. • Protocols to manage activities in bushfire danger weather, including Total Fire Ban days, will be developed. • Preparation of a specific Battery Fire Response Plan, under the general BFEMOP, in consultation with fire authorities, fire suppression experts and in reference to relevant standards and guidelines.	Construction Operation Decommissioning

Mitigation number	Mitigation measure	Project Stage
BF3	Appropriate fire-fighting equipment will be held on site to respond to any fires that may occur at the site during construction. This equipment will include fire extinguishers, a 1000 litre water cart (fitted with suitable hosing, fittings and diesel firefighting pump) retained on site on a precautionary basis. Finalised equipment lists would be detailed in Work Method Statements.	Construction
BF4	Following commissioning of the BESS, the local NSW RFS and Fire and Rescue brigades will be invited to an information and orientation day covering access, infrastructure, firefighting resources on-site, fire control strategies and risks/hazards at the site	Operation
BF5	The access track will comply with the requirements of property access roads in accordance with Table 5.3b of the PBP. All access and egress tracks on the site would be maintained and kept free of parked vehicles to enable rapid response for firefighting crews and to avoid entrapment of staff in the case of bush fire emergencies.	Construction Operation Decommissioning
BF6	A Hot Works Permit system shall be applied to ensure that adequate safety measures are in place. Fire extinguishers would be present during all hot works. Where practicable hot works would be carried out in specific safe areas (such as the Construction Compound temporary workshop areas).	Construction Operation Decommissioning
BF7	Prior to operation of the BESS, an Emergency Response Plan (ERP) will be prepared in consultation with the RFS and FRNSW. This plan must include but not be limited to: • Specifically addresses foreseeable onsite and off-site fire events and other emergency incidents. • Risk control measures would include the level of personal protective clothing required to be worn, the minimum level of respiratory protection required, decontamination procedures, minimum evacuation zone distances and a safe method of shutting down and isolating the system (either in its entirety or partially, as determined by risk assessment). • Outline other risk control measures that may need to be implemented in a fire emergency due to any unique	All stages

Mitigation number	Mitigation measure	Project Stage
	hazards specific to the site. • Two copies of the ERP are stored in a prominent 'Emergency Information Cabinet' which is located in a position directly adjacent to the site's main entry point. Once constructed and prior to operation, the operator of the facility will contact the relevant local emergency management committee.	
BF8	BESS design would consider the following: • Locating the BESS as far as practicable from any sensitive receptors or large stands of vegetation. • Installing reliable automated monitoring (voltage and temperature), alarm and shutdown response systems. • Installing reliable integrated fire detection systems • Ensuring the battery containers are not vulnerable to external heat effects in the event of a bush fire. • Designing appropriate separation and isolation between battery containers and between batteries and other infrastructure, including gravel surfacing around the facility for a minimum 11m in accordance with APZ. • Compliance with all relevant guidelines and standards. Facilitation of first responder training in the management of LFP battery fires at the site for local brigades.	Design
Landscape and visual amenity		
VA1	Building design • Consider use of materials that integrate with the surrounding landscape Where practicable use suitable colours and finishes for project infrastructure to minimise visual impacts	Design
VA2	Dark Sky Planning guidelines and national light Pollution Guidelines for Wildlife will be considered during detailed design Cut off and direct light fittings (or similar technologies would be used where appropriate to minimise glare and light spill	Design

Mitigation number	Mitigation measure	Project Stage
	onto private property.	
VA3	Landscaping will be installed in accordance with the conceptual landscape plan, including screen planting along the west of the BESS facility. The final location and extent of landscaping will be determined during detailed design. During detailed design would consider the key principals: • Planting should remain in keeping with existing landscape character • Species selection is to be typical of the area • Planting layout should avoid screening views of the broader landscape • Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation Allow native vegetation to regrow over any areas of disturbance	Design
Noise and vibration		
NV1	Establish a complaints procedure including signage and other means to advertise the contact number regarding complaints. Respond to complaints in a timely manner and keep relevant parties informed of progress.	All stages
NV2	For construction works conducted within close proximity to the dwelling/building of Receiver R4, potential noise exceedances to this receiver would be managed by implementing time restrictions and/or providing periods of repose for residents, where feasible and reasonable.	During construction
NV3	The following noise management measures should be considered as part of a Noise Management Plan. • Plant and equipment should be properly maintained • Avoid any unnecessary noise when carrying out manual operations and when operating plant • Any equipment not in use for extended periods during construction work should be switched off. • Good relations with people living and working in the vicinity of a construction site should be established at the	Prior to and during construction

Mitigation number	Mitigation measure	Project Stage
	beginning of a project and be maintained throughout the project • Keep people informed of progress and take complaints seriously The person selected to liaise with the community should be adequately trained and experienced in such matters.	
Water use and flooding		
W1	Increase levels to maintain adequate freeboard of BESS infrastructure to ensure the site is constructed above the 1% AEP event to reduce risk from flooding.	All stages.
W2	Develop Flood Emergency Response Plan (FERP).	Prior to construction
W3	A Fire Water Management Procedure would be included within the Emergency Response Plan in accordance with applicable Australian Standards for handling hazardous materials and EPA regulations.	Design
W4	Erosion and sediment control measures will be implemented to mitigate any impact in accordance with Landcom's Managing Uran Stormwater: Soils & Construction (NSW OEH, 2004) including for water access at any location.	Prior to construction Construction
W5	All staff would be appropriately trained in the minimisation and management of accidental spills.	All stages.
W6	The refuelling of plant and machinery would be undertaken in impervious bunded areas on hardstand areas only.	All stages
W7	Machinery would be checked daily to ensure there is no oil, fuel or other liquids leaking from the machinery. All staff would be appropriately trained through toolbox talks for the minimisation and management of accidental spills.	Construction Operation
W8	An incident management procedure to address any spills and pollution incidents will be developed and implemented.	All stages

Mitigation number	Mitigation measure	Project Stage
	The procedure would be incorporated into the Construction and Operation Environmental Management Plans and include a requirement to notify EPA for incidents that cause material harm to the environment (refer s147-153 Protection of the Environment Operations Act).	
W9	Prior to construction, access to a RWCC filling station will be obtained. The Project will adhere to any rules and regulations.	Prior to construction Construction Operation
W10	Ensure appropriate drainage controls and hydrology are incorporated into the design to minimise the area of disturbance, runoff and pollutant generation. This would include consideration of water used during and emergency fire event, and road/culvert design.	Design
Aquatic		
A1	Protection shall be provided for the works in the vicinity of waterways to minimise runoff from construction into these waterways and waterbodies	Construction
A2	Work would not occur during high rainfall events and flooding	Prior to construction Construction
A3	Mitigation measures described in Section 6.10 (Soils and Contamination) regarding potential pollution and contamination would be implemented through the Erosion and Sediment Control and Soil and Water Management Plans	Prior to construction Construction
Soils and contamination		

Mitigation number	Mitigation measure	Project Stage
SC1	Progressive and adaptive Erosion and Sediment Control Plans (ESCP) and Soil and Water Management Plan (SWMP) will be prepared for the Project in accordance with Landcom Soils and Construction: Managing Urban Stormwater (Landcom, 2004) and include, but not be limited to: • Minimising the extent and duration of ground disturbance • Progressive rehabilitation of disturbed areas • Stockpile management of topsoil to prevent soil structural decline. Topsoil will be stripped and stockpiled separately. Stockpiles will be stabilised with a groundcover (i.e. geotextile or similar) if stockpiling is required for more than six weeks • Spill Response Procedure • Unexpected Finds Procedure, for contaminated soil Maintain at least 70% groundcover where applicable throughout the site during operation to reduce the risk of erosion	All stages
SC2	A comprehensive agronomic nutrient soil survey sampling and analysis prior to construction to establish a baseline nutrient data set would be undertaken to: • Support rehabilitation of the Project Site land to Class 4 stable, non-polluting, productive land on decommissioning. Support preparation of the vegetative screening area to provide a growing environment which is conducive to achieving a successful vegetative screen.	Prior to construction Decommissioning
SC3	A Revegetation and Rehabilitation Plan for decommissioning will be prepared and include stabilisation and topsoil amelioration (e.g., incorporation of organic matter to improve soil structure or gypsum to improve structure, reduce hard-setting surfaces and reduce soil dispersion).	Decommissioning
SC4	Avoid altering the groundwater and surface water regime to prevent mobilisation of any salt stores, however low, in the soil.	All phases

Mitigation number	Mitigation measure	Project Stage
SC5	Reference the soil survey results (this document), Australian Soil and Land Survey Handbook (CSIRO, 2009), Guidelines for Surveying Soil and Land Resources (CSIRO, 2008) and the Land and Soil Capability Assessment Scheme: second approximation (NSW OEH, 2012) when returning the site to the BESS farmland capability	Decommissioning
SC6	An Unexpected Finds Procedure should be developed and implemented, should contaminated material be identified onsite during the construction program.	Construction
SC7	A post decommissioning PSI with supplementary soil testing would be undertaken within the BESS Facility, with recommendation to a detailed site investigation if required. This would occur prior to significant soil disturbance.	Decommissioning
Land use compatibility		
LU1	A Revegetation and Rehabilitation Plan is to be prepared in consultation with NSW Department of Primary Industries prior to decommissioning to return the land to safe stable non-polluting productive state.	Decommissioning
LU2	All above ground and below ground cabling and infrastructure would be removed.	Decommissioning
LU3	An agronomic soil survey would be undertaken prior to construction and post decommissioning to inform soil nutrient amelioration prior to revegetation.	Decommissioning
LU4	Land forming would return the site to the pre-existing slope and flat features suitable for agricultural purposes	Decommissioning
Social and economic		
SIA1	Community and Stakeholder Engagement Strategy would be prepared. The following key engagement needs that have been identified for stakeholder and community engagement in the upcoming phases of the Project would be included	Prior to construction

Mitigation number	Mitigation measure	Project Stage
	in the strategy: • Ensure open, transparent, timely, and accessible communication of Project information to reduce uncertainty and address community concerns. • Proactively address both real and perceived concerns about potential amenity and safety impacts, including traffic, noise, visual changes, and environmental impacts. • Maintain regular engagement with local councils, particularly during the construction phase, to monitor, discuss, and adaptively respond to emerging concerns from the community and local businesses. • Develop accessible and responsive grievance and remedy mechanisms to ensure that community concerns and complaints are handled appropriately and fairly. • Clearly communicate accommodation arrangements for construction workforces. • Establish a Community Benefit Sharing Program (CBSP) that could be implemented through the VPA, ensuring these initiatives offer ongoing opportunities for meaningful community involvement and decision-making. • Provide robust engagement with the community to address and alleviate concerns based on perception as well as technical realities. • Collaborate with local councils and relevant regional stakeholders to support initiatives that promote regional economic and social development. Engage economic development agencies to share and promote the Project's positive outcomes, showcasing the renewable energy industry's contribution to the region.	
SIA2	An Accommodation and Employment Strategy (AES) would be prepared. To mitigate potential impacts on housing and accommodation within the Project's social locality, it is recommended that the AES be developed in consultation with local Councils and key stakeholders. The AES should: • Propose measures to ensure an adequate supply and availability of accommodation for both construction and	Prior to construction

Mitigation number	Mitigation measure	Project Stage
	operational workforces. • Prioritise accommodation options that minimise adverse social impacts on local communities, particularly those related to housing affordability and availability for existing residents. • Collaborate with the Council and local stakeholders to undertake an inventory of under-utilised buildings that could be repurposed as temporary workforce accommodation. • Facilitate the employment of local residents wherever feasible, including through the use of locally registered contractors who may already employ a local workforce. This approach can reduce the need for importing labour and minimise accommodation pressure. • Engage with education and training providers such as TAFE to identify local skills gaps and sponsor upskilling or certification programs aligned with Project workforce needs, contributing to regional capacity building. • Develop and implement workforce behaviour and safety policies, including clear expectations for conduct while in transit, on-site, in accommodation, and when interacting with local communities. Where possible, coordinate with community liaison officers or representatives from other renewable energy or major infrastructure projects in the region to ensure a harmonised approach to workforce management and minimise cumulative impacts on local housing, services, and businesses.	
SIA3	A Community Benefit Sharing Program (CBSP) implemented as part of the Voluntary Planning Agreement (VPA) would be prepared with the aim to maximise benefits for local community members throughout the Project lifecycle. The Applicant has committed to entering into a VPA for the Project with the Council. The CPSP will: • Ensure initiatives offer ongoing opportunities for meaningful community involvement and decision-making. • Include representation from Traditional Owners and other key local Aboriginal stakeholders to uphold inclusive and culturally respectful engagement. In addition to the CBSP, the Applicant will explore opportunities to support local initiatives through community	Prior to construction

Mitigation number	Mitigation measure	Project Stage
	sponsorships. To ensure that both the CBSP and community sponsorships deliver meaningful and lasting impact, the Applicant could: • Continue to consult with local communities to identify needs and priorities and tailor CBSP initiatives accordingly over the life of the Project. Collaborate with other renewable energy developers and industry stakeholders to ensure coordination and complementarity of benefit programs across the region, reducing the risk of duplication and improving effectiveness.	
Non-aboriginal heritage		
NAH1	Should an item of historic heritage be identified, the Heritage NSW would be contacted prior to further work being carried out in the vicinity in accordance with the Non-Aboriginal Heritage unexpected finds procedure in the EIS.	All Stages
Resource use and waste generation		
RW1	A Waste Management Plan (WMP) would be developed in consultation with Council to minimise waste, including: • Identification of opportunities to avoid, reuse and recycle, in accordance with the waste hierarchy. • Quantification and classification of all waste streams. • Confirmation and evidence of waste management agreements with waste facilities prior to the disposal of any waste product. • Defining appropriate lines of communication for each waste stream so any restrictions can be identified. • Provision for recycling management on-site. • Provision of toilet facilities for on-site workers and identify that sullage would be disposed of (i.e., pump out to local sewage treatment plant). • Tracking of all waste leaving the site. • Disposal of waste at licenced facilities permitted to accept the waste.	Construction and operation

Mitigation number	Mitigation measure	Project Stage
	Requirements for hauling waste (such as covered loads).	
RW2	A septic waste management system would be installed and operated according to the Wagga Wagga City Council regulations.	Construction Operation
RW3	Where possible, waste would be removed on a daily basis, or as soon as reasonably practical, to maintain the Development Footprint being litter free.	Construction
RW4	LFP batteries would be kept, stored, managed and transported according to manufacturer's instructions and the ADG Code. Any spent batteries would be recycled at a B-Cycle accredited, EPA permitted and licensed recycler of LFP batteries.	Construction Operation Decommissioning
RW5	Develop a Decommissioning Waste Management Plan, when the project is planned for decommissioning.	Decommissioning

Appendix F Specialist reports

F.1 Biodiversity Development Assessment Report (BDAR)

F.2 Aboriginal Cultural Heritage Assessment (ACHA)

F.3 Traffic Impact Assessment (TIA)

F.4 Preliminary Hazard Analysis (PHA)

F.5 Bushfire Assessment Report (BFAR)

F.6 Landscape Character and Visual Impact Assessment (LCVIA)

F.7 Construction & Operation Noise and Vibration Assessment (CONVA)

F.8 Flood Impact Assessment (FIA)

F.9 Aquatic Assessment of Significance (AAoS)

F.10 Soil Technical Report

F.11 Preliminary Site Investigation (PSI)

F.12 Social Impact Assessment (SIA)

Appendix G Site water balance

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